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One of the Educational Journals of the Second Constitutional Era The: “Talebe: Yeni Mektep” Journal and Women's Education

Dilek ÜNVEREN¹ Muhammed İN²

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Abstract:

This study aims to examine the views on women's education in that era and the contribution of the periodical, Talebe: Yeni Mektep, first published in the early years of the Second Constitutional Era, to the educational life of the period. Talebe: Yeni Mektep Journal is a journal that pursued the purpose of serving education and teaching, but its publication life was brief. The publication frequency of the journal, which was launched in the press world on February 1, 1327 at the İzmir Şemseddin Printing House, was set to every fifteen days. The subscription fee was fifteen cents (kuruş) and the price of one issue was thirty para. The owner and editor-in-chief of the journal was Mehmet Sırrı (SANLI); the responsible director was Faik Şemseddin Efendi. The journal's publication policy aims to make a significant contribution to every stage of student life, with the help of teachers and directors. The journal, which generally provides information about the education policies of the Second Constitutional Era, also includes a comparative analysis of the old and new education systems. This study aimed to examine and evaluate the contribution of the journal Talebe: Yeni Mektep to the educational life of that period and evaluate articles related to women's education.

Keywords:

Education of History, Women's Education, Education in Second Constitutional Period, National Education

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INTRODUCTION

After the declaration of the Second Constitution of the Ottoman Empire, printing houses that had been silent for years all over the the Ottoman Empire began operations. The censorship that had been applied to the press for a long time was removed. Additionally, many short-term and long-term publications started to circulate. Journals covering many topics, from politics to economics, philosophy to education, and social life, were published and included articles on various subjects. The subject of this study, Talebe: Yeni Mektep Journal, also began publication in İzmir in February 1327 (1911). However, the journal ended its publication life after the publication of its third issue on March 1, 1328, without publishing any farewell letter. Therefore, our study focused on the three published issues of the journal. Mehmet Sırrı Bey, the chief writer of the journal, is identified as an educator, theater artist, and writer. The journal, which was published aimed to benefit every stage of the student's life with the contributions of managers and teachers, published stories, articles and scientific news on the theme of education and training in each issue. This journal, published during the Balkan War years, is an important publication in terms of showing the importance the intellectuals of the period gave to education and women's education, even during the war. Therefore, this study's contribution is considered important to the literature. In the journals published during this period, topics such as child education and women's education were examined by intellectuals. The articles published in the important journals of the period, such as Terbiye journal, Terbiye ve tedrisat journal, Yeni fikir, and Yeni journal, are the most concrete evidence of this. Research has been conducted on these journals, but no study has explored on the Talebe: Yeni Mektep journal, which is the subject of our study. Therefore, it is important to examine the articles of this original journal on education by translating them into Latin letters and making them available to researchers in the history of education through this research. In this context, the first part of the study describes the founding staff and purpose of the journal, and provides information about its formal features, publication period, and price. In the second part, a brief review of the journal's content and articles is provided, and three issues of the journal are subjected to an index analysis. As a journal dedicated to the field of education, the third section evaluates its articles, with a special emphasis on those related to women's education, focusing on education and women's thought during the Second Constitutional Era.

METHOD

This study aims to examine the contribution of the journal *Talebe: Yeni Mektep*, which was first published in the early years of the Second Constitutional Era, to the educational life of the period, and its views on women's education. For this purpose, articles and stories published in the journal especially on education and women's education were transcribed. The document analysis method was used in the study. Document analysis is a methodological and systematic examination of electronic or printed documents. It is a preferred method, especially in the examination of historical sources (Bowen, 2009, p.29).

The Founding Staff and Purpose of the *Talebe: Yeni Mektep* Journal

Yeni Mektep Journal, which was first published on February 1, 1327 (1911), by Mehmet Sırrı (Sanlı) Bey, one of the important figures in the history of Izmir press. Mehmet Sırrı Bey is among the important figures of the Izmir press history. Born to a curious, researching and learning loving mother, Sırrı Bey's father Ali Bey was a merchant. It is reported by family members that the family's roots are in Konya and that they migrated to the island of Chios from there. Sırrı Bey was also born on the island of Chios in 1884. After completing his primary and secondary education there, he went to Izmir and completed his high school education at Izmir High School. Therefore, he first came to Izmir during these times and could add his name to the list of the important intellectuals of this city. Mehmet Sırrı, who stands out with his identity as a writer and educator, practiced the profession of teaching in Izmir during the Second Constitutional Era. He aimed to publish a school journal by drawing inspiration from the experiences he had in his professional life. The first journal Mehmet Sırrı published in Izmir was *the Talebe: Yeni Mektep* journal (Aktas, 1991).

The responsible director of the journal was Faik Şemseddin, who would become famous in Izmir with his historical novels in the following years, and his draftsmen were Şefik Şemseddin and Bahaddin Bey. The annual subscription fee for the journal, which was published every fifteen days by its founding staff, was fifteen cents, and a copy was thirty cents. Its office was the Şemseddin Printing House in Izmir (Talebe, 1911).

The journal *Talebe* began its publication with the aim of making a serious contribution to every stage of education during the Second Constitutional Era with the support of school administrators and teachers. The content of the journal consists

of education, exams, competitions for teachers of literature, Turkish, history, geography, health, calculation, algebra, gymnastics, painting, music; in short, all industrial and mathematical sciences (Talebe, 1911). The journal tries to explain scientific issues that are difficult for an ordinary citizen and a student to understand, in a simple, clear, and understandable way. In addition, its aim is to give a friendly and warm face to science and to create a modern society that is aware of scientific developments and reaches every level of education. Additionally, the journal aims to serve the children who are deprived of learning environments and schools, and the village teachers who are deprived of following new scientific developments due to the difficulties of transportation. In addition, it considers it a great duty to inform readers about all kinds of science and the latest stages of industrial discoveries, accompanied by perfect pictures (Talebe, 1911). However, it can be easily inferred by the readers that the main purpose of the authors was to assist students and their families in achieving the students to a level where they can compete with advanced civilizations in terms of ideas and morals. It is understood that the main purpose of the journal is so that readers can communicate the information they will get from the journal to others in oral and written form, to raise the new generation of teachers and writers.

Content Review and Index of the Journal

Style of the Journal

The style of the journal targets both academic education and the public. The journal includes clear, understandable, and detailed articles. In addition, there are stories, riddles and educational humor that can be easily understood by anyone who can read and write. In addition, a nationalist style is striking in the journal. The most concrete example of this is that the first issue begins with the *Alsancak* poem under a large Turkish flag on the cover page.

Content Review

The journal, whose first issue was published in February 327, opened with the poem *Alsancak* (Koyuncu, 1911, p. 1) by poet Akil Koyuncu. This poem, which is themed around love of the flag and national feelings, shows the importance placed on the idea of nationalism by the journal. Following this, the poem titled *Güneşe* (Haşim, 1911, p. 2) by the poet Ahmet Haşim is featured on the second page. The founder of the journal, Mehmet Sırrı Bey, greets his readers with a story titled *Siyah Güller* on the fourth page of this issue. This story criticizes the education system for its reliance on rote learning. The violence suffered by a student who challenges their teacher's explanations with questions is narrated and argued that violence in education does

not provide discipline. The narrative indicates that students who are subjected to violence by their teachers become estranged from education, and as a metaphor, where they are hit, black roses grow. The journal's responsible manager, Faik Şemseddin, meets the readers with an article titled Şöhret Yolunu Buluncaya Kadar Edison (Şemseddin, 1911, p.5). This article tells us that Edison, a famous scientist, was born into a difficult environment and was saved from a miserable life thanks to his intelligence and aptitude for science. It is stated that Edison, who invented the phonograph, found his way to fame after the exhibition held at the Paris Academy of Sciences. The author emphasizes that Edison was still alive when the article was written. In short, an individual who follows the path of science and technology contributes to the development of both their own life, and their country. As a result, a strong society is constructed from strong individuals, and the peace and prosperity of development is enjoyed through overcoming the misery of backwardness.

In the History of the Scientific Committee (Şükrü, 1911, p.9), written by the mathematics teacher Mehmet Şükrü, famous scientists such as Copernicus and Edison, and the works they contributed, are mentioned. In this issue, Mehmet Sirri Bey, in addition to the Black Roses story, wrote an article titled School and Family (Sirri, 1911, p.14). On the last page of the first issue, there are wise sayings from famous writers in the column titled Deep Ideas. For example, Tolstoy's words "Those who do not understand life are afraid of death" (Talebe, 1911, p.11) are included. In another column of the last page, there is "Mektebi Latifeler" (Talebe, 1911, p.19). There are humorous articles about education under this title. In the first story under this title, the teacher asks the student, "Son, why don't you study civilized knowledge anymore?" The student replies, "Sir, when I heard that Italy is also among the civilized states, I became estranged not only from the lessons but also from the word civilization." During the time period in question, Italy and the Ottoman Empire were at war. For this reason, Italians were criticized in the journal through this article, and it seems that the authors tried to influence the readers accordingly.

The journal greets its readers with a picture of the poet Ahmet Haşim on the cover page of the second issue published on February 15. The first page of this issue includes a poem by Ahmet Haşim titled My Home. The preface of the second issue includes a letter dedicated to the director of the journal, from the readers. This letter explains that it was unfortunate for the people that no journal had been published for the development of the school until now. However, this sadness become history with the publication of the journal, Talebe, as a result of the efforts of the founders. The first issue of the journal was received with great pleasure. The journal expresses

its gratitude for the great interest shown in it through this letter and responds that it will continue its work as long as the interest continues.

The founding team, which mentioned that competitions would be organized in the first issue, organized a literary competition. It was announced that the winner of this competition was the story titled *Gizli Cerihalar* by Adil Bey, number 337, a first-year student, of the Izmir Mekteb-i Sultanisi. Adil Bey's story tells of a young man who admires a naive and delicate lady who walks home from school every evening. Adil Bey follows the lady home for several days before finally getting the courage to ask her name. Our hero, who learns that the lady's name is Pervin, cannot find a response to his feelings and this situation remains a secret wound (Talebe, 1911, p.25).

In the second issue, Mehmet Şükrü continues his series of articles entitled "History of the Scientific Board". In addition to this, Mehmet Sırrı's articles titled *Our Girls' Education*, *You Are a Girl*, *Your Mind Does Not Comprehend*, which we will discuss in detail later, . On the twenty-seventh page, there is an article by Faik Şemseddin explaining that an electric locomotive has started to be used on the Transylvania lines in America, and this is one of the latest developments in the field of technology (Şemseddin, 1911, p.27). In the article titled *Scientific News*, it is conveyed to the reader that the latest technology products have started to be used on some train lines in America. This article shows that the journal fulfills its duty of informing its readers about the latest developments in the field of science. On the last page of the journal, there are riddles.

The third issue of the journal was published on March 1, 328. In this issue, physician Mustafa Enver Efendi wrote an article titled "School Life," in which he explained the difficulties of school life to students. Mustafa Enver emphasizes that learning science is a difficult and long path that requires patience. He explains that the discipline applied to students in schools is necessary, not because teachers enjoy imposing discipline, but because it is for the benefit of the students. He advises students not to lose interest in school, when they encounter difficulties. It is an article that gives advice to students and explains that they must struggle in order to develop. Apart from this, in the third issue, there are two articles that belong to Mehmet Sırrı titled *Bir Ceriha-i Vatan* (The Wound of The Homeland), *Kızların Eğitim ve Terbiyesi* (Education and Discipline of Girls.) There is also an article by Faik Şemseddin titled *If America's Six Billionaires Had Stayed in Their First Professions*. In his article, Şemseddin explains that if the famous American tycoons, such as Rothschild and Rockefeller, had not improved themselves, they would have

remained as bankers and accountants' apprentices. This article conveys the message to readers that no matter what, they should not give up trying, working, and learning.

Index of the Journal

After the publication of the third issue of the journal Talebe no statement was made by the founding staff and it ceased publication. Therefore, this study focuses on the three issues of the journal. The page numbers and titles of the articles published in these issues are given in the table. The purpose of the index study is to facilitate researchers in conducting future studies related to this journal.

As can be seen in the table, the journal has allocated substantial space to articles, stories, and scientific research news in all the issues it has published. The vast majority of the stories and articles are educational in theme. In addition, there are a small number of poems. In addition, the journal has included humor and riddle sections, to attract readers' attention.

Table 1

Types of Writing and Writers in the Journal of The Talebe: Yeni Mektep

Page	Title	Writer	Types of Writing
First Issue-1 February 327			
Enterance Page	Alsancak	Akil KOYUNCU	Poem
1	To the sun	Ahmet Haşim	Poem
4	Black Roses	Mehmet Sırrı	Monologue
5	Edison Until He Found His Way to Fame	Faik Şemseddin	Article
9	History of the Scientific Committee	Mehmet Şükrü	Article
14	Education and Training Lessons - School Family	Mehmet Sırrı	Article

15	In the stillness	Baha Esad	Story
16	Deep Thoughts		Humor

Second Issue-15 February 327

Cover Page	Picture of Poet Ahmet Haşim		Picture
18	My Home	Ahmet Haşim	Poem
19	History of the Scientific Committee	Mehmet Sükrü	Article
23	In the stillness	Baha Esad	Story
23	Monologue- You Are A Girl, You Can not Understand	Mehmet Sırrı	Story
25	The Piece That Won Our Literary Competition Hidden Wounds	337 Izmir School Sultan Student- Adil Bey	Story
27	Electric Locomotive on America's Transylvanian Lines	Faik Şemseddin	Article
29	School Latifes	Paragraph
31	Education and Training Issues - The Issue of Training of Our Girls	Mehmet Sırrı	Article

Third Issue- March 1, 328

Cover Page	A picture of two children choosing between flowers		Picture
33	A valuable gift from the honorable physician Mustafa Enver Bey to the student! School Life	Mustafa Enver	Article

36	In the stillness	Baha Esad	Story
38	I Had a Star in My Eyes	Mehmet Haşım	Story
39	Car Animal		Story
42	A Wound of the Homeland	Mehmet Sırrı	Monologue
43	What If America's Six Billionaires Had Stayed in Their First Professions?	Faik Şemseddin	Article
46	The issues of Education and Training- For Teachers	Kırkagaç M. Lutfi	Article
47	Education and Discipline of Girls – Mabad	Mehmet Sırrı	Article

The Issue of Women's Education, Teaching and Education

Before the Second Constitutional Era, literature and art made significant contributions to the education of society. The development of the idea of public opinion, especially put forward by Şinasi, one of the Tanzimat intellectuals, significantly served to shed light on the ambiguous place of women in society and social life. Non-Muslim women were prominent in early art and literary texts, especially during the onset of the constitutional monarchy. Women's education through literature, and the moral and psychological collapses experienced, was shown and conveyed in novels. Tanzimat intellectuals such as Ahmed Midhat adopted an instructive and educational manner in their works. However, there is also a prevailing opinion that literature, newspapers, and journals mislead society. For example, Mehmed Celal puts forward an opposing view in his short work, Roman Mütalaası. In the same period, novels and poems were defined as, mufsid-i ahlak, moral corruption for women. In the early 20th century, as a result of the change in mentality, literature was seen as very important for improving the morality and moral cleanliness of women and young girls (Dusgun, p.337-338). This view continued to grow stronger during the Second Constitutional Era and found a

place itself in most of the journals published. Talebe: Yeni Mektep journal also gave ample space to the articles on women's education, in its short publication life.

The aim of publishing the Talebe: Yeni Mektep journal is to contribute positively to education. Although different types of articles have been published, the common theme is to contribute to the educational life of society and women. In addition, the journal's publication policy provides information about the perspectives of the intellectuals on education and teaching, in the relevant period, education and training.

The journal's chief writer Mehmet Sırrı has been interested in education since the first issue. He published his articles in the education, teaching, and monologue columns. In the first issue, his story titled Black Roses (Sırrı, 1911, p.4), the first thing a student hears from his teacher when he arrives at his new school is, "There is no memorization in this school! The student is very surprised by this statement. Because he remembers that in his old school, twenty or thirty-page books were memorized, he approaches studying differently now. According to him, if there is no memorization, there is no school. After this surprising statement, he recounts that he asked his teacher questions at his old school, and when the teacher could not find an answer to a question, the student was beaten with a falaka. The student's grandmother also suggests that he should not disobey his teachers, and says that roses will grow where the teacher hits him. However, when the student comes home after the falaka punishment, he cannot stand the pain of his foot and sees that the sole of it has turned black. Then, he tells his grandmother that black roses have grown where the teacher hit him. With this story, the author expresses his opposition to the rote-based structure of the old education system and the violence used to ensure discipline. The new education system should be more focused on learning than rote-learning. The message to students is to make schools a welcome environment instead of an oppressive environment.

Sırrı Bey, in his article titled School and Family (Sırrı, 1911, p. 14), he draws attention to another aspect of education life. School and family are two elements that need to be reconciled for the advancement of educational life, especially for the advancement of our country and state. However, unfortunately, these two institutions, these two educational and training centers have not yet reached an agreement in our country. The Frenchman Ernst Lewis says in a conference he gives that "education should not continue at home". The author infers from this statement that mothers in France are so concerned with the upbringing of their children that they are criticized. However, there are mothers in our country who bring their

children to the door of the school and give the teacher some inordinate warnings. Naturally, the author does not approve of this situation. Entrusting the upbringing of children to mothers who are unaware of scientific knowledge (child education) is as strange and dangerous as entrusting a patient to a man who does not understand medical science. In order to develop education and training, the best use should be made of schools and families. In order to benefit sufficiently from the family institution, girls and women must be educated. Because children who are deprived of the moral training of the family face the danger of becoming intelligent, skillful and capable thieves or disrespectful selfish people when they leave school.

After emphasizing the importance of women's education for progress in the issue of School and Family, the second issue of the journal, published as 'You Are a Girl, You Cannot Understand!' (Sirri, 1911, p. 14), was released. In this story, the events between a brother and sister are told through the sister's eyes. One day, the brother comes to his sister's room, sees the geography book, and asks her sarcastic questions about the shape of the world. The brother, who receives serious and clear answers to his questions, cannot answer his sister's questions and leaves the room in anger. As he leaves the room, he says, "You are a girl, you cannot understand these things" (Sirri, 1911, p. 23). The sister does not get angry at all because she thinks that people get angry at things they do not know. In the story, the sister has won a victory over her brother and proven that women can also understand complex subjects. She even illustrates her claim with the example of my mother winning every argument she has had with my father for years. This story once again criticizes the arrogant attitude of men towards women during the period in question. It is conveyed that stereotyped expressions such as "long hair, short mind," "you are a girl, so you cannot understand," which are spread among the public, are major obstacles to the development of society.

The journal, which focused on the education of women, published another article, "Education and Training of Our Girls." This article emphasizes that the education and training of women is crucial for the development of social life and national existence. In addition, it is conveyed that a society that deprives its women of the guidance of science and education, is doomed to never achieve progress. The article mentions the criticisms of French intellectuals who study the reasons for the progress of the British, mentioning that their own society is lagging behind in the education of women. In this context, concerns are expressed that if women's enlightenment through education is not given greater importance, their social welfare will continuously decrease. Mehmet Sirri Bey, who conveys these messages, begins his article with J. J. Rousseau's words, "The aim of men is to look good to

women, if you want to have virtuous men, teach women what virtue and greatness mean" (Sirri, 1911, p.31). He ends with the words...

The negative effects of a patriarchal society can be cited as a reason for women unable to participate in education. However, women from the period in question also find some aspects of it to criticize. On this important issue, the editor-in-chief of the journal, Mehmet Sirri, criticizes the women of the period for not knowing and recognizing their intellectual elders and spirituality, and for thinking that they had nothing to ask of their husbands other than silk sheets and dresses that would ruin their family budgets. He advises that women have a slightly greater responsibility than men regarding women's education, and that they should be more enthusiastic about education. Women should go to a school where they can both learn domestic skills and study science. * In fact, Ottoman women during the Second Constitutional Era had access to such a school in 1914. However, the important point here is that the writer of the journal, Mehmet Sirri Bey, expressed this idea in his article titled Education and Discipline of Girls -2 (Sirri, 1912, p.47), as early as 1911. This situation illustrates how (although the journal's publication life was short-lived) it made quite sensible and logical suggestions on education and training.

He wrote the last article of the journal under the title "Discussions on Education and Discipline" (Lütfi, 1912, p.46) from the teachers' school Kırkağac M. Lütfi, In his article, in which he addressed all educators, Lütfi Bey was concerned that the dark clouds of ignorance surrounding the country would bring our entire social life to a level where it would be impossible to breathe, both socially and economically. The author believed that the only way to alleviate this concern was through the science and education provided by teachers. The article insisted that the most important way to disperse the clouds of darkness and ignorance that had surrounded the Ottoman State for many years, was through national education. When the periodicals of the period were examined, it was seen that the vast majority of the intellectuals of the Second Constitutional Era were aware of this situation. For this reason, the development of social education and instruction was prioritized in order for the future of the state to be established on solid foundations.

Ethical considerations

This study adheres to the highest ethical standards in academic research. Since the research does not involve human or animal participants, it was not necessary to obtain approval from an ethics committee. No personal or sensitive data were collected, and there was no risk of harm to any individuals.

The study is based on the analysis of historical documents and secondary data sources, ensuring full compliance with ethical research guidelines. All sources used have been properly cited following APA 7 guidelines, and due diligence has been exercised to maintain academic integrity.

CONCLUSION

The Second Constitutional Era is a period of transition from empire to republic, and preparation for the nation-state structure. In these years, nationalization and westernization are more prominent in the topics addressed by the late Ottoman intellectuals. During this period, everything from the economy to literature, from politics to social life, came under the influence of the nationalist movement. Therefore education also received its share of this movement. In addition, the initiatives for women's participation in social life gained strength during this period.

Talebe: Yeni Mektep Mecmuası is a science and education journal that reflects the characteristics of the period and clearly reveals the intellectual world. Although the journal set out to make serious contributions to every stage of the student's school life, the aim of educating the entire public is felt. The fact that it gives wide coverage to issues related to women's education and participation in social life is concrete evidence of this claim. Apart from this, the fact that the journal includes series of articles consisting of the latest scientific and technological developments in the western world shows that the aim is for the society not to remain indifferent to these developments.

The journal Talebe, which has a clear style, tried to appeal to all segments of society. As emphasized in our study, significant emphasis has been placed on the education of women and girls in particular. It has been suggested that women should not only stay at home, but also participate in social life. Actions have been taken based on the idea that this can only be achieved through education and that education should be provided not only to students but also to all segments of society. The effect of education on social development is emphasized by the idea that children who do not receive discipline and morality in their families, no matter how well they are educated, will face the danger of turning into disrespectful, selfish, and skillful thieves after graduating from school.

The years when the political administration in Turkey underwent significant constitutional changes within the Ottoman Empire are called the Second Constitutional Era (1908-1918). During this period, which served as a bridge in the process of regime change, serious mental transformations were experienced in terms of not only political administration but also socioeconomic, educational, and cultural aspects. The issue of women's place in society, in particular, influenced the thought world of almost every intellectual to the extent that even journals were published on this subject. One of the most important of these is *Kadınlar Dünyası* (Women's World). The writers of this journal, published between 1913-1921, are all women. In general, attention was drawn to women's

rights, education and roles within the family (Gülcü and Tunç, 2012). From this point of view, the importance of Talebe, Yeni Mektep Journal, which is the subject of this study, should be emphasized. The inclusion of these ideas predates *Kadınlar Dünyası* (Women's World) journal, which is historically significant regarding women's adaptation to social life. It draw the attention of society to this issue.

One of the reasons why women's education was given importance in the last years of the Ottoman Empire, was because of a significant decrease in the male population during the long years of war. For this reason, women also had to take responsibility in some professions that were necessary for the continuation of daily life. More women were now entering professions such as bread making, tailoring, and working in health care. Another important reason to emphasize is that educating women significantly contributes to family education. It is expected that the family unit established under the responsibility of an educated mother will make a great contribution to the future of society. Because, a good family means well-educated children, the aim is to secure a good future through them.

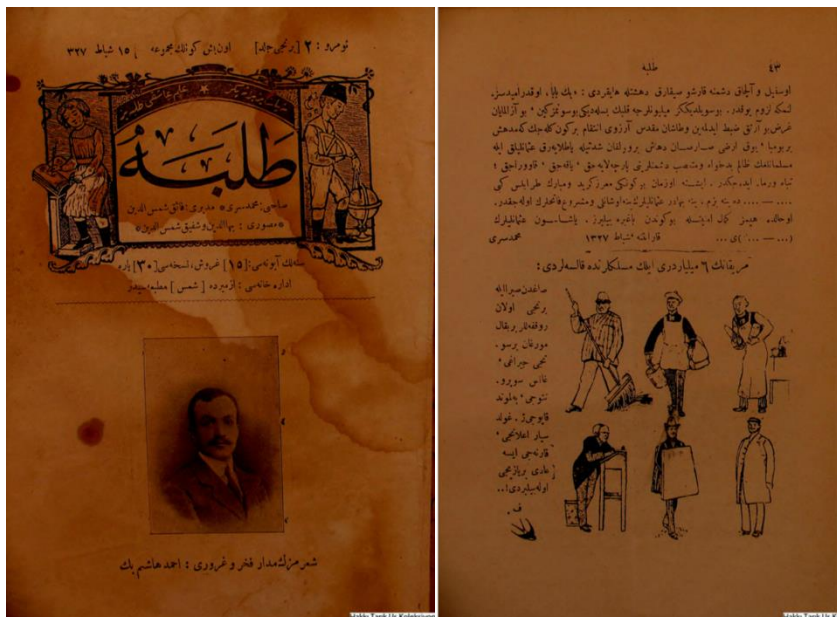
REFERENCES.

- Baskın, B. (2007). 2. Meşrutiyette eğitim, kadın ve inas darülfünunu (ilk kadın üniversitesi) [Education, women and humanity darülfünunu (first women's university) in the 2nd Constitutional Monarchy]. Master's thesis, İstanbul Üniversitesi, Sosyal Bilimler Enstitüsü.
- Bilge, H. (2020). Osmanlı Devleti'nin öğrencilere özel son gazetelerinden: Talebe Mecmuası [One of the last newspapers of the Ottoman Empire special for students: Student journal]. *Asia Minor Studies*, 8(2), 467–478. <https://doi.org/10.17067/asm.736840>
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 27-40,.
- Çetin, M. (1994). Mehmet sırrı sanlı'nın hayatı ve eserleri üzerinde bir araştırma, [unpublished master's thesis], [A study on the life and works of mehmet sırrı sanlı] Ege Üniversitesi Sosyal Bilimler Enstitüsü.
- Düşgün, U. (2023). Mehmed Celâl'in romanlarında kadınlar [Women in Mehmed Celâl's novels]. In Ü. Deveci (Ed.), *Hayatı sanat olarak yaşamak* [Living life as art] (pp. 337–348). Post Yayınları.
- Etili, A. N. (2021). Mehmet Sırrı Sanlı'nın tiyatro eserlerinin incelenmesi [Analysis of Mehmet Sırrı Sanlı's theater works]. Master's thesis, Kocaeli Üniversitesi, Sosyal Bilimler Enstitüsü.
- Gülcü, E., & Tunç, S. (2012). Osmanlı basın hayatında *Kadınlar Dünyası* dergisi [The Women's World journal in the Ottoman press]. *Çankırı Karatekin Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 3(2), 155–176.
- Kırkağaç, M. (1912). Tedris ve terbiye meselesi: Muallimlere [The issue of education and training: To teachers]. *Yeni Mektep Mecmuası*, 3, 46–47.
- Sırrı, M. (1911). Mektep ve aile [School and family]. *Yeni Mektep Mecmuası*, 1, 14–15.

- Sırrı, M. (1911). Sen kızsın, senin aklın ermez [You are a girl, your mind does not understand]. *Yeni Mektep Mecmuası*, 2, 23–25.
- Sırrı, M. (1911). Siyah güller [Black roses]. *Talebe: Yeni Mektep Mecmuası*, 1, 4.
- Sırrı, M. (1912). Kızlarımızın tahsil ve terbiyesi [The issue of education of our girls]. *Yeni Mektep Mecmuası*, 3, 31–33.
- Sırrı, M. (1911). Kızlarımızın terbiyesi meselesi [The issue of education of our girls]. *Yeni Mektep Mecmuası*, 2.
- Şemseddin, F. (Ed.). (1911). *Talebe: Yeni Mektep Mecmuası*, 2.
- Şemseddin, F. (Ed.). (1911). *Talebe: Yeni Mektep Mecmuası*, 1.
- Şemseddin, F. (Ed.). (1912). *Talebe: Yeni Mektep Mecmuası*, 3.
- Şemseddin, F. (1911). Şöhret yolunu buluncaya kadar Edison [Edison until he found the way to fame]. *Yeni Mektep Mecmuası*, 1, 5–9.
- Şemseddin, F. (1911). Amerika'nın Transilvanya hatlarında elektrikli lokomotif [Electric locomotive on the Transylvanian lines of America]. *Yeni Mektep Mecmuası*, 2, 27–29.
- Türk Diyanet Vakfı İslam Ansiklopedisi. (1996). Genç kalemler: II. Meşrutiyet'ten sonra Selanik'te yayımlanan ve dilde sadeleşme akımının öncülüğünü yapan dil ve edebiyat dergisi [Genç Kalemler: A language and literature journal published in Thessaloniki after the Second Constitutional Era and pioneering the simplification movement in language]. *Türk Diyanet Vakfı İslam Ansiklopedisi*, 14, 21–23.

APPENDICES

Examples from the pages of the journal



Data Availability Declaration

No Primary Data Utilized:

This study is conceptual in nature and does not rely upon primary data collection. As such, there are no datasets directly associated with the presented findings. The discussions and conclusions drawn are based on an extensive review of existing literature and analytical insights put forth by the authors.

Author Contributions

Dilek Ünveren and Muhammed İn contributed equally to this work. They collaboratively handled the conceptualization, methodology design, data acquisition, and analysis. Each author played a significant role in drafting and revising the manuscript, ensuring its intellectual depth and coherence. All authors have thoroughly reviewed, provided critical feedback, and approved the final version of the manuscript. They jointly take responsibility for the accuracy and integrity of the research.

Ethics statement: We hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. We take full responsibility for the content of the paper in case of dispute.

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Investigation of the Novice TCSOL Teacher Identity Construction Via Dynamic Systems Model of Role Identity

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Abstract:


This qualitative case study (N=3) investigates the identity construction of novice language teachers in Teaching Chinese to Speakers of Other Languages (TCSOL) within Thailand. Framing teacher identity as a complex dynamic system, the study employs the Dynamic Systems Model of Role Identity (DSMRI) to explore how these teachers (re)define and (re)negotiate their identities. Data were collected via interviews and focus group discussions, using metaphors to prompt teachers to reflect on the questions. Analyzing novice teachers' beliefs, goals, self-perceptions, and perceived action possibilities across various role identities, the study finds all of them remain in a continuous 'learner' state and experience shifts from idealism to realism in professional views. The study highlights a misalignment between the current TCSOL practicum format and actual teaching practice, hindering professional development and identity construction. Novice TCSOL teacher identity is significantly influenced by social and political contexts and reinforced through organizing cultural activities. Three novice TCSOL teachers hold beliefs and goals extending beyond language teaching, emphasizing the mutual impact of personal behavior on national image and international relations. The paper calls on the Chinese academic community to increase its focus on empirical research on (TCSOL) teacher identities. This research contributes to addressing the gap in studies on teacher identity in regions such as Asia and explores the identity construction of transnational foreign language teachers beyond English.

Keywords: Novice TCSOL teachers; Teacher identity; DSMRI; Professional development


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INTRODUCTION

The broader context for the emergence of teachers teaching Chinese to speakers of other languages (TCSOL) is one of globalization and multilingualism. With China's increasing economic influence around the world, the number of Chinese language learners has risen, significantly boosting the demand for TCSOL teachers and diversifying their roles (Liu & Li, 2023; Sun et al., 2022). Taking Thailand as an example, data released by the Overseas Chinese Affairs Office of the State Council of China in 2019 indicate that over 17,000 Chinese volunteer teachers were teaching in more than 1,000 primary and secondary schools as well as higher education institutions across 73 provinces in Thailand (Chong Ewe & Min, 2021). To meet this global demand, the Centre for Language Exchange and Cooperation (CLEC, formerly known as Hanban/Confucius Institute Headquarters) recruits thousands of teachers annually as volunteers to teach Chinese at primary and secondary schools, or universities worldwide (Sun, 2021). Furthermore, the establishment of the 'Chinese International Education Foundation (CIEF)' has taken on full responsibility for the branding and operation of Confucius Institutes (CIs; Xinhua News Agency, 2020). CLEC provides teaching materials and training services, while CIEF offers financial support for CIs (Liu, 2019; Starr, 2009). It is notable that perspectives on CIs vary, encompassing cultural diplomacy (Pan, 2013), soft power (Repnikova, 2022), national identity (Li & Xv, 2023), national image building (Hu et al., 2022), cross-border mergers and acquisitions (Wang et al., 2021). These diverse views, along with some negative media coverage, may lead TCSOL teachers to question their profession, diminishing their confidence in their careers (Ma & Gao, 2017).

According to the CLEC website, there are three main categories of TCSOL teachers, namely volunteer teachers, dispatched teachers, and full-time teachers, forming a hierarchical career development pathway. Consistent with Lefebvre et al. (2022), this study uses the term "novice" to refer to TCSOL teachers at the beginning of their professional careers. In this case, volunteer teachers are essentially novice TCSOL teachers, most of whom are graduate students. After accumulating at least two years of experience, volunteer teachers become eligible to take the dispatched teacher qualification exam, which is also open to teachers from primary, secondary, and higher education institutions in China. Full-time teachers are officially employed by Chinese universities and work on a rotational basis between domestic and overseas assignments. These three types of teachers differ in terms of responsibilities and compensation packages. As revealed in the literature, novice TCSOL teachers face potential challenges in adapting to new living and working environments, managing relationships with colleagues and students, and developing resources for actual teaching (Sun et al., 2022). Additionally, the dynamic power process of their dual identity as language instructors (i.e., Chinese) and language learners (i.e., Thai, in the case of this study) (Liu & Li, 2023), along with various potential emotional critical incidents they may encounter (Derakhshan & Nazari, 2023), can impact the construction of novice TCSOL teacher identity and their future commitment to this profession. According to Akkerman

and Meijer (2011), teacher identity is the pursuit of answering the questions, “Who am I as a teacher?” and “What kind of teacher do I want to become?”

Research has shown that teacher identity plays a key role in helping novice teachers transition from student to professional, supporting their learning and teaching practices (Beijaard et al., 2022; Schelling et al., 2021; Yazan, 2018). Furthermore, cultivating a strong teacher identity is essential for improving novice teachers’ well-being (Thomas & Beamchamp, 2011). Meanwhile, understanding the factors that influence and shape the processes of novice teacher identity formation can assist teacher educators and educational policymakers in making more effective decisions (Izadinia, 2013). As Kanno and Stuart (2011) suggest, the construction of teacher identity is indispensable in the learning process of novice second language teachers, and the academic community should further explore the development of teacher identity as a core component of teacher education knowledge. However, little focus has been directed toward the construction of TCSOL teachers’ identities (Han & Ji, 2021; Wang & Du, 2014). More research is needed to understand how novice TCSOL teachers construct their identities as overseas Chinese teachers (Liu & Li, 2023; Sun et al., 2022).

This study responds to the calls made by Izadinia (2013) and Olsen et al. (2022) for more research on teacher identity in regions such as Asia, since “applying teacher identity in new locations, also using the new contexts to grow teacher identity as a concept, will deepen and strengthen the field (Olsen et al., 2022, p.8).” In fact, identity crises in this region have had a negative impact on both teachers’ well-being and their teaching practices. For example, Wei (2021) highlights how major historical events, such as the Cultural Revolution, and China’s educational reform environment have led to conflicts between teachers’ imagined identities and external realities. In response to the well-being and pedagogical challenges arising from identity crises, teachers do not passively adapt; rather, they actively construct their ideal teacher identity within their own professional practice. As Wei (2021) states, “The contingent of ordinary teachers in China imagines the bright future of their profession in a rigid educational reality and seeks balance between the self and society with the help of this endless inner imagination.” (p. 9)

In this paper, we explore how novice TCSOL teachers view themselves in Thailand in light of the Dynamic Systems Model of Role Identity (DSMRI). This study aims to provide valuable implications and insights to guide schools/CIs and policymakers/CLEC in enhancing their support for the identity construction of novice TCSOL teachers in the Thai context. It is also hoped that more attention will be drawn to the construction process of teacher identities within the Chinese academic community. The following research questions underpinned this study:

RQ1: How do the novice TCSOL teachers view/identify themselves in the Thai environment?

RQ2: How does the formation and construction process of novice TCSOL teacher identity correspond to factors identified in existing research?

RQ3: What are the distinctive characteristics of novice TCSOL teacher identity?

LITERATURE REVIEW

(Novice) Language Teacher Identity

Researchers (e.g., Beijaard et al., 2004; Rodgers & Scott, 2008) have suggested that language teacher identity (LTI) is a multidimensional and dynamic concept, involving a complex and continuous developmental process influenced by both personal and social factors. Initially focused on linguistic identity, research on LTI has been shaped over time by sociocultural theory, communities of practice theory, and post-structuralism (Kayi-Aydar, 2019). Recent research (e.g., Sang, 2022) indicates that the development of the LTI is increasingly seen as an encompassing socialization process within teacher learning. Furthermore, LTIs have been explored in connection with various issues, such as practicum programme (Wang et al., 2021), social structure (Gu & Benson, 2014), transnational context (Han & Ji, 2021; Liu & Li, 2023), or institutional construction (Tsui, 2007), all of which are related to specific contexts. Specifically, Richards (2023) identifies three primary sources of LTI: past experience, teacher education, and language proficiency. For example, past experience encompasses a teacher's history as a student, their experiences within formal education, and their observations of other teachers and participation in classroom activities (Richards, 2023).

Novice teachers are typically individuals who are either in the process of completing their training, have only recently finished it, or are at the beginning stages of their teaching careers with limited professional experience (e.g. less than two years) (Gatbonton, 2008). As Farrell (2016) notes, novice teachers may encounter a range of challenges and experience transition shock as they embark on their teaching careers. These challenges include effective classroom management, differentiating instruction to meet the needs of diverse students, parent communication, limited interaction with colleagues, and insufficient supportive leadership. Often, these issues are accompanied by negative emotions such as isolation, anxiety, stress, and frustration, which are strongly linked to teacher attrition (Fantilli & McDougall, 2009; Farrell, 2016).

Given these considerable challenges and emotional strains, developing a strong teacher identity becomes critical for novice teachers (Izadinia, 2013). Although teacher identity lacks a fixed definition (Beijaard et al., 2004), recent research provides a useful reference by defining it as:

"Teachers' understandings and beliefs about themselves as teachers in relation to other multiple intersecting identities, shaped through ongoing goal-focused, agentic regulating

processes that facilitate the interpretation and re-interpretation of personal and professional experiences which are situated within multilayered, social-cultural-historical contexts” (Hong et al., 2024, p. 4).

This definition suggests that research on novice language teacher identity should emphasize three essential aspects: (1) understanding teacher identity as part of an ongoing, goal-oriented, agentic process; (2) recognizing teacher identity as one of multiple, intersecting identities shaped by socio-cultural-historical contexts; and (3) examining how teacher identity is negotiated within the standards and expectations of professional communities (Hong et al., 2024).

In empirical research, attention has been given both to how novice teachers construct their sociocultural identities through the interplay of cultural, institutional, and environmental factors (e.g., Chen et al., 2023; Kanno & Stuart, 2011), as well as to the role of individual characteristics in shaping novice teacher identity (e.g., Rogers, 2011; Ruohotie-Lyhty & Moate, 2016). For instance, based on grounded theory, Flores and Day (2006) examined the relationship between contexts and the identity formation of novice teachers through a multi-perspective approach. They found that personal and professional histories, pre-service training, school culture, and school leadership significantly impact novice teacher identity. Furthermore, they highlighted the benefits of incorporating teacher identity into teacher education programs and fostering partnerships between schools and higher education. Pillen et al. (2013) and Hong et al. (2018) explored the influence of tensions on novice teacher identity development. Despite using different methodologies (Pillen et al. employed a mixed-methods approach, while Hong et al. used qualitative research), both studies confirmed the negative impact of tensions on novice teachers’ professional growth and identity formation, emphasizing the role of teacher educators and schools in addressing these tensions. In a recent study, Nazari et al. (2023) proposed similar recommendations, arguing that “identity-based novice teacher development will provide a more helpful conceptualization for understanding and helping novices’ development” (p. 24). They further highlighted both commonalities (such as emotional labour, agency conflicts, and identity standard tensions) and differences (such as sense of belonging, future selves, and resistance) in the identity formation of novice teachers across one, two, and three years of experience, underscoring the inherent complexity of teacher identity construction (Kayi-Aydar, 2019).

Similar to current study, Han and Ji (2021) focused on the identity construction of Chinese as a Foreign Language (CFL) teachers in the Australian context, pointing out that the formation and transformation of CFL teacher identities are profoundly shaped by their self-identification and integration within the community. They highlighted how cultural connectedness plays a critical role in aligning organizational attitudes with teachers’ relationships between self and others. The research also revealed that many CFL teachers in Australia struggle to experience a cohesive sense of self, which can complicate their identity

construction. This lack of communication and integration between the self and community members has led to crises in their professional positioning.

In conclusion, research on (novice) language teacher identity can draw on diverse theories and methods. Factors such as personal and professional histories, social, cultural, and historical contexts, individual characteristics, transnational settings, and emotional dimensions may all influence the construction of (novice) language teacher identities. These findings not only inform this study but also highlight the complexity of (novice) language teacher identity formation. Finally, the relative scarcity of studies on identity construction among TCSOL teachers in Thailand points to a potential contribution of this paper.

Metaphors and Teacher Identities

According to Kövecses (2010), metaphor refers to understanding one conceptual domain in terms of another, involving a target domain and a source domain. For example, in the metaphor “ARGUMENT IS WAR” ARGUMENT is the target domain, and WAR is the source domain (Kövecses, 2010). As Lakoff and Johnson (1980) noted, metaphor is not just a matter of language, but human thought processes and actions are largely metaphorical.

In teacher education, interest in teachers’ self-understanding and professional development through metaphors has grown significantly since Lakoff and Johnson (1980) published *Metaphors We Live By* (Zhu & Zhu, 2018). Studies originated from different countries or regions such as Canada (Thomas & Beauchamp, 2011), China (Gao & Cui, 2021), New Zealand (Cobb, 2022), and Saudi Arabia (Alfayez, 2021), as well as other places. They have focused on teachers at different career stages (e.g., Erickson & Pinnegar, 2016) and across subjects. For example, Ma and Li (2017) employed metaphors to inquire about the views and aspirations of 68 pre-service TCSOL teachers, revealing themes such as professional competencies, student development, knowledge and culture dissemination. Most studies demonstrate metaphor’s effectiveness in researching teacher identity, with implications for policymakers, school leaders, and teachers themselves. Additionally, some researchers have integrated verbal metaphors with visual modes to explore teacher identity formation (e.g., Brandão, 2021; Cobb, 2022), using various theories or perspectives to analyse metaphors, which informs this research.

Metaphors offer a powerful means to delve into facets of teacher identity that are difficult to articulate (Thomas & Beauchamp, 2011; Zhu et al., 2022). However, it is important to treat participants’ metaphors as indicative of notions sanctioned by them for public verbalization (de Guerrero & Villamil, 2002). As Buchanan (2015) suggests, participants may offer metaphors that are attention-grabbing or emotionally appealing rather than expressing themselves straightforwardly, yet the metaphor-elicitation process itself has educational significance. Furthermore, it is essential for metaphor researchers to recognize the inherent subjectivity in interpretation (Armstrong et al., 2011).

Teachers’ metaphors should be seen as socially constructed cognitive tools, representing cognitive phenomena and a socio-cultural process interacting with various

socio-cultural conditions (de Guerrero & Villamil, 2002; Zhu & Zhu, 2018). This opens possibilities for integrating metaphors with the following theoretical framework (DSMRI).

METHOD

Theoretical Framework

The Dynamic Systems Model of Role Identity (DSMRI) is a comprehensive and integrated metatheoretical framework developed by Kaplan and Garner (2017). Its objective is to capture the intricate interplay of content, structure, and process in the formation of identity within diverse social-cultural contexts. Specifically, DSMRI draws upon the Complex Dynamic Systems approach, integrating psychology, social psychology, symbolic interactionism, and social-cultural theory (Kaplan & Garner, 2017 p.13). DSMRI emphasizes that teacher identity is rooted in an individual's interpretation of the teacher role within their lived context (Garner & Kaplan, 2018).

According to Kaplan and Garner (2017, 2018), there are four central components in DSMRI which are conceptually constructed, highly interdependent, and partially overlapping (see Figure 1): (a) ontological and epistemological beliefs, which refers to the individual's knowledge they hold to be true about the world related to their role, and their perception of certainty, complexity, and the credibility of the sources of their ontological knowledge, along with the emotions linked to these beliefs. (b) Purpose and goals encompass the individual's knowledge and support of an overarching purpose for their role, as well as the emotions associated with these purposes and goals. Goals can vary along multiple dimensions, such as intrinsic and extrinsic goals, self-oriented and other-oriented goals, and proximal and distal goals. (c) Self-perceptions and Self-definitions encompass the individual's understanding of their personal and social attributes and characteristics that they deem relevant when assuming the role, along with the emotions associated with them. (d) Perceived action possibilities refer to the strategies and behaviours that individuals perceive as available to them to pursue their goals (purpose and goals) within their role. These perceptions are influenced by their interpretation of the situation (ontological and epistemological beliefs) and their understanding of themselves within that situation (self-perceptions and self-definitions).

The DSMRI emphasizes three comprehensive aspects of the role identity system: content—the quantity, type, and complexity of the elements, like knowledge, beliefs, goals, self-perceptions; structure—the degree of harmony, alignments, integration, and tension within and between components; process—the dynamic nature of change in the content and structure of the role identity components (Kaplan & Garner, 2017).

We observe that, in addition to works published by Kaplan and Garner, DSMRI has been applied by empirical researchers in diverse fields, including mathematics education (Heffernan & Newton, 2019), translation studies (Chen & Huang, 2022), and science teaching (Hathcock et al., 2020). For instance, Yang et al. (2021) used DSMRI to explore identity

development among three experienced English as a foreign language (EFL) teachers in China, identifying a progression of identities at different career stages: companion in the early stage, motivator in the middle stage, and life coach in later years. Unlike studies that focus on experienced teachers, Wang et al. (2021) applied the DSMRI framework to examine the evolving identity construction of a novice Chinese EFL teacher across three phases: pre-practicum, practicum, and the first year of teaching. Their findings highlight dynamic shifts in the teacher's beliefs, goals, self-perceptions, and action possibilities, supporting DSMRI's utility for tracking professional growth and identity development among language teachers. This evidence supports our choice of DSMRI as the theoretical framework for this study.

Moreover, Varghese et al. (2005) and Olsen et al. (2022) advocate for openness to multiple theoretical perspectives to deepen our understanding of the processes and contexts of teacher identity. Accordingly, this study employs the DSMRI framework as a primary guide and use metaphors in interviews as a supportive method to facilitate participant reflection.



Figure 1. The Dynamic Systems Model of Role Identity (DSMRI), Kaplan and Garner (2017)

Participants and Sampling

This one-year-long qualitative study employed the DSMRI framework to explore the identity construction of novice TCSOL teachers in Thailand. The study adopted a purposive sampling approach, as participants were selected based on predefined criteria: they had to be novice Chinese language teachers currently working in Thailand, with no restrictions on age, gender or school type. To facilitate recruitment, a call for participation was distributed via a WeChat group dedicated to Chinese teachers in Thailand. This method also exhibits characteristics of convenience sampling, as it relied on an accessible online community. Interested teachers could contact the authors for further inquiries. One limitation of this approach is self-selection bias, as participation was voluntary. Teachers who responded to

the recruitment message may have had a stronger interest in professional identity issues or been more willing to share their experiences. As a result, the sample may not fully represent all novice TCSOL teachers in Thailand.

Initially, five teachers expressed interest in participating. However, by the time consent forms were to be signed, two withdrew due to personal reasons. The final sample consisted of three participants: two female teachers (pseudonyms Lucy and Lily), and one male teacher (pseudonym James). They work in different cities in Thailand: Lucy at a Chinese school in the eastern province, Lily at a Confucius Institute in a prominent city, and James at a college in another large city. Therefore, their work environments, teaching materials, and students vary somewhat. Unlike TCSOL teachers working in Western countries, such as New Zealand (Sun et al., 2022), the three participants in this study do not have local full-time teachers supervising their classes. Table 1 presents the basic background information of the participants.

Table 1

Participants' Profiles

Name	Gender	Highest educational qualification	Teacher certificate	Working experience
Lucy	Female	B.A. TCSOL	No Certificates	She had contact with Russian exchange students during school practicum, with no other work experience
Lily	Female	B.A. TCSOL	TCSOL Certificate	She interned at a middle school in China, with no other work experience
James	Male	B.A. Logistics M.A. TCSOL	TCSOL Certificate & China's Teacher Qualification Certificate	He had interactions with international students from various countries during practicum at school, with no other work experience

Data Collection

This study conducted three interviews and one focus group discussion, with each interview lasting an average of 60 to 90 minutes. The first round comprised unstructured interviews, during which the first author introduced the participants to the purpose of the study and their rights. These interviews covered topics such as the participants' place of birth and upbringing, hobbies, family members, educational backgrounds, and learning experiences. The primary aim was to establish rapport, create a comfortable atmosphere, and gain preliminary insights into the participants' personal and professional backgrounds. This informal conversation helped foster a sincere, open, and friendly relationship between

the participants and the researchers, laying the foundation for the subsequent interviews. The second round of semi-structured interviews focused on the participants' educational experiences, their experiences working as TCSOL teachers in Thailand, and their future career plans. To encourage participants to think deeply about the interview topics, the researchers requested that participants use metaphors to respond to certain questions. For example, 'What metaphor would you use to describe yourself as a TCSOL teacher?' (Thomas & Beauchamp, 2011).

The focus group discussion was conducted by the former two authors and three participants. It mainly addressed the key points mentioned in the first two interviews, such as 'What makes you mention teaching Chinese and promoting Chinese culture first when talking about your responsibilities?' and 'Why do you all say that you represent the image of China?'. The final round of interviews took the form of a reporting-interview hybrid, where the first author presented the findings of the data analysis to each participant and solicited their opinions on the accuracy of these analyses. Concurrently, interviews were conducted with each participant to inquire about their recent work situations, aiming to uncover any new phenomena relevant to the research topic.

The first round of interviews took place in March 2023, shortly after the participants' first term had ended. At that time, they had been living and working in Thailand for approximately seven months. The second round of interviews occurred in September and October 2023, during the mid-term of their second contract. The focus group discussion took place in November 2023. The initial draft of this paper was completed in early 2024, and the third round of interviews commenced in mid-March 2024. At that time, the participants were approaching the end of their second term, marking another significant milestone in their professional development. All interviews and discussions were recorded. Due to geographical constraints, all data collection was conducted online. Participants voluntarily chose to use their native language (Chinese) for interviews, and transcription and translation were carried out collaboratively by the authors.

Ethical Considerations

This design and method were approved by the Ethics Committee of the Institute of Education at the University of Strathclyde (Approval Number: 290823). All participants signed consent forms before their participation, they voluntarily took part in the study, fully understanding their rights and responsibilities. For example, participants were informed that they had the right to refuse to answer or skip any interview questions, and they could withdraw from the study at any time without facing any consequences. Additionally, to protect participants' privacy, the researchers anonymized the participants (e.g., Lucy, Lily, James) and blurred any potentially identifying information, such as providing only general descriptions of their work locations (e.g., eastern provinces, large cities, well-known cities).

Data Analysis

This study employs DSMRI as the theoretical framework aiming to capture the intricate interactions among content, structure, and processes in the formation of identity for novice TCSOL teachers within the context of Thai sociocultural backgrounds (Kaplan & Garner, 2017). In practice, a deductive- inductive qualitative content analysis was conducted following the guidelines of Garner and Kaplan (2018) and the DSMRI Codebook (Kaplan & Garner, 2022). The key steps involve becoming familiar with the materials, annotating keywords and sentences, categorizing them into DSMRI content dimensions, discussing and confirming the categorizations, and repeating these steps until all materials are coded. Table 2 shows the examples of how these statements were coded.

We adhered to the advice of Miles et al. (2020) by conducting data analysis concurrently with data collection. Specifically, the first author transcribed participants' audio recordings into text, which was then cross-checked by the second author. After both authors agreed on the accuracy of the transcriptions, they individually conducted a meticulous reading of the transcription materials, highlighting words and sentences related to DSMRI content dimensions. Once the transcription materials for the first participant were fully coded, the two authors held meetings to cross-verify and discuss any discrepancies, continuing the discussion until a consensus was reached. This process was repeated for the materials of the second and third participants. The third author supervised the process, reviewed the English translation of the manuscripts, and provided feedback on revisions. The first round of interviews with the three participants yielded over 73,000 words of transcription material, resulting in a total of 288 text reference points based on the DSMRI content dimensions. The second round of interviews with the three participants yielded over 50,000 words of transcription material, resulting in a total of 160 text reference points. We initially conducted a comparative analysis of the content from the participant's first and second interviews, aiming to identify individual changes. Subsequently, we engaged in cross-case comparisons to identify commonalities and differences. We found that areas with greater discrepancies often involved sentences with multiple codes. These sentences may contain more nuanced information and thus require closer attention.

The work of Armstrong et al. (2011) and Gao and Cui (2021) provide valuable guidance for the metaphor analysis in this study. Armstrong et al. (2011) suggest that to enhance the credibility of metaphor analysis, researchers should intentionally incorporate triangulation into the research design and emphasize the importance of understanding social and cultural contexts when interpreting metaphors. Gao and Cui (2021) propose a four-step approach: identification, naming, grouping, and abstraction. Unlike studies such as Ma and Li (2017), which classify collected metaphors to extract themes, this paper views metaphors as an auxiliary tool that facilitates participants' reflective thinking during interviews. In our analysis, we consider potential comprehension challenges arising from

language, social, or cultural differences. Our process includes three main steps: identifying the metaphor, translating directly from Chinese to English, and providing contextual interpretation (see Table 3 for an example). As Yuan et al. (2022) noted, “our categorization of metaphors primarily reflects the identity orientations held by participants during the study” (p. 827).

In terms of establishing trustworthiness, in addition to conducting member checks for interview analysis and using a coding process to cross-check and discuss themes, we also paid close attention to translation issues in the excerpts presented in the findings section. To preserve the authenticity of the data and avoid any omissions of meaning or undue additions, we consistently reflected on our roles as researchers and conducted repeated checks of both the excerpts and their English translations. Additionally, we ensured content validity by aligning the interview questions with the study’s research objectives, ensuring that the data collected directly addressed the core research questions. Furthermore, the third author, who has extensive academic and research expertise, supervised all stages of the study to ensure adherence to academic standards and best practices.

Table 2

DSMRI Codebook Excerpts (More Examples See Garner & Kaplan, 2018).

DSMRI Dimensions	Operational Definition within Case	Teacher Role Examples
Self-definitions & self-perceptions	Statements about self, including personal characteristics, attributes, preferences, attitudes, emotions related to self, and how these relate to role	‘Working at the Confucius Institute perfectly fulfils my desire to be involved in foreign affairs’
Ontological & epistemological beliefs	Statements about the nature of the world and the knowledge that the teacher holds to be true, including the nature of the domain in which the teacher practices, and beliefs about the certainty, complexity, and source of knowledge and learning	‘I want to treat every student equally and do my best to have a good relationship with every student.’
Purpose and goals	Statements about the individual’s purpose and goals for teaching	‘But I would also say let them develop an interest and let them learn a little more.’
Perceived action possibilities	Statements about possibilities for activities related to the role, such as classroom practice, and the likelihood of, and contextual facilitators and inhibitors of, such actions	‘Last year it felt like I was just doing a monologue in class, while this year I’m trying to find ways to motivate the students and encourage everyone to stay engaged.’

RESULTS

The results of this study indicate that although the participants' 'role identity as learners' is consistently present, it shifts from 'learners as students' before entering practical teaching to 'learners as teachers' afterward, demonstrating a dynamic and dialogical relationship. Following the guidance of the DSMRI Codebook (Kaplan & Garner, 2022), the following section will begin with the participants' previous role identities, proceed to their current role identities, and end with future imagined role identities. This section will be structured around the content, structure, and processes of each role identity to illustrate the diversity, complexity, and dynamism of TCSOL teacher identity construction.

Participants' Previous Role Identities—Secondary School and University Students

All three participants mentioned their experiences with 'Zhong Kao' (the high school entrance examination), 'Gao Kao' (the college entrance examination), and university education as students. These experiences, along with their existing role identities, have shaped their self-perceptions, ontological and epistemological beliefs, purpose and goals, and action possibilities to some extent.

The Socio-cultural Context Is An Indispensable Control Parameter

In the cultural context of the Chinese education system, gaining admission to a reputable middle school and high school significantly increases the chances of entering a prestigious university. Consequently, Chinese society places great emphasis on the Zhong Kao and Gao Kao. The shared belief among schools, teachers, parents, and students is that 'hard work and diligent study lead to good results.' This phenomenon has historical roots. Chinese cultural traditions, such as Confucianism, value education highly, emphasizing that students should be diligent and respect their teachers. Teachers, in turn, are expected to be knowledgeable, morally upright, and dedicated to imparting knowledge to their students. This creates a teacher-centred tradition within the Chinese education system and consciously or unconsciously fosters an exam-oriented student role identity. This is evidenced in Lily's interview and Lucy's metaphor:

Lily: My impression of middle school teachers is that they were all particularly strict with me, both in terms of my grades and my behaviour.

Lucy: Students are blank paper. They will take on the shape of what and how we teach them. (When reflecting on her work in Thailand, Lucy used this phrase to emphasize the significant impact that teachers have on students in terms of knowledge, skills, and personal development.)

Alignment among Goals, Beliefs, and Action Possibilities

Due to their exam-oriented student role identity, the primary goal for the participants during this period was to achieve high scores, reflecting the alignment of goals, beliefs, and action possibilities in the DSMRI framework. However, participants had different self-

definitions, which reminds the authors to consider the potential impact of differences in gender, personality, and upbringing environments.

Lily: My grandmother was a high school teacher, and I have always enjoyed interacting with others. From primary school to high school, I attended a foreign language school where the teachers were excellent. I was eager to learn from them, especially because of the strong foreign language environment. This influenced my choice of major in college, making me more inclined towards international content.

Lucy: My grades from elementary to high school were not very good, and I barely got into college. However, at every stage, I encountered great teachers who helped me a lot.

The excerpts above reveal that teachers are significant others for the participants, their actions and ideologies have a profound impact on participants' possible future selves. Notably, positive role models inspire participants to emulate their teachers, while negative role models lead participants to avoid similar behaviours in their practice. This stems from the participants' reflections on their experiences in the role of students, bringing about a new understanding of the need to treat every student equally.

Lucy: My high school teacher paid special attention to students who performed well academically or had influential backgrounds while ignoring those who didn't.....From my high school teacher, I see the need to treat every student equally, not to see if his family is good or bad or what, or who has special care..... I want to treat every student equally and do my best to have a good relationship with every student.

Lily: From primary school to high school, I attended a foreign language school where the teachers were excellent. I was eager to learn from them, especially because of the strong foreign language environment. This influenced my choice of major in college, making me more inclined towards international content.

James: She (the teacher) has rich teaching experience, and her lectures are very clear. She has introduced many practical principles and ideas which are very easy to use, we just follow her methods, that's almost become a fixed pattern.

The Shifts in Goals, Action Possibilities, and Beliefs

Upon entering university, the participants still identified themselves as students, but their goals shifted from achieving high scores to becoming competent TCSOL teachers. Their actions evolved from merely absorbing knowledge to learning methods of imparting knowledge and skills. As their knowledge accumulated, they developed new perceptions of their future roles. Particularly, James, whose undergraduate major was in management and who pursued a master's degree in TCSOL, said:

I have a strong voice in this topic because I come from a cross-disciplinary background, and the education I received in TCSOL has been tremendously beneficial to my job. While I had some prior experience working with international students in China, it was more of an

after-school tutoring and didn't involve standing in front of a classroom, delivering lectures to a group of a dozen or more students. Especially, micro-teaching has been incredibly helpful.

In James's excerpt, he mentioned a potential factor that hinders the identity construction of novice TCSOL teachers: the form of the practicum. Both Lucy and James had practicums teaching Chinese to foreign students in China, whereas Lily's practicum involved teaching first-year students at a local school. These two forms of practicums differ significantly in terms of teaching targets, content, and social environment compared to the participants' actual work contexts. This disparity may require the participants to readjust their acquired experiences to adapt to their real jobs, likely diminishing their self-efficacy.

Lucy: During my practicum, I taught Russian exchange students, but it felt more like being a teaching assistant because a professional teacher was instructing them. My main responsibilities were individual tutoring, grading assignments, and helping them with their daily problems.

Lily: My university classified TCSOL as a teacher training program, which focused more on developing teaching skills. This made it easier for me to transition into a professional role..... The school where I interned placed a strong emphasis on grades, both parents and subject teachers were very concerned about rankings.

Despite some shortcomings, the TCSOL teacher education programme and practicums play an important role in the construction of teacher identities, especially in establishing goals and beliefs. The data show that 'teaching Chinese and spreading Chinese culture' is both the participants' goal and their belief. They believe that learners from different countries want to learn Chinese, and their role is to meet this demand, giving meaning to their role. These beliefs and goals are set by official documents and are continuously reinforced in the TCSOL teacher education system and training programs.

Lucy: (become a TCSOL teacher) I feel very honoured, and my responsibility is significant; we are not just teaching Chinese and culture but also representing the image of teachers and the Chinese people. In the place where I am, there are very few Chinese, the locals do not see me as an individual but as a representative of China.....This is related to our training, as each session emphasizes the importance of being mindful of our behaviour and actions.

From this perspective, the participants' self-perception is shaped by the sociopolitical context, imbuing their roles with significant and positive meanings that the participants are willing to embrace. This further underscores that, although the current practicum format provides valuable teaching experience, it does not perfectly align with TCSOL's goals.

Participants' Current Role Identities—Learners as Teachers

When the three participants conducted practical teaching in Thai classrooms, they were institutionally recognized as teachers. However, as they crossed boundaries, their professional development and identity construction experienced fluctuations. As novice TCSOL teachers, they had much to learn, such as the skills needed to impart knowledge to Thai students and how to interact with students and colleagues.

Supportive Social Context in Thailand

Although it was the first time for all three participants to teach outside of China, factors such as the respectful social atmosphere towards teachers in Thailand and the support from their colleagues helped them adapt to the new environment. The locals were friendly and the opportunities for tourism and cultural experiences made their lives vibrant, further deepening their affection for Thailand.

Lucy: Everyone (colleagues) took good care of me, especially when I got COVID, the school arranged for someone to deliver meals to me. The local shop owners often remind me to return home early, which makes me feel warm in my heart; The students here are very honest, even though some are not good at studying sometimes, even if they find one Thai Baht, they will hand it over to teachers.

Peripheral Domain and Conflicts between Beliefs and Actions

The schools where Lucy and James work do not place much emphasis on Chinese teaching, which prevents them from realizing their imagined roles as teachers and diminishes their motivation for self-learning. In contrast, Lily works at a Confucius Institute, leading to a different self-perception compared to the other two.

Lucy: My school told me not to assign Chinese homework to students because parents can't help with it, and there might be complaints if we do. Initially, I was very passionate about dedicating myself to Chinese education. Yes, I'm very enthusiastic about teaching Chinese. But after a while, I might start to slack off a bit and wonder how different this is from what I studied in university.

James: Later on, the school gave me a lot of translation work, and I ended up teaching very few Chinese classes. It feels like I'm not a Chinese teacher anymore but rather a translator.

Lily: We (at the Confucius Institute) have been very busy recently, besides teaching, we have two major events to organize..... During this process, I have met many experts and scholars, learned a lot from them, which has been very helpful for my personal growth.

Lucy and James' extracts show that strong negative emotions arise when beliefs, actions, and goals are not aligned, causing them to readjust their perceptions of themselves as TCSOL teachers; Lily's extract highlights another important finding, namely that by organising cultural activities, not only are they aligned with the goals of teacher education

programme and training, but that the experience and sense of achievement gained from holding the activities has increased her confidence in pursuing this profession.

Changes Reflect the Development of Identity

The sense of achievement Lily gained from organizing cultural activities strengthened her work behaviours. For Lucy and James, changes in their teaching behaviours were reflected in how they adapted the curriculum. Interestingly, Lucy insisted on following the textbook during the first semester, despite noticing that students were not performing well. In the second semester, she adapted the curriculum to address students' weaknesses. Conversely, James trimmed the teaching content in the first semester but reverted to following the textbook in the second semester. These changes in teaching behaviours are the result of participants' proactive reflection. Through practice, they learn how to improve teaching effectiveness to achieve their goals.

Lucy: The reason I didn't use the previous textbook from last semester is twofold. Firstly, that textbook wasn't suitable for the students. Secondly, when I taught them last semester, I noticed that they had weak foundations in areas like Pinyin and stroke order. So, this semester, my primary focus is to help them build a solid foundation.

James: this term I didn't make as many alterations to the course materials as I did last semester. Instead, I tried to stick with the original content..... In the past, I simply taught based on what I learned from textbooks, but now I make more adjustments based on experience. For instance, last year it felt like I was just doing a monologue in class, while this year I'm trying to find ways to motivate the students and encourage everyone to stay engaged.

James uses the Chinese proverbs 'crossing the river by feeling the stones' and 'a newborn calf is not afraid of a tiger' to describe his process of exploration and learning when he started practical work.

Critical incidents have altered the participants' beliefs and behaviours, leading to a redefinition of their self-perception. Lucy vividly recalls an incident related to classroom discipline. During one class, a student was talking, Lucy reminded him three times, using Chinese, English, and Thai languages. However, the student did not stop and instead imitated Lucy's way of speaking Thai. This made Lucy very angry, and she sought help from her Thai colleague in the neighbouring class. The Thai colleague then escorted the student out of the classroom, resulting in good discipline in that class afterward. Later on, that same student started to study, which deeply moved Lucy, and she actively helped him. This also corroborates Lucy's metaphor that 'Thai students are angels when they're out of class and devils when they're in class.'

For Lily and James, the policy documents from CLEC had a significant impact. According to CLEC's guidelines, Lily must be at least 26 to advance to a higher teaching level, but she has not yet met the age requirement. This forced her to reconsider her career

plans. James exhibited noticeable changes between the former two interviews. In the first interview, he expressed a strong determination to continue his career in TCSOL. However, during the second interview, he displayed obvious uncertainty, accompanied by intense negative emotions. This transformation was primarily triggered by the recruitment regulations for dispatched teachers had been changed. This change led to a sense of ‘crisis’ for James:

(When I saw the notice) it was a very anxious time, I told my mum (jokingly) that I didn't want to live, hahahahahahaha (laughter), I was really about to get depressed during that time. I need to consider finding a job in the future, I think the earlier you prepare for anything the better, it's not like if I ignore it, it will just disappear.

James's metaphors also provide evidence of this shift (see Table 3). The transition from ‘rice bowl’ to ‘brick mover’ shows that James's perception of the TCSOL profession has moved from idealistic to realistic. Lucy and Lily exemplified this change as well. The inconsistency between their beliefs, goals and their actions in practice prompted a change in their perceptions: Lucy initially believed in ‘treating every student equally and getting along with every student,’ but she later found that ‘this is very difficult to achieve.’ Similarly, Lily moved from wanting to continue her TCSOL career to reconsidering her career plans. This shift from idealism to realism also led to changes in participants' beliefs, goals, action possibilities, and self-perceptions, influencing their professionalism as teachers.

The excerpts above demonstrate that as novice teachers, the participants are learning in practice how to teach Chinese effectively (such as modifying teaching materials) and how to communicate with students (such as handling disciplinary issues). This process is accompanied by emotional fluctuations: when beliefs, goals, and self-perception align, participants experience positive emotions (like Lucy feeling moved when a previously disruptive student began studying seriously). Conversely, when there is a mismatch between beliefs, self-perception, and action possibilities, negative emotions arise (such as Lily and James feeling uncertain about their future career development).

Table 3

James's Metaphors

Metaphors	Literal Translation	Paraphrasing
教(jiāo) 中(Zhōng) 文(wén) 是(shì) 我(wǒ) 的(de) 饭(fàn) 碗(wǎn) , 我(wǒ) 要(yào) 把(bǎ) 饭(fàn) 碗(wǎn) 端(duān) 稳(wěn) 点(diǎn)	Teaching Chinese is my rice bowl, I should keep it steady.	The statement conveys that teaching Chinese is his livelihood, and it reflects his determination and effort to ensure the stability and success of his work.
年(nián) 轻(qīng) 的(de) 热(rè) 血(xuè) 铸(zhù) 就(jiù) 了(le) 国(guó) 际(jì) 中(zhōng) 文(wén) 教(jiào) 育(yù) 的(de) 长(Cháng) 城(chéng)	Young blood forges the Great Wall of international Chinese language education	In the interview, he used this statement not only to speak about the role of young people in the field of TCSOL but also with a tinge of pathos, pointing out its instability. This is an Internet buzzword, roughly similar in meaning to 'migrant worker.' James used it to describe his transition in feelings towards TCSOL from idealistic to realistic.
我(wǒ) 是(shì) 一(yí) 个(ge) 打(dǎ) 工(gōng) 人(rén) , 一(yí) 个(ge) 搬(bān) 砖(zhuān) 人(rén)	I am a labourer; I am a brick mover.	

Differences leading to changes in beliefs, goals, action possibilities and self-perceptions. These differences primarily arise from the contrast between the participants' personal experiences and the actual teaching context in Thailand. The differences are manifested in several ways: As students, the participants worked hard in school, focusing on academics and preparing for the Gaokao, whereas Thai students did not meet their expectations in terms of effort, and Thai schools prioritized activities over academics; The participants' classroom behaviour as students (e.g. following the teacher's instructions) contrasted with the classroom discipline issues they encountered with Thai students; The pressure observed in Chinese students (such as striving for high scores) differed from the lack of academic pressure among Thai students; There were differences between the skills participants learned in teacher education programs and the realities of teaching practice; The participants received information indicating a strong demand for Chinese language learning among foreign learners, which contrasted with the lack of emphasis placed on it by the institutions and students they were teaching.

These differences posed challenges for the participants, who used various strategies, such as colleague support and self-reflection, to address these issues. Through this process, their beliefs about teaching and the role of a teacher changed, as did their teaching goals, actions possibilities, and self-perceptions. One piece of evidence is the shift from idealism to realism in their perception of the TCSOL profession as mentioned above.

Lucy: In the beginning, I wholeheartedly dedicated myself to the cause of Chinese education. Yes, I was genuinely passionate about teaching Chinese. However, after some time, there might have been some lethargy. I realized that this wasn't exactly what I had studied in college... It's quite a bit different from what I first expected to become as a teacher, I never expected that I would become this type of figure.

Lily: Thai students are not in the habit of copying and memorising, you can't demand high grades from Thai students like you do with Chinese students, otherwise, it will only lead to the teacher becoming depressed.

James: Chinese class at this college is an elective. Sometimes when the school has activities or students have exams, the Chinese class gets cancelled.

Inadequate Thai Language Proficiency and Professional Competence Constrain Goals and Self-perceptions

Participants expressed that their inadequate Thai language skills caused inconveniences in their work, and combined with their limited professional capabilities, they felt their teaching performance did not align with the ideal image of a language teacher.

Lucy: I don't speak Thai well, so I don't have any contact with student's parents..... I have problems communicating with them (students) in Thai, so I type for them, use Google Translate, and tell them can't be late for my class.

Lily: I don't know how to speak Thai and can only use English as the medium of instruction. I worry that students might not understand, and the teaching outcomes might not meet my expectations. I also feel that my professional knowledge is not solid enough. For instance, if I am suddenly asked to explain a grammar clearly, I would be very hesitant.

Beliefs, Goals, Action Possibilities, and Self-perceptions which Beyond Teaching

Participants generally expressed that their words and actions represent not only themselves but also the image of Chinese teachers, Chinese people, and China as a whole. One of their goals is to dispel stereotypes about Chinese people and establish a new image of China. This is evidenced by their metaphors such as 'cultural ambassador,' 'bridge,' and 'change agent.' This aligns with the goals set by the Chinese educational authorities, instilling a sense of mission and honour in the participants, which empowers their professional development and identity construction. In the future, attention should be paid to the potential impact of negative reports about Confucius Institutes mentioned in the literature review on the participants.

Lucy: I think it is because our school is a Chinese school, that will be affected by the relationship between the two countries There are fewer Chinese on my side, when I walk down the street and people see me, they don't see me as an individual, they see Chinese teachers and China in me.

Lily: The work at the Confucius Institute is very diverse. It's not just about teaching Chinese; we also organize many large-scale cultural events. The Confucius Institute serves as a bridge for cultural exchange, and I am now in the role of an exporter.

James: Everyone around me is Thai, and they interpret my every word and action as representative of Chinese behaviour, so I'm extra cautious. I find this job to be incredibly meaningful. We not only enhance our professionalism in teaching, but at a deeper level, we're striving to reshape an image, showing them what contemporary Chinese people are like.

It can be seen that the relationships between the two countries might have emerged as influential factors in the formation of novice TCSOL teacher identity. When researchers inquired about the reasons behind this assertion during interviews, participants pointed out that although the relationships between the two countries may seem distant from their personal lives, they do impact their psychological states and behaviours. As James put it, good relations between the two nations would require more TCSOL teachers, which encourages him to excel and set a positive example for future teachers. Furthermore, James also mentioned that due to the Russia-Ukraine conflict, many TCSOL teachers were unable to continue working in their respective countries and had returned to China.

Consistent Belief and Goal—Students' Interest in Learning Chinese

All three participants consistently emphasized the importance of Thai students' interest in learning Chinese throughout the interviews. This emphasis may stem from the participants' reflections on their own experiences as students and the status of Chinese language in the local context. The institutions they work for do not necessarily expect or enforce a relatively formal and impersonal role for teachers in front of students.

Lucy: I want to treat every student equally and do my best to have a good relationship with every student, but that's not really how it works in teaching. But I would also say let them develop an interest and let them learn a little more.

Lily: I think that having an interest in learning a language is really important. First, you need to attract their interest, and then they can better accept the language. When they encounter difficulties in learning, they won't feel discouraged.

James: Ideally, regardless of the nationality or proficiency level of my students, I want to spark their interest in Chinese. What's important is cultivating their interest so that they all want to learn Chinese. I think if I can achieve that, then I've achieved my goal.

Participants' Future Imagined Role Identities

The three participants have different responses regarding whether they will continue working as a TCSOL teacher. Lucy has clearly stated that she will not work in Thailand for a third year, she hopes to return to China and find a job as a teacher or a civil servant. Lily, due to not meeting CLEC's age requirement, might first apply for a master's program in

Thailand, but she is unsure if she will continue in TCSOL after graduation. James expressed that he would like to continue working in TCSOL if possible. As of the time of submission, Lucy has returned to China, Lily is still working at the Confucius Institute, and James has applied to teach Chinese in South America.

This reflects the uncertainty novice TCSOL teachers face regarding their future career development, which may hinder identity construction and professional growth. A potential reason for this uncertainty, or even the decision to leave the profession, is the instability of TCSOL work due to the need to work in different countries. This instability is 'not aligned with the basic expectations of many Chinese people and is also subject to the influence of international relations (from James)'.

DISCUSSION

How do novice TCSOL teachers perceive or identify themselves within the Thai environment? How does the formation and construction process of novice TCSOL teacher identity correspond to factors identified in existing research?

The three participants believe their primary task is to teach Chinese language and culture to Thai students, emphasizing the importance of Thai students' interest in learning Chinese. They recognize themselves as novice TCSOL teachers, especially when encountering difficulties and feeling inadequate. Through continuous reflection on their prior experiences and current teaching practices, they learn and adjust their behaviours to achieve their goals. Notably, they perceive their actions as representing not only themselves but also the image of China and Chinese people. This sense of mission and responsibility motivates them to present their best selves to students and those around them, aiding their professional growth and identity formation.

According to DSMRI, participants' current role identities (e.g. novice TCSOL teachers) are inseparable from their past role identities (e.g. students) and future imagined role identities (e.g. master students or TCSOL teachers) (Kaplan & Garner, 2017). They reflect on and derive meaning from their previous role identity experiences, negotiating and reinterpreting them in interactions with others and the wider field (Pennington & Richards, 2016; Sachs, 2005). This demonstrates the interplay of identities-in-practice (Varghese et al., 2005; Wenger, 1998), identities-in-discourse (Fairclough, 2003; Trent, 2012), and identities-in-activities (Dang, 2013), proving the complexity of identity formation.

In this study, participants exhibit primary role identities such as TCSOL student role identity, Chinese teacher role identity, teacher-learner role identity, cultural disseminator role identity, and the identity of representing China and Chinese people, reflecting that identity development is emergent, continuous, non-linear, and contextualised. This indicates that the TCSOL teacher role identity itself constitutes an element within a multi-level hierarchical structure, which at the individual unit-of-analysis reflects a complex dynamic system comprising multiple role identities (Kaplan & Garner, 2017).

The beliefs, goals, action possibilities, and self-perceptions of novice TCSOL teachers are significantly influenced by social and political contexts (Lasky, 2005). This reflects the Chinese government's strong desire to promote contemporary China globally through Confucius Institutes and Chinese teachers. The study found that the lack of emphasis on Chinese language by overseas educational institutions or students can lead to negative emotions among novice TCSOL teachers (e.g., James). Considering that novice teachers might be shocked by the disparity between idealized teaching styles and real classroom situations, it suggests that teacher identity should be better integrated with existing TCSOL teacher education programs (e.g., Flum & Kaplan, 2012; Kanno & Stuart, 2011) to help novice teachers better cope with potential challenges.

Participants' perceptions of themselves are influenced not only by their past experiences, teacher education, and language proficiency (Richards, 2023) but also by their interactions and relationships with students, teaching institutions, and communities, as well as social, cultural, political, and historical forces (Rodgers & Scott, 2008). Teachers are not empty vessels (Kanno & Stuart, 2011) their understanding of relationships with others and their comprehension of social, cultural, political, and historical forces are crucial. In this process, teachers identify different ways to understand their experiences, reflecting the diverse developmental capacities of their self-concept, thereby influencing their understanding of their identities (Rodgers & Scott, 2008). From this point we see the possibility and necessity for individual teachers to participate as researchers in studies on teacher identity.

Izadinia (2013) and Olsen et al. (2022) call for enhanced research on teacher identity in developing regions such as Asia. They advocate for 'applying teacher identity in new locations, also using the new contexts to grow teacher identity as a concept, will deepen and strengthen the field.' This article emphasizes that when studying teacher identity in Asian regions (such as China and Thailand), cultural influences must not be overlooked (as highlighted in DSMRI). For instance, traditional Chinese culture emphasizes that students should be diligent and respectful towards teachers, while teachers should have authority and be held to high expectations (Ma & Gao, 2017). This cultural expectation contrasts with the experiences of novice TCSOL teachers in cross-cultural classroom settings, leading to a sense of uncertainty, ambiguity, and tension among the participants. Such uncertainty, ambiguity, or tension reflects instability factors that can act as system triggers in the process of role identity formation (Kaplan & Garner, 2017). Finally, the findings align with the transition cycle outlined by Adams et al. (1976), as cited by Meijer (2017).

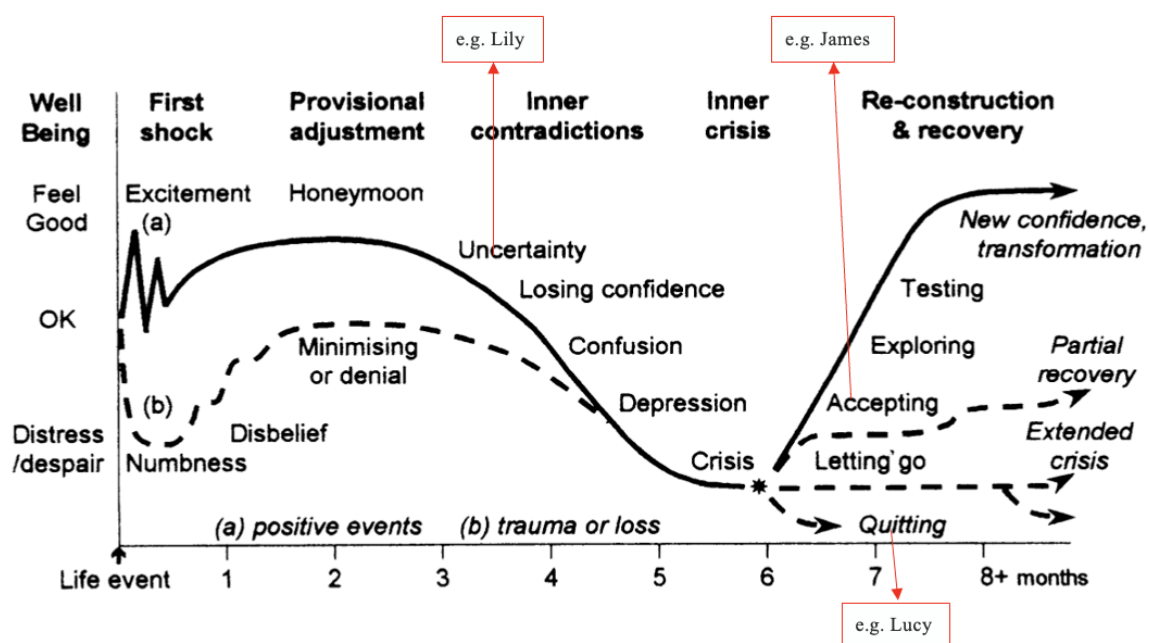


Figure 2. Phases and features of the transition cycle, Adams et al. (1976), cited by Meijer, 2017

What distinctive characteristics define novice TCSOL teacher identity at this stage?

Beyond merely focusing on the characteristics of novice TCSOL teacher identity construction, this research likes to emphasize the following points.

First, novice TCSOL teachers possess a strong sense of mission and responsibility, which is primarily cultivated through TCSOL teacher education programs. Many of their beliefs and goals extend beyond language teaching, highlighting the potential connections between international relations and individual psychology and behaviour. This demonstrates that teacher identity is influenced by social and political contexts (Lasky, 2005; Zhu & Zhu, 2018). Moreover, there is a significant discrepancy between the idealized scenarios described in TCSOL teacher education programs (e.g., strong demand for learning Chinese among foreign learners) and the teaching realities encountered by novice teachers (e.g., the marginalization of Chinese language instruction in local schools). This misalignment leads to transfer shock (Caspersen & Raaen, 2014), and the impact of cross-boundary experiences on new teachers' identity development has been increasingly recognized (e.g., Beauchamp & Thomas, 2011). To mitigate the negative effects of such shocks on novice TCSOL teachers' identity formation and professional development, our recommendations align with those of Kanno and Stuart (2011) and Richards (2023), advocating for the inclusion of identity-related content in existing TCSOL teacher education programs. This could help teachers develop an awareness of identity formation and strengthen their understanding of its ongoing evolution (Beauchamp & Thomas, 2009).

Second, organizing cultural activities aligns with the objectives of TCSOL teacher education by reinforcing the consistency between individual and group behaviours within the TCSOL community, strengthening novice teachers' identification with the professional group. Additionally, positive emotions, such as the experiences and sense of achievement gained from these activities, contribute to the construction of novice TCSOL teachers' professional identity, demonstrating identity-in-activity (Dang, 2013; Karimi & Mofidi, 2019), an aspect that has been relatively underexplored in TCSOL teacher identity research. Therefore, in practice, TCSOL teacher education programs should emphasise the psychological and behavioural developments of novice teachers during cultural activities. Furthermore, integrating existing cultural activity cases into training can help cultivate and enhance the organizational and innovative abilities of novice TCSOL teachers in planning and implementing such activities.

Third, the significant role of practicum in the identity formation of pre-service and novice teachers has been widely acknowledged (e.g., Wang et al., 2021; Zhu et al., 2022). This study finds that the current practicum format for TCSOL teachers differs from their actual teaching practice, hindering professional development and identity construction. Improvements to the current internship format are needed, such as establishing reciprocal teacher education programs between countries (Xu & Connelly, 2022) to help more students experience overseas classrooms. These practices can enhance the 'language socialization' process of teachers (Sang, 2023), aiding in their identity formation.

Fourth, the three novice TCSOL teachers experienced a shift in their perception of teaching activities from naive and idealistic views to more realistic ones (Lindqvist et al., 2017), particularly after encountering critical incidents (Nazari & De Costa, 2022). Reflection on these experiences promotes personal and professional growth (Walkington, 2005). We advocate for novice TCSOL teachers to develop a habit of self-reflection, such as keeping a teaching reflection journal or recording reflective teaching videos. Furthermore, we suggest that CLEC establish a database to collect these reflective materials and encourage interested researchers to conduct studies based on this data. This would facilitate the identification of emerging challenges and the development of more effective recommendations for TCSOL teacher education and professional development.

Fifth, given challenges like limited Thai language proficiency, inadequate professional skills, and inappropriate teaching materials, it is essential to emphasize the importance of professional learning skills (e.g., Beijaard et al., 2022; Sun et al., 2022) for novice TCSOL teachers. Specifically, in addition to the aforementioned reflections, another essential professional learning skill is teacher agency. Becoming the agent of one's own development requires teachers to indicate how they see themselves as teachers (possessing a professional self-image) and to identify the key areas they need to learn in order to become competent teachers (Beijaard et al., 2022). Novice TCSOL teachers must learn to regulate and take responsibility for their own learning. In other words, when facing challenges such as Thai language proficiency or the applicability of teaching materials, TCSOL teachers can exercise

their agency to find appropriate solutions. The role of TCSOL teacher education programs and teacher identity development, therefore, is to cultivate teachers' awareness of their own agency, encourage them to take initiative, and provide necessary support measures to facilitate the implementation of their efforts.

Lastly, despite researchers (e.g., Yang et al., 2021) have called for long-term, large-scale studies on teacher identity, we recognise the importance of the diversity and individual agency within the teacher community, we advocate for more teachers to participate as researchers in studies on language teacher identity. This can be facilitated by creating open-source databases to collect real-life cases from teachers or by establishing online/offline teacher identity workshops (Beijaard et al., 2022).

We hope more attention will be drawn to the construction process of TCSOL teacher identities within the Chinese academic community, such as by launching journals focused on identity themes to promote empirical research on teacher identity in China (Asia). We also hope that educational institutions in Thailand will pay more attention to Chinese language teaching.

CONCLUSION

Framed within the Dynamic Systems Model of Role Identity (DSMRI), this paper investigates the experiences of three novice TCSOL teachers in Thailand, revealing that the 'role identity as learners' is consistently present. Chronologically, distinguishing between 'learner as a student' and 'learner as a teacher,' as well as the future imagined role identities, indicating identity development involves the formation and restructuring of relationships within and among role identities through intra- and interpersonal processes. These processes are mediated by socio-cognitive and cultural means and are shaped by the context as well as individual dispositions (Kaplan & Garner, 2017). The study uncovers that novice TCSOL teachers hold beliefs and goals beyond language teaching (e.g. representing an image of China), highlighting the influence of social and political contexts on teacher identity construction. This identity construction is further reinforced through holding cultural activities, emphasizing the importance of international relations and host country culture in TCSOL teacher identity research. The study has certain limitations, particularly the small sample size, which may restrict the broader applicability of the findings. Furthermore, the reliance on interviews for data collection and the relatively short timeframe might affect the robustness of the conclusions. Future research should address these limitations by conducting more extensive studies.

REFERENCES

- Akkerman, S. F., & Meijer, P. C. (2011). A dialogical approach to conceptualizing teacher identity. *Teaching and Teacher Education*, 27(2), 308–319.
<https://doi.org/10.1016/j.tate.2010.08.013>

- Armstrong, S. L., Davis, H. S., & Paulson, E. J. (2011). The Subjectivity Problem: Improving Triangulation Approaches in Metaphor Analysis Studies. *International Journal of Qualitative Methods*, 10(2), 151–163. <https://doi.org/10.1177/160940691101000204>
- Beauchamp, C., & Thomas, L. (2009). Understanding teacher identity: an overview of issues in the literature and implications for teacher education. *Cambridge Journal of Education*, 39(2), 175–189. <https://doi.org/10.1080/03057640902902252>
- Beauchamp, C., & Thomas, L. (2011). New teachers' identity shifts at the boundary of teacher education and initial practice. *International Journal of Educational Research*, 50(1), 6–13. <https://doi.org/10.1016/j.ijer.2011.04.003>
- Beijaard, D., Koopman, M., & Schellings, G. (2022). Reframing Teacher Professional Identity and Learning. *The Palgrave Handbook of Teacher Education Research*, 1–23. https://doi.org/10.1007/978-3-030-59533-3_28-1
- Beijaard, D., Meijer, P. C., & Verloop, N. (2004). Reconsidering research on teachers' professional identity. *Teaching and Teacher Education*, 20(2), 107–128. <https://doi.org/10.1016/j.tate.2003.07.001>
- Brandão, A. C. de L. (2021). First experiences of teaching EFL in metaphors. *Teaching and Teacher Education*, 97, 103214. <https://doi.org/10.1016/j.tate.2020.103214>
- Buchanan, R. (2015). Teacher identity and agency in an era of accountability. *Teachers and Teaching*, 21(6), 700–719. <https://doi.org/10.1080/13540602.2015.1044329>
- Caspersen, J., & Raaen, F. D. (2014). Novice teachers and how they cope. *Teachers and Teaching*, 20(2), 189–211. <https://doi.org/10.1080/13540602.2013.848570>
- Chen, B., & Huang, J. (2022). Toward a framework for understanding translation and interpreting teacher role identity. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.980196>
- Chen, C., Ji, S., & Jiang, J. (2023). How does professional identity change over time among Chinese preservice preschool teachers? Evidence from a four-wave longitudinal study. *Teaching and Teacher Education*, 125, 104071. <https://doi.org/10.1016/j.tate.2023.104071>
- Chong Ewe, L., & Min, F. (2021). Teaching Chinese Language Outside of China: The Case of Chinese Teachers in Thailand. *Asia-Pacific Social Science Review*, 21(4).
- Cobb, D. J. (2022). Metaphorically drawing the transition into teaching: What early career teachers reveal about identity, resilience and agency. *Teaching and Teacher Education*, 110, 103598. <https://doi.org/10.1016/j.tate.2021.103598>
- Dang, T. K. A. (2013). Identity in activity: Examining teacher professional identity formation in the paired-placement of student teachers. *Teaching and Teacher Education*, 30, 47–59. <https://doi.org/10.1016/j.tate.2012.10.006>
- de Guerrero, M. C. M., & Villamil, O. S. (2002). Metaphorical conceptualizations of ESL teaching and learning. *Language Teaching Research*, 6(2), 95–120. <https://doi.org/10.1191/1362168802lr101oa>

- Derakhshan, A., & Nazari, M. (2023). "I am Fed Up with the Criticisms": Examining the Role of Emotional Critical Incidents in a Novice Teacher's Identity Construction. *The Asia-Pacific Education Researcher*. <https://doi.org/10.1007/s40299-022-00666-1>
- Erickson, L. B., & Pinnegar, S. (2016). Consequences of personal teaching metaphors for teacher identity and practice. *Teachers and Teaching*, 23(1), 106–122. <https://doi.org/10.1080/13540602.2016.1203774>
- Fahad Alfayez, A. (2022). Saudi Female Teachers' Identity Through the Use of Metaphors. *Arab World English Journal*, 13(3), 139–158. <https://doi.org/10.24093/awej/vol13no3.9>
- Fantilli, R. D., & McDougall, D. E. (2009). A study of novice teachers: Challenges and supports in the first years. *Teaching and Teacher Education*, 25(6), 814–825. <https://doi.org/10.1016/j.tate.2009.02.021>
- Farrell, T. S. C. (2016). Surviving the transition shock in the first year of teaching through reflective practice. *System*, 61(61), 12–19. <https://doi.org/10.1016/j.system.2016.07.005>
- Flum, H., & Kaplan, A. (2012). Identity formation in educational settings: A contextualized view of theory and research in practice. *Contemporary Educational Psychology*, 37(3), 240–245. <https://doi.org/10.1016/j.cedpsych.2012.01.003>
- Gao, Y., & Cui, Y. (2021). To arrive where you are: A metaphorical analysis of teacher identity change in EAP reform. *Teaching and Teacher Education*, 104, 103374. <https://doi.org/10.1016/j.tate.2021.103374>
- Garner, J. K., & Kaplan, A. (2018). A complex dynamic systems perspective on teacher learning and identity formation: an instrumental case. *Teachers and Teaching*, 25(1), 7–33. <https://doi.org/10.1080/13540602.2018.1533811>
- Gatbonton, E. (2008). Looking beyond teachers' classroom behaviour: Novice and experienced ESL teachers' pedagogical knowledge. *Language Teaching Research*, 12(2), 161–182. <https://doi.org/10.1177/1362168807086286>
- Gu, M. (Michelle), & Benson, P. (2014). The formation of English teacher identities: A cross-cultural investigation. *Language Teaching Research*, 19(2), 187–206. <https://doi.org/10.1177/1362168814541725>
- Han, Y., & Ji, X. (2021). Chinese Self, Australian Other: Chinese as a Foreign Language Teacher Identity Construction in Australian Contexts. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.792004>
- Hathcock, S. J., Garner, J. K., & Kaplan, A. (2020). Examining micro-change within and among science teachers' identities: A multiple case study. *Science Education*, 104(5). <https://doi.org/10.1002/sce.21577>
- Heffernan, K. A., & Newton, K. J. (2019). Exploring mathematics identity: an intervention of early childhood preservice teachers. *Journal of Early Childhood Teacher Education*, 40(3), 296–324. <https://doi.org/10.1080/10901027.2019.1590484>
- Hong, J., Day, C., & Greene, B. (2018). The construction of early career teachers' identities: coping or managing? *Teacher Development*, 22(2), 249–266. <https://doi.org/10.1080/13664530.2017.1403367>

- Hong, J., Dionne Cross Francis, & Schutz, P. A. (2024). Reconceptualizing teacher identity development. *Educational Psychologist*, 1–18.
<https://doi.org/10.1080/00461520.2023.2292713>
- Hu, Y., Sun, Y., & Lien, D. (2022). The Resistance and Resilience of National Image Building: An Empirical Analysis of Confucius Institute Closures in the USA. *The Chinese Journal of International Politics*, 15(2), 209–226. <https://doi.org/10.1093/cjip/poac010>
- Izadinia, M. (2013). A review of research on student teachers' professional identity. *British Educational Research Journal*, 39(4), 694–713.
<https://doi.org/10.1080/01411926.2012.679614>
- KANNO, Y., & STUART, C. (2011). Learning to Become a Second Language Teacher: Identities-in-Practice. *The Modern Language Journal*, 95(2), 236–252.
<https://doi.org/10.1111/j.1540-4781.2011.01178.x>
- Kaplan, A., & Garner, J. K. (2017). A complex dynamic systems perspective on identity and its development: The dynamic systems model of role identity. *Developmental Psychology*, 53(11), 2036–2051. <https://doi.org/10.1037/dev0000339>
- Karimi, M. N., & Mofidi, M. (2019). L2 teacher identity development: An activity theoretic perspective. *System*, 81, 122–134. <https://doi.org/10.1016/j.system.2019.02.006>
- Kayi-Aydar, H. (2019). Language teacher identity. *Language Teaching*, 52(3), 281–295.
<https://doi.org/10.1017/s0261444819000223>
- Kövecses, Z. (2010). *Metaphor: a Practical Introduction*. Oxford University Press.
- Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. University of Chicago Press.
- Lasky, S. (2005). A sociocultural approach to understanding teacher identity, agency and professional vulnerability in a context of secondary school reform. *Teaching and Teacher Education*, 21(8), 899–916. <https://doi.org/10.1016/j.tate.2005.06.003>
- Lefebvre, J., Lefebvre, H., & Lefebvre, B. (2022). Reflection of novice teachers on their teaching practice. *Reflective Practice*, 1–15. <https://doi.org/10.1080/14623943.2022.2056883>
- Lindqvist, H., Weurlander, M., Wernerson, A., & Thornberg, R. (2017). Resolving feelings of professional inadequacy: Student teachers' coping with distressful situations. *Teaching and Teacher Education*, 64, 270–279. <https://doi.org/10.1016/j.tate.2017.02.019>
- Liu, X. (2019). So Similar, So Different, So Chinese: Analytical Comparisons of the Confucius Institute with its Western Counterparts. *Asian Studies Review*, 43(2), 256–275.
<https://doi.org/10.1080/10357823.2019.1584602>
- Liu, Y., & Li, X. (2023). A Narrative Inquiry of Transnational Language Teachers' Professional Identity Construction. *Journal of Language, Identity & Education*, 1–18.
<https://doi.org/10.1080/15348458.2022.2160332>
- Ma, X., & Gao, X. (2017). Metaphors used by pre-service teachers of Chinese as an international language. *Journal of Education for Teaching*, 43(1), 71–83.
<https://doi.org/10.1080/02607476.2016.1182372>
- Meijer, P. C. (2017). Essential Issues in Developing a Professional Identity as a Teacher. *New Frontiers of Educational Research*, 207–223.

https://doi.org/10.1007/978-981-10-3549-4_12

- Miles, M. B., Huberman, A. M., & Saldaña, J. (2020). *Qualitative Data Analysis: a Methods Sourcebook* (4th ed.). Sage.
- Nazari, M., & De Costa, P. I. (2022). Contributions of a Professional Development Course to Language Teacher Identity Development: Critical Incidents in Focus. *Journal of Teacher Education*, 002248712110591. <https://doi.org/10.1177/00224871211059160>
- Nazari, M., De Costa, P. I., & Karimpour, S. (2023). Novice language teacher identity construction: similarities, differences, and beyond. *Educational Linguistics*, 0(0). <https://doi.org/10.1515/eduling-2022-0013>
- Olsen, B., Buchanan, R., & Hewko, C. (2022). Recent Trends in Teacher Identity Research and Pedagogy. *The Palgrave Handbook of Teacher Education Research*, 1–24. https://doi.org/10.1007/978-3-030-59533-3_80-1
- Pan, S. (2013). Confucius Institute project: China's cultural diplomacy and soft power projection. *Asian Education and Development Studies*, 2(1), 22–33. <https://doi.org/10.1108/20463161311297608>
- Pillen, M., Beijaard, D., & Brok, P. den. (2013). Tensions in beginning teachers' professional identity development, accompanying feelings and coping strategies. *European Journal of Teacher Education*, 36(3), 240–260. <https://doi.org/10.1080/02619768.2012.696192>
- Repnikova, M. (2022). Rethinking China's Soft Power: "Pragmatic Enticement" of Confucius Institutes in Ethiopia. *The China Quarterly*, 1–24. <https://doi.org/10.1017/s0305741022000340>
- Richards, J. C. (2023). Teacher, Learner and Student-Teacher Identity in TESOL. *RELC Journal*, 54(1), 003368822199130. <https://doi.org/10.1177/0033688221991308>
- Rodgers, C. R., & Scott, K. H. (2008). The development of the personal self and professional identity in learning to teach. In *Handbook of Research on Teacher Education* (pp. 732–755). Routledge.
- Ruohotie-Lyhty, M., & Moate, J. (2016). Who and how? Preservice teachers as active agents developing professional identities. *Teaching and Teacher Education*, 55, 318–327. <https://doi.org/10.1016/j.tate.2016.01.022>
- Sachs, J. (2005). Teacher education and the development of professional identity: learning to be a teacher 1. In Connecting policy and practice. In *Connecting Policy and Practice* (pp. 5–21). Routledge.
- Sang, Y. (2022). Research of Language Teacher Identity: Status Quo and Future Directions. *RELC Journal*, 53(3), 003368822096156. <https://doi.org/10.1177/0033688220961567>
- Sang, Y. (2023). Uncovering language socialization mechanisms in language teacher identity formation: An ethnographic study in a Chinese culture class. *Linguistics and Education*, 73, 101138. <https://doi.org/10.1016/j.linged.2022.101138>
- Schellings, G., Koopman, M., Beijaard, D., & Mommers, J. (2021). Constructing configurations to capture the complexity and uniqueness of beginning teachers' professional identity. *European Journal of Teacher Education*, 1–25. <https://doi.org/10.1080/02619768.2021.1905793>

- STARR, D. (2009). Chinese Language Education in Europe: the Confucius Institutes. *European Journal of Education*, 44(1), 65–82. <https://doi.org/10.1111/j.1465-3435.2008.01371.x>
- Sun, P. P. (2021). Understanding the Sustainable Development of L2 Chinese Teachers in New Zealand: A Case Study of Teaching Assistants' Motivational Engagement in Teaching Chinese as a Foreign Language. *Sustainability*, 13(10), 5521. <https://doi.org/10.3390/su13105521>
- Sun, P. P., Wang, Y., Lv, Y., & Li, Z. (2022). Novice Chinese as a foreign language teachers' identity construction in primary schools in New Zealand from positioning and affordance perspectives. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.979803>
- Thomas, L., & Beauchamp, C. (2011). Understanding new teachers' professional identities through metaphor. *Teaching and Teacher Education*, 27(4), 762–769. <https://doi.org/10.1016/j.tate.2010.12.007>
- Trent, J. (2012). The Discursive Positioning of Teachers: Native-Speaking English Teachers and Educational Discourse in Hong Kong. *TESOL Quarterly*, 46(1), 104–126. <https://doi.org/10.1002/tesq.1>
- TSUI, A. B. M. (2007). Complexities of Identity Formation: A Narrative Inquiry of an EFL Teacher. *TESOL Quarterly*, 41(4), 657–680. <https://doi.org/10.1002/j.1545-7249.2007.tb00098.x>
- Varghese, M., Morgan, B., Johnston, B., & Johnson, K. A. (2005). Theorizing Language Teacher Identity: Three Perspectives and Beyond. *Journal of Language, Identity & Education*, 4(1), 21–44. https://doi.org/10.1207/s15327701jlie0401_2
- Walkington, J. (2005). Becoming a teacher: encouraging development of teacher identity through reflective practice. *Asia-Pacific Journal of Teacher Education*, 33(1), 53–64. <https://doi.org/10.1080/1359866052000341124>
- Wang, L., & Du, X. (2014). Chinese Teachers' Professional Identity and Beliefs about the Teacher-Student Relationships in an Intercultural Context. *Frontiers of Education in China*, 9(3), 429–455. <https://doi.org/10.1007/bf03397030>
- Wang, R., Elahi Shirvan, M., & Taherian, T. (2021). An Ecological Study of Identity in Teaching English as a Foreign Language in Light of the Dynamic Systems Model of Role Identity. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.799418>
- Wei, G. (2021). Imagined professional identity: A narrative inquiry into a Chinese teacher's perezhivaniya in life. *Teaching and Teacher Education*, 102, 103337. <https://doi.org/10.1016/j.tate.2021.103337>
- Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*. Cambridge University Press.
- Xinhua, N. (2020). *Xinhua Adapting to the development of international Chinese language education: Ministry of Education establishes a centre for language education and cooperation - Xinhuanet* Wwww.xinhuanet.com. http://www.xinhuanet.com/world/2020-07/05/c_1126198982.htm

- Xu, S., & Connelly, F. M. (2022). Reciprocal learning between Canada and China in teacher education and school education: Partnership studies of practice in cultural context. *Frontiers of Education in China*, 12(2), 135–150.
<https://doi.org/10.1007/s11516-017-0013-6>
- Yang, S., Shu, D., & Yin, H. (2021). “Frustration drives me to grow”: Unraveling EFL teachers’ emotional trajectory interacting with identity development. *Teaching and Teacher Education*, 105, 103420. <https://doi.org/10.1016/j.tate.2021.103420>
- Yazan, B. (2018). conceptual framework to understand language teacher identities. *Journal of Second Language Teacher Education*, 1(2). <https://doi.org/10.1558/slte.24908>
- Zhu, G., Rice, M., Li, G., & Zhu, J. (2022). EFL Student Teachers’ Professional Identity Construction: A Study of Student-Generated Metaphors Before and After Student Teaching. *Journal of Language, Identity & Education*, 1–16.
<https://doi.org/10.1080/15348458.2020.1777872>
- Zhu, J., & Zhu, G. (2018). Understanding student teachers’ professional identity transformation through metaphor: an international perspective. *Journal of Education for Teaching*, 44(4), 500–504. <https://doi.org/10.1080/02607476.2018.1450819>

Data Availability Declaration

Data Availability Upon Formal Request:

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

Author Contributions

Multiple Authors with Distinct Roles:

Author Contributions:

Dr Ingeborg Birnie spearheaded the conceptualization, designed the research methodology, revised the manuscript for intellectual depth and supervised the entire project. Yu He and Shipeng Cui were responsible for the data collection, analysis, and interpretation, bringing analytical rigor to the study. Shipeng Cui took the lead in drafting the manuscript, ensuring its alignment with scholarly standards. All authors collaboratively discussed the results, provided critical insights, and contributed to the final manuscript. They have read, approved, and take joint accountability for the presented work's accuracy and integrity.

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The Effect of Artificial Intelligence Applications in 6th Grade Visual Arts Course on Student Attitudes and Course Outcomes

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Abstract:

The aim of this study is to investigate the effects of artificial intelligence-supported teaching practices on students' attitudes and course outcomes in the visual arts course at the 6th grade level of secondary school. The research was conducted in a private middle school in Mersin province, Turkey, in the second semester of the 2023-2024 academic year. A total of 40 students participated in the study, which was designed as a quasi-experimental design with an experimental-control group. The experimental group used teaching methods enriched with artificial intelligence tools, while the control group continued with the traditional curriculum. Quantitative data were collected using the Attitude Scale Towards Visual Arts Lesson and Course Outcome Scale as pre-test -post-test. The results of the application showed that there was a significant increase in the attitude towards the course of the students who received the artificial intelligence-based instruction. Similarly, the course acquisition scores of the students in the experimental group were found to be statistically higher than those of the control group. The research results provide important insights into how student-centered and AI-based approaches can be effective in achieving course objectives.

Keywords: Artificial intelligence, visual arts teaching, attitude, attainment

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INTRODUCTION

Artificial Intelligence, one of the fastest developing technologies today, draws attention with its new and effective applications in the field of education. Artificial intelligence-based applications, which offer many advantages such as supporting students' learning processes, increasing the variety of teaching materials, and reducing teachers' workload, are shaping the future of education. The low quality of learning outcomes in courses taught with traditional methods necessitates research into artificial intelligence-based teaching methods. The need to use artificial intelligence-based applications to provide students with a more engaging and interactive educational environment is becoming increasingly apparent (Grájeda et al., 2024; Kim, 2023). Artificial intelligence tools provide personalized learning content, allowing students to engage in activities that suit their learning pace and interests (Aliabadi, 2023; Alshammari & Al-Enezi, 2024; Makeleni et al., 2023). In addition, AI-based feedback mechanisms allow students to instantly track their progress and identify the points they are missing. In educational research, several studies have emphasized that artificial intelligence has a positive impact on learning outcomes (Lin & Chen, 2024; Yılmaz, Erdem & Uygün, 2024). In light of these studies, it is believed that artificial intelligence technologies can be effectively used in the visual arts course.

The contribution of visual arts activities to the development of students in the cognitive, affective, and psychomotor domains can be further emphasized with artificial intelligence-supported methods (Su & Mokmin, 2024). At the same time, since art education supports the development of students' original thinking and aesthetic sensitivity, the potential of artificial intelligence applications in this field should not be ignored. Thus, in addition to traditional approaches, visual arts education supported by artificial intelligence-based applications provides a student-centered and interactive learning experience. The visual arts course in secondary school programs is important for developing students' imagination and supporting their critical thinking skills. However, traditional methods can sometimes be insufficient to keep students engaged in the classroom (Kibici, 2022; Özkan, 2022). At this point, personalized learning opportunities provided by artificial intelligence applications increase students' motivation for the course (Asio & Gadia, 2024; Xie, Lin & Yu, 2024). Thanks to artificial intelligence software, students can be directed to activities that match their interests and learning styles. In some visual arts activities, AI-powered digital drawing or design programs allow students to create tangible products (Black & Chaput, 2024). This increases students' sense of accomplishment and helps them develop positive attitudes toward the course (Ren, Edwards & Jamiat, 2024).

The role of AI in education also requires a rethinking of educational policies and curricula (Han, Park & Lee, 2022). Researchers note that there are various limitations in applications due to the lack of understanding of artificial intelligence and teachers' difficulties in adapting to these technologies (Yim & Wegerif, 2024). Therefore, teacher training and infrastructure investments need to be carefully planned for the effective

implementation of AI applications (Aliabadi, 2023). Considering all these factors, the role of AI in education is becoming increasingly diverse and important. In particular, the innovative solutions it can provide in interdisciplinary fields and arts education increase the quality and effectiveness of education (Kharroubi et al., 2024). In this context, the advantages offered by artificial intelligence applications have great potential in courses such as visual arts courses, where creativity and original thinking are at the forefront. The main purpose of this study is to make students' course outcomes more meaningful by using artificial intelligence-based teaching practices in the 6th grade visual arts course and to examine the effects of these practices on students' attitudes and academic achievement. For this purpose, the changes that may occur in students' learning motivation and creativity levels with the integration of artificial intelligence tools into the course process will be investigated. In particular, AI-based applications in visual arts education are expected to diversify forms of artistic expression by providing students with different perspectives (Grájeda et al., 2024; Su & Mokmin, 2024; Vu & Tran, 2022).

Research on the use of AI in education has generally focused on structured and analytical skills-based areas such as mathematics, science and language learning. These studies have demonstrated the potential of AI to provide personalized learning experiences, increase student achievement, and provide support to teachers (Hwang, 2022; Guo & Wang, 2025). However, the role of AI in disciplines that require creativity, aesthetic sensitivity and subjective expression, such as visual arts education, has not been sufficiently examined. In the literature, comprehensive studies on the effects of AI-supported practices on artistic skills, creative thinking processes or student attitudes, especially at the secondary school level, are limited (Choi, Yang & Goo, 2024). This research gap makes it difficult to understand the potential and limits of AI in disciplines such as art education. This study aims to fill this gap by examining the impact of AI-based instructional practices on student attitudes and course outcomes in a 6th grade visual arts course. In this way, it is aimed to make an original contribution to the literature by presenting concrete findings on the integration of AI in creative fields and to provide a guiding framework for educators.

The Role and Historical Development of Artificial Intelligence in Education

Artificial intelligence technologies are becoming more prevalent in educational institutions, providing students with new learning methods and teachers with data-driven decision-making mechanisms (Villegas-Ch et al., 2024). The role of AI in education also creates opportunities for professional development for teachers. AI-based teacher assistants facilitate time-consuming processes such as lesson planning and student assessment, allowing teachers to focus more on subjects that require creativity (Galindo-Domínguez et al., 2024). Artificial intelligence applications also capture students' attention and help improve academic performance by providing different learning environments (Hwang, 2022). AI-based simulations, game-based learning tools, and virtual laboratories increase students' experiential learning opportunities (Guo & Wang, 2025). In this way, students can concretize abstract concepts and increase their interest and motivation in the course.

Similarly, interactive content provided by artificial intelligence encourages students to actively participate in the course and enhances collaboration among students (Ren, Edwards & Jamiat, 2024). In addition, it is also stated that it contributes to the development of 21st century skills such as creative thinking, problem solving, and collaboration (Yue, Jong & Dai, 2022).

The historical development of artificial intelligence in education has paralleled the advancement of technological capabilities and computer science. Since the early 2000s, technology applications in education have become more accessible with the widespread use of the Internet and online learning platforms. In this process, computer-supported collaborative learning environments, online exams, and automated assessment systems began to analyze student data in more detail (Guo & Wang, 2025). The use of big data and artificial intelligence techniques in education gained momentum especially after the 2010s (Chauhan & Soni, 2024). In this period, adaptive learning systems and intelligent teaching guides aim to provide students with personalized learning experiences. Looking at the historical development, we can see that artificial intelligence applications were initially more rigid and rule-based, but today they have become dynamic thanks to deep learning algorithms (Han et al., 2022). Thus, AI in education has evolved from a tool that simply delivers learning content to a system that understands students' learning processes and can guide them in real time. In the process, AI technologies have become more inclusive and adaptive, enabling them to engage students of different ages and learning levels (Yim & Wegerif, 2024).

Applications of Artificial Intelligence in The Process of Learning and Teaching

Artificial intelligence applications in the learning and teaching process are designed to respond to students' individual learning needs and make educational processes more efficient. Adaptive learning platforms allow each student to progress at his or her own pace by providing content according to his or her level and interests (Xie, Lin & Yu, 2024). In this way, students do not need to move on to the next topic before they have fully grasped the subject and can more easily overcome their own learning deficiencies. In addition, AI-enabled course management systems allow teachers to monitor classroom performance and attendance in real time (Taskiran, 2023). In this way, teachers can provide personalized support by focusing on the points that students are having difficulty understanding. Students' interest and motivation in the classroom will be instantly measured by AI-based applications, maintaining the vitality of the learning process. In addition, AI-based chatbots and virtual assistants provide one-on-one guidance to students, allowing them to continue learning outside the classroom (Jindal & Kumar, 2024).

AI-based feedback mechanisms, on the other hand, not only provide correct and incorrect answers, but also analyze the student's thought process and offer developmental suggestions (Wood & Moss, 2024). Thus, students have the opportunity to learn from their mistakes and improve their learning strategies. Instructional materials are enriched with the

help of artificial intelligence, and students are presented with interactive simulations, games, video content, and problem-solving activities. All these applications keep students' interest and curiosity alive and make the learning process more enjoyable (Guo & Wang, 2025).

The use of artificial intelligence applications in learning processes makes it easier to support students with different levels of intelligence and different learning styles. For example, in language learning, AI-based online platforms improve students' pronunciation skills and vocabulary, analyze their reading and writing levels, and suggest appropriate exercises (Guo & Wang, 2025). Similarly, in math or science courses, AI-based problem-solving tools that provide instant feedback to students aim to deepen their conceptual understanding (Hwang, 2022). These applications encourage research and discovery processes by allowing students to learn through trial and error without fear of making mistakes.

Although the use of AI in education provides significant advantages such as providing personalized learning experiences, increasing students' motivation and supporting teachers in data-driven decision-making processes, the integration of this technology also brings some challenges (Chauhan & Soni, 2024; Choi, Yang & Goo, 2024). One of these challenges is that teachers do not have sufficient training and skills to use AI tools effectively (Aliabadi, 2023). This deficiency can make it difficult to implement AI-based applications efficiently in classrooms. Comprehensive and structured professional development programs are needed for teachers to combine AI technologies with pedagogical knowledge (Yim & Wegerif, 2024). In addition, the use of AI in education raises ethical issues; issues such as privacy of student data, potential biases in algorithms, and fair use of technology are issues that need to be carefully addressed (Chauhan & Soni, 2024). Designing AI systems in a transparent, fair and student privacy-protective manner is indispensable for their reliable use in education. In addition, the lack of technological infrastructure also stands out as an important obstacle. Not all schools have the hardware, software and internet access to support AI applications (Taskiran, 2023). This may increase the digital inequality between schools in socioeconomically disadvantaged areas and schools with better conditions. Therefore, the widespread and effective use of AI in education requires strategic approaches to address these challenges.

Integrating Visual Arts Education and Artificial Intelligence in Secondary Schools

AI applications in education reveal effective results in different fields with advantages such as producing solutions for students' individual learning needs, optimizing learning processes and providing important support to teachers (Xie, Lin & Yu, 2024; Guo & Wang, 2025). These benefits have a great potential especially for visual arts education where creativity and individual expression are at the forefront. Visual arts education aims to develop students' aesthetic sensitivity, critical thinking skills and artistic expression skills (Mahsan et al., 2023). Artificial intelligence tools offer students innovative opportunities to

support these goals. For example, AI-supported software can analyze students' artistic works and provide immediate feedback, thus enabling a better grasp of technical skills (Ren, Edwards & Jamiat, 2024). In addition, AI allows students to explore different art movements, get acquainted with digital art forms, and even participate in creative processes by collaborating with AI (Black & Chaput, 2024). This process increases students' artistic competence as well as their interest and self-confidence in art (Kim, 2023). Research shows that integrating AI into the visual arts curriculum encourages students' creativity and positively affects their academic achievement (Lin & Chen, 2024; Yılmaz et al., 2024). This relationship between the general applications of AI in education and its specific effects in visual arts education proves that AI can play a transformative role in arts education.

Visual arts education at the secondary level plays an important role in shaping students' cognitive and creative skills and developing their aesthetic perceptions. Art education aims to help students explore different perspectives and strengthen their critical thinking skills (Mahsan et al., 2023). In the visual arts course, students develop their own forms of expression using basic art elements such as color, shape, line, and texture. In this way, students' aesthetic sensitivity and abstract thinking skills are enhanced. In addition, while studying the visual arts, students engage in high-level cognitive processes such as problem solving and innovative thinking (Black & Chaput, 2024). The creative process is intertwined with students' self-expression and encourages them to create original products. Considering the mental development of middle school students, art education also contributes to their emotional maturation processes (Su & Mokmin, 2024). Visual arts allow students to explore their inner world and develop empathy skills. As a result, students can better communicate and express themselves through art. In addition, group work and collaboration in art activities help to strengthen social skills and sense of responsibility (Mahsan et al., 2023).

Another important aspect of visual arts education is that it helps students become aware of cultural and artistic heritage. Knowledge of art history and the artistic approaches of different cultures broadens students' worldview and contributes to their respect for cultural diversity (Aliabadi, 2023). As middle school students examine works of art from different time periods and geographical locations, they enrich their aesthetic tastes and artistic sensibilities. In the process, it is possible for students to better understand their own cultural identity and to use artistic forms of expression more authentically (Black & Chaput, 2024). In addition, projects and performance exhibitions through the arts enhance students' freedom of self-expression. In such activities, peer feedback and teacher evaluation open the door for students to further develop their artistic orientation. Visual arts education also facilitates interdisciplinary connections, allowing students to have a deeper learning experience in both artistic and academic processes. Therefore, visual arts education enables students to view the world from an aesthetic and holistic perspective while continuing to develop many skills related to academic and social life (Su & Mokmin, 2024).

Teaching visual arts in a traditional classroom environment may not have the desired effect due to various limitations. Large class sizes and inadequate physical facilities make it difficult to conduct student-centered art activities (Holmes, 2020). For example, a lack of materials and equipment may prevent students from expressing their creativity. In addition, teachers are limited by class time and curriculum time, resulting in a loss of flexibility in the process of planning and implementing arts activities. This can hinder students' active participation and deepening of learning (Su & Mokmin, 2024). In traditional teaching approaches, a learning environment that is sufficiently sensitive to individual differences cannot be created because students are usually directed to one type of work. If students' interests and ability levels are ignored, art education can lead to loss of motivation and negative attitudes towards the course (Baltezarević & Baltezarević, 2024).

Visual arts education is becoming more interactive and richer every day with technological innovations. The introduction of artificial intelligence technologies in this field is leading to a transformation in many dimensions, from teaching methods to the production of artworks. Students at the secondary level can interact more closely with visual design and creative processes thanks to AI-based tools. Today, AI-based image creation, photo transformation, and design projects not only develop students' artistic skills, but also provide them with technological literacy (Jindal & Kumar, 2024; Yim & Wegerif, 2024).

By exploring different art movements through AI-powered platforms, students become more engaged in the process of developing their own artistic style. At the same time, teachers can use these tools to more closely analyze student work and monitor their progress. Artificial intelligence algorithms can identify students' mistakes, styles, and strengths, and provide feedback mechanisms accordingly. As a result, course effectiveness and student learning become more efficient. Research shows that artificial intelligence tools have a positive impact on students' attitudes and performance (Lin & Chen, 2024; Yilmaz et al., 2024). This interaction is not limited to traditional visual arts techniques, but also encourages the integration of new media and digital arts applications into the program. The dynamism that AI-based applications bring to the classroom increases students' motivation to learn while diversifying their forms of artistic expression (Wood & Moss, 2024).

Integrating AI into the visual arts classroom requires a planned and deliberate approach. First, it is important for teachers to understand the basic principles of AI technologies and their pedagogical benefits (Su & Mokmin, 2024). By linking AI-based applications with curricular goals, teachers enrich not only students' technological skills but also their artistic perspectives. In this integration process, classroom activities need to be redesigned and learning outcomes need to be clearly defined (Chauhan & Soni, 2024). AI-enabled projects to be presented to students should be organized in a way that develops both their technical and aesthetic aspects. For example, while students experiment with color and composition using AI filters on a digital painting platform, they also gain awareness of traditional art concepts. The selection of AI tools to be used during the course is based on the teaching objectives and the age level of the students. Some applications

provide basic drawing and painting techniques in a digital environment, while others offer functions such as photo manipulation or object recognition with advanced artificial intelligence algorithms (Choi, Yang & Goo, 2024). Proper instruction of these applications by teachers will ensure that students receive maximum benefit. In addition, the suitability of infrastructure and hardware is also an important factor in the integration of artificial intelligence. Computer labs, tablets or interactive boards allow students to practice with these technologies. The transfer of course content to digital platforms and students' individual or group work with artificial intelligence software enriches the learning process (Lin & Chen, 2024; Yılmaz et al., 2024).

The integration of artificial intelligence into visual arts courses also brings innovations in assessment and measurement methods. While the subjective judgments of the instructor come into play in traditional art assessments, AI-based systems can analyze student work using more objective criteria. Students' color harmony, compositional balance, or technical application skills can be scored by artificial intelligence algorithms and constructive feedback provided to students (Ren, Edwards & Jamiat, 2024). In this way, students' performance levels can be more accurately determined, and teachers can create development plans tailored to each student. In addition, AI systems automatically transform student work into portfolios, making it easier to track progress over time. At the end of the year, teachers can more clearly see where the student has strengthened or struggled from the beginning. This allows the grading process to encompass student progress rather than being limited to the final product (Chauhan & Soni, 2024). At the same time, AI-based assessment increases students' sense of ownership of the course and makes them active participants in the learning process. This is because AI makes students' efforts and achievements visible at all times by providing immediate feedback. Moreover, by analyzing the data obtained, teachers can determine which subjects in the curriculum need additional support (Taskiran, 2023; Wood & Moss, 2024).

Artificial Intelligence Tools Used in Visual Arts and Their Effects on Learning Outcomes

In the field of visual arts, it is important to select artificial intelligence tools according to the level of the students, the goals of the course, and the needs of the curriculum. For example, Deep Dream, developed by Google, uses artificial neural networks to create surreal effects and unusual shapes on existing images. This application provides students with an art experience that encourages abstract thinking and allows them to experiment with different compositions (Alan & Yurt, 2024; Wood & Moss, 2024). Runway ML, on the other hand, stands out as a platform that can be used by both professional artists and educators, offering a wide range of features such as video editing, object recognition, and augmented reality effects with different artificial intelligence models. Such platforms allow students to bring physical works of art, such as traditional painting or sculpture, into the digital world. Text-to-image models such as DALL-E also allow students to combine vocabulary and expressive skills with visual elements. Images created with text input spark

students' imaginations and help them experience the relationship between "text and image" from a different perspective. In this context, performance in the visual arts also increases (Black & Chaput, 2024).

In addition to tools such as Deep Dream, Runway ML, and DALL-E, there are also AI-based applications suitable for different levels of education. For example, drawing programs with simpler interfaces allow students to digitally transform their own works using different effects and filters with just a few clicks. Some applications can analyze students' beginning drawings and offer automatic suggestions for areas open to development. Advanced students and teachers can train their own AI models using Python or similar programming languages and integrate them into their art projects (Jindal & Kumar, 2024). In this way, visual arts education offers a richer learning experience by combining disciplines such as coding and data science. The variety of AI tools also allows teachers to enrich the activities they will integrate into the lesson (Lin & Chen, 2024). For example, within the scope of a project, students can examine motifs in nature, transfer them to an AI application, and transform the resulting abstract designs into different art forms. In this way, students can play an active role in both analytical and creative processes. The automated processes offered by these tools save time and facilitate the implementation of larger-scale art projects. In addition, students can quickly share their own work and receive peer feedback, which strengthens the culture of collaboration and interaction in art education, increases attitudes towards the course, and encourages participation in the course (Baltezarević & Baltezarević, 2024; Grájeda et al., 2024).

Students who experience artificial intelligence applications in class help each other and solve potential technical problems together. Thus, a positive classroom climate and collaborative approach expand the benefits of artificial intelligence-based learning. At the same time, it is observed that students can more quickly change their attitudes towards technology to positive by being inspired by their peers who have similar interests (Kim, 2023; Choi, Yang & Goo, 2024). Since students grow up interacting with smart devices and computer games from a young age, they can adapt to artificial intelligence tools more quickly (Yılmaz, Erdem & Uygün, 2024). These students are generally open to technological innovations and enjoy digital applications in classes (Kharroubi et al., 2024).

Related studies reveal that students generally approach AI-based applications with feelings of curiosity and excitement (Lin & Chen, 2024). However, in addition to this positive approach, it is also reported that some students have concerns about the complexity of technology and the risks of failure (Yılmaz, Erdem & Uygün, 2024). These two extreme emotional states lead to different forms of interaction and learning outcomes in the classroom. Some studies show that AI tools increase students' interest in lessons, increase classroom interaction, and positively affect learning motivation (T et al., 2024; Villegas-Ch et al., 2024). On the other hand, studies that draw attention to the importance of the human factor in the learning process emphasize that AI cannot replace the teacher, but can contribute in a supportive position (Holmes, 2020).

Students' academic success, creativity levels, problem-solving skills, and interest in lessons are used as basic criteria in evaluating the effectiveness of artificial intelligence applications (Wood & Moss, 2024). Studies show that artificial intelligence-based teaching methods offer students a personalized and interactive learning experience when compared to traditional teaching methods (Chai et al., 2021; Aliabadi, 2023). This interaction can increase students' academic performance and make the scope of the course more interesting (Asio & Gadia, 2024; Xie, Lin, & Yu, 2024; T et al., 2024). At the secondary school level, it is emphasized that the integration of artificial intelligence not only positively supports course outcomes, but also provides students with the opportunity to prepare for future technologies (Yim & Wegerif, 2024). While working with artificial intelligence software, students grasp the logic of algorithms and unknowingly develop their data processing and modeling skills (Xie, Lin & Yu, 2024). This provides a strong foundation for students who want to focus on STEM fields in later stages of education (Grájeda et al., 2024). On the other hand, an innovative field of study emerges for students interested in the synthesis of art and technology. Artificial intelligence affects not only students' in-class performance but also their self-regulation skills and attitudes towards learning (Kim, 2023). Because artificial intelligence systems can instantly monitor students' learning processes and provide them with customized tasks, warnings and guidance. This helps students actively participate in course outcomes and take ownership of learning as a whole (Yim & Wegerif, 2024).

The potential of AI-based applications in education is increasing, but the impact of these technologies on students' attitudes and course outcomes is not fully understood. At the secondary school level, especially in courses that require creativity and interaction, such as visual arts, the use of AI has the potential to increase students' motivation and contribute to academic success (Yanal, 2019). However, it can be said that in the existing literature, comprehensive research on how AI tools are integrated into the classroom environment, to what extent they contribute to student skills, and what the difficulties are in this process is limited. Some studies suggest that AI technologies positively affect student attitudes and learning levels, while others highlight problems such as implementation difficulties, teacher competencies, or lack of technological infrastructure (Choi, Yang, & Goo, 2024; Taskiran, 2023; Lin & Chen, 2024; Yilmaz et al., 2024; Derinalp & Ozyurt, 2024; Han, Park, & Lee, 2022). These varying findings do not provide a clear framework for how effective artificial intelligence is in the field of visual arts. The differences in cognitive and affective needs of 6th grade students in particular suggest that the efficiency to be obtained from artificial intelligence tools may also vary. In addition, the nature of the visual arts course has an applied and experiential structure, which necessitates that artificial intelligence tools be examined in terms of process, creativity and aesthetic dimensions rather than just theoretical knowledge. Therefore, studies on how artificial intelligence technologies actually affect students' artistic skills, freedom of artistic expression and learning processes need to be expanded. It has not yet been sufficiently clarified how differences in student attitudes towards artificial intelligence-based applications shape interest and success in the course.

At the same time, it is also important to collect and analyze comprehensive data based on student feedback. It is clear that teachers, administrators and education policy makers need a guiding guide on this issue. This gap in the literature on the use of artificial intelligence in the field of visual arts constitutes the main problem of the study. Therefore, it is of great importance to deeply understand the contribution of these technologies to the educational process by examining students' attitudes towards artificial intelligence-based teaching environments and the changes in their course outcomes.

When the existing studies are examined, it is seen that there is evidence that AI-supported teaching methods increase students' academic performance and self-regulation skills (Guo & Wang, 2025; Villegas-Ch et al., 2024). However, these findings are generally concentrated on courses such as mathematics, science or language learning, and there are fewer studies in creativity-based areas such as visual arts. This situation creates a lack of information on the effectiveness of AI tools in art classes, and requires further expansion of theoretical and applied research. Considering that the visual arts course aims to help students develop original forms of expression, internalize basic art concepts such as color and form, and gain aesthetic sensitivity, the question of the extent to which AI technologies serve these goals becomes important (Black & Chaput, 2024).

On the other hand, the emotional dimension of students' experiences during their interaction with AI applications has not been fully elucidated. While AI tools can increase motivation by providing students with instant feedback and the ability to quickly correct errors, they can also cause negative effects such as technological anxiety, perception of inadequacy, or excessive dependence (Chauhan & Soni, 2024). This multifaceted interaction shows that the impact on student attitudes is not one-way and that AI technologies need to be managed. Similarly, teachers' level of adoption of these tools, course designs, and feedback mechanisms have the potential to affect students' attitudes and achievement levels. The limited number of studies in the literature that systematically address quantitative and qualitative data at the secondary school level in a holistic manner also complicates the problem. Therefore, examining the effects of AI technologies on student attitudes and course outcomes in detail will meet an important need in both practical and theoretical terms.

This study makes an important contribution to the literature by addressing the effects of the integration of artificial intelligence-based applications into the 6th grade visual arts course on students, both academically and emotionally. Since visual arts education is a critical area that shapes students' aesthetic perceptions, creativity skills, and cultural awareness, the role of artificial intelligence tools in this course is seen as a key point in understanding the digital transformation in education. Considering the limitations of existing research, the results of this study will guide not only student success, but also support creative processes through artificial intelligence, develop original thinking skills in students, and make the learning process enjoyable (Chai et al., 2021; Yim & Wegerif, 2024). In addition, the study findings will provide important data to the academic community on

how compatible the integration of artificial intelligence is with the objectives of the course and how the skills students gain in this process will be reflected in their future learning experiences. The feedback that students will give to this study will also shed light on the aspects in which artificial intelligence software can be developed in art education. On the other hand, conducting the study in a creative field such as visual arts aims to show that artificial intelligence technologies are not only a means of transferring information, but also play an active role in the processing of aesthetic and cultural values (Lin & Chen, 2024). Thus, examining the interaction between technology and art in depth will constitute an exemplary model for the spread of similar applications in different disciplines.

Purpose of the Study

The purpose of this research is to enable students to make sense of the course outcomes by using artificial intelligence tools in the 6th grade visual arts course and to examine the effects of these applications on student attitudes and achievements. In relation to this purpose, the following questions were sought:

- To what extent do the artificial intelligence-based teaching practices applied in the 6th grade visual arts course in middle school affect the students' course outcomes?
- To what extent do the artificial intelligence-based teaching practices applied in the 6th grade visual arts course in middle school affect the students' course attitudes?

METHOD

Research Model

In order to obtain the quantitative data of the study, a quasi-experimental design, which is one of the ways in which quantitative research can be conducted, was used (Bosh, 2017). A quasi-experimental research design is a model in which pre-test s and post-test s are applied to previously created experimental-control groups, experimental interventions are made to the participants in the experimental group, and no intervention is made to the control group (Fraenkel & Wallen, 1996). In cases where the groups cannot be formed by random selection and random distribution is not possible, the widely used method is the pre-test -post-test control group quasi-experimental design model (Valente & MacKinnon, 2017). In this context, it was decided that the most appropriate method for the research problem of the study, the characteristics of the group and the scales used was the pre-test -post-test control group quasi-experimental design. In the experimental design model created; lessons were given to the experimental group with activities developed in accordance with creative thinking skills, while the control group was given activities prepared in accordance with the requirements of the program prepared by the Ministry of National Education of Türkiye. In the research, data were analyzed using the "Course

Achievement Scale" and "Attitude Scale Towards Visual Arts Course" before and after the application of the experimental procedure.

Research Group

The study was conducted in a private secondary school located in Mersin province during the second semester of the 2023-2024 academic year. The research group consisted of 40 students who were taking visual arts courses in grades 6A and 6B. Of the participants, 20 students were in the experimental group and 20 students were in the control group. There were 20 (9 male, 11 female) students in the experimental group and 20 (10 male, 10 female) students in the control group. The artificial intelligence-based teaching method applied to the experimental group was examined as an independent variable in the experimental study. The course outcomes and attitude scores towards the visual arts course constituted the dependent variables of the experimental study. While the applications were applied in the experimental group with the teaching program developed by the researcher and artificial intelligence tools, the visual arts course activities were applied in the control group by fulfilling the requirements of the program prepared by the Ministry of National Education of Türkiye for the same outcomes. The applications were carried out by the researcher in the experimental and control groups. The scale form regarding the attitude towards the visual arts course and the course outcome scale forms were applied separately and the results were obtained.

Experimental Practice

In the first stage of the study, the Visual Arts Achievement Test and attitude scale were applied to the sixth-grade middle school students as a pre-test. In the second stage of the study, the students in the experimental group were informed about the subjects of the Visual Arts Education course and the use of subject-specific artificial intelligence tools. In the control group, the current visual education program was applied. Instructional practices lasted five sessions in both groups.

In both groups, the aim was to study the following course outcome and the work of Osman Hamdi Bey called "The Turtle Trainer" within this framework.

- *Discuss the subject chosen by an artist in his works and why he created a work of art.*
- *Explain the feelings and thoughts reflected in the artist's work.*
- *Explain how the work of art triggers feelings, emotions and aesthetic reactions.*

- Use critical thinking skills while defining, analyzing, interpreting and judging the work of art.

Students in the experimental group examined the digital prints of Osman Hamdi Bey's works called "The Turtle Trainer" using artificial intelligence tools in the classroom according to the methods of examining works of art. At this stage, students actively tried to analyze the related visual arts course outcomes on the artificial intelligence screen. In the experimental group, "Copilot (<https://copilot.microsoft.com/>)" and "ChatGPT (<https://ChatGPT/>)" applications were used as artificial intelligence tools.

The cognitive and technical competencies of the students allowed them to use the AI tools effectively with teacher guidance; the aforementioned tools were experienced in a structured process through prompts created jointly with the teacher at the beginning of the lesson, rather than independent learning by the students. The prompts were developed as a class with the teacher introducing and guiding the functions of the tools in Turkish; this approach made the abstract or complex structure of the tools understandable for the students and provided a learning environment appropriate to their age and developmental levels.

*** Translated with www.DeepL.com/Translator (free version) ***

In the first step of the application, the experimental group students wrote the prompt "Bringing Osman Hamdi Bey's work named "The Tortoise Trainer" to the screen" from the artificial intelligence application as indicated in the visual below (Figure 1 and Figure 2).

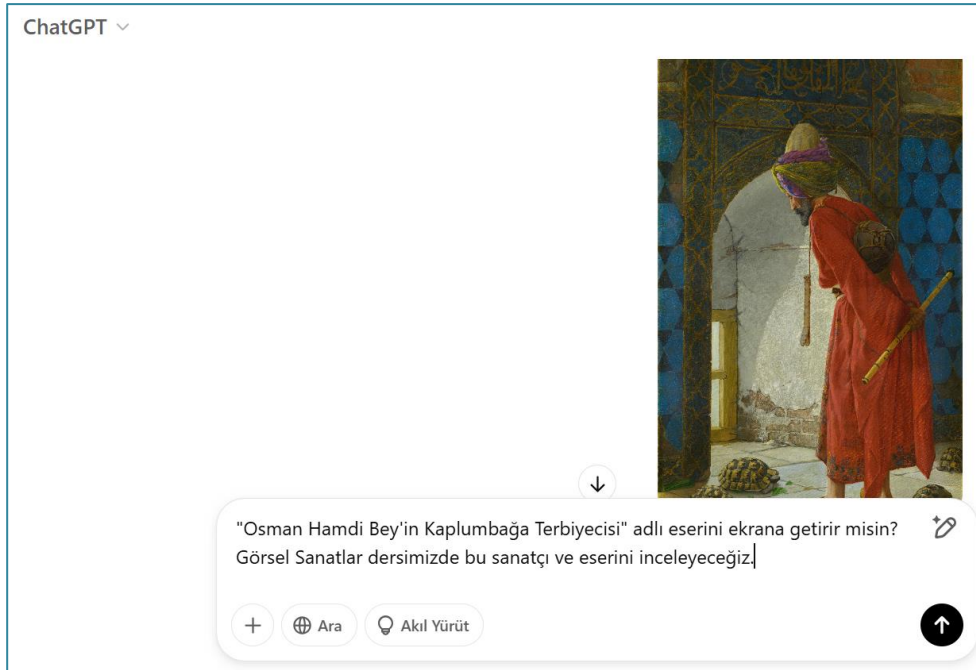


Figure 1.

As an example, the painters from our country and around the world who deal with similar themes and subjects like Osman Hamdi Bey and the characteristics of their works were examined with artificial intelligence tools.

ChatGPT ▾

Osman Hamdi Bey'in "Kaplumbağa Terbiyecisi" resmini ekrana getirir misiniz? Bu resmin ana teması nedir? Sanatçı bu eseri niçin ve hangi amaçla oluşturmuştur? Sanatçının eserinde yansıttığı duygu ve düşünceleri açıklayabilir misiniz?



Osman Hamdi Bey'in "Kaplumbağa Terbiyecisi" eseri, Türk sanat tarihinin en önemli ve ikonik tablolarından biridir. Bu tablo, sanatçının hem sanatsal becerisini hem de toplumsal eleştirilerini ortaya koyduğu bir başyapıttır. Aşağıda bu eserle ilgili detaylı bilgiler ve analizler yer almaktadır:



ChatGPT uygulamasına ileti gönder



Ara



Akl Yürüt



Figure 2.

On the ChatGPT server, students searched for answers by asking questions such as “What is the artist’s purpose in Osman Hamdi Bey’s work “The Tortoise Trainer”? What is the theme of the work? What are the feelings and thoughts reflected by the artist in the work, etc.?” on an image obtained with artificial intelligence and had group discussions with their friends (Figure 3, Figure 4, Figure 5). Then, students worked individually on the artificial intelligence application and were allowed to repeat the activities.

ChatGPT ▾

Eserin Ana Teması

"Kaplumbağa Terbiyecisi," toplumsal değişim ve modernleşme süreçlerini eleştirel bir dille ele alır. Osman Hamdi Bey, bu eserinde değişimin zorluklarını, sabır gerekliliğini ve liderlik kavramını metaforlarla işler:

1. **Kaplumbağalar:** Toplumun geleneklere bağlı, değişime karşı dirençli yapısını temsil eder. Kaplumbağaların hareketlerinin yavaşlığı, modernleşme sürecinin sancılı ilerleyişine bir göndermedir.
2. **Terbiyeci Figürü:** Osmanlı kıyafetleri içinde bir derviş ya da filozofu andıran figür, lideri ve reformcu temsil eder. Elindeki ney ve değnek, hem sabırlı hem de kararlı bir öğretici figürüdür.
3. **Mekan ve Arka Plan:** Osmanlı mimarisine özgü çini detaylar ve mekansal kompozisyon, geleneksel ile modern arasında bir denge kurma çabasını



ChatGPT uygulamasına ileti gönder



Ara



Akl Yürüt



Figure 3.

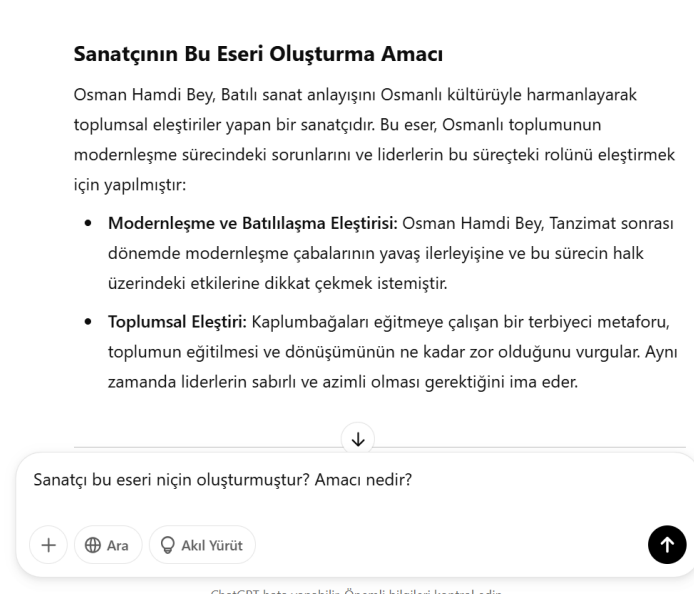


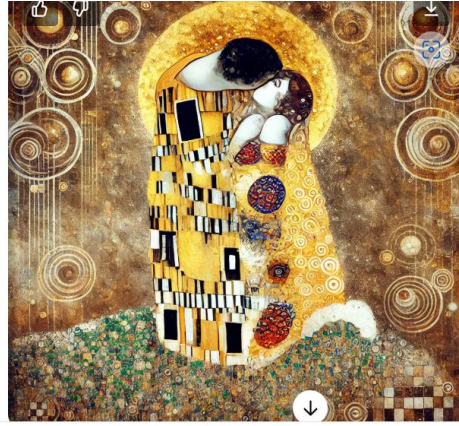
Figure 4.



Figure 5.

Later, on the artificial intelligence application, the students were given a command such as "Which painter and work in Turkey and the world does Osman Hamdi Bey's work named "The Tortoise Trainer" have similarities with? Show these works". The artificial intelligence suggested multiple images related to the subject and the images were selected by the students (Figure 6 and Figure 7). In addition, the students asked additional questions on an image obtained with the artificial intelligence, "What are the artistic features of the resulting works? What is their theme?" etc. and did group work with their friends (Figure 8).

ChatGPT ▾



Osman Hamdi Beyin dünyadan sanatçı ve resim örnekleri veriri misin? Görselleri de gösteriniz?

+ Ara Akıl Yürüt



Figure 6.

ChatGPT ▾

Osman Hamdi Beyin eseri ve Gustav Klimt'in sanat eserleri arasındaki benzerlikler nelerdir.

Osman Hamdi Bey'in "Kaplumbağa Terbiyecisi" ile Gustav Klimt'in eserleri arasında hem tematik hem de estetik açıdan dikkat çekici benzerlikler bulunmaktadır. Her iki sanatçı da farklı coğrafyalarda ve sanat akımlarında eserler üretmiş olsa da, bazı ortak yönleri sahiptir:

1. Dekoratif Unsurların Kullanımı

- Osman Hamdi Bey:** "Kaplumbağa Terbiyecisi" eserinde Osmanlı mimarisine özgü çini detayları, süslemeler ve renkli desenler dikkat çeker. Arka plandaki motifler ve kıyafet detayları, dekoratif bir estetik oluşturur.
- Gustav Klimt:** Klimt'in eserleri, altın varaklar, geometrik desenler ve ince detaylarla bezeli dekoratif unsurlarıyla bilinir. Örneğin, "The Kiss" (Öpücük) eserinde zengin süslemeler hem duygusal hem de görsel bir zenginlik katar.

Benzerlik: Her iki sanatçı da eserlerinde dekoratif detaylarla görsel derinlik yaratır ve sanatın estetik yönünü öne çıkarır.

ChatGPT uygulamasına iletir gönder

+ Ara Akıl Yürüt

ChatGPT ▾

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ChatGPT uygulamasına iletir gönder

+ Ara Akıl Yürüt

Figure 7.

ChatGPT ▾

2. Sembolizm ve Derin Anlam

- Osman Hamdi Bey:** "Kaplumbağa Terbiyecisi" sembolik bir eserdir. Kaplumbağalar, toplumun değişime olan direncini simgelerken, terbiyeciyi figürü liderliği ve sabrı temsil eder.
- Gustav Klimt:** Klimt'in eserleri de yoğun bir şekilde sembolizm içerir. "The Tree of Life" gibi eserlerinde yaşam, ölüm ve aşk gibi evrensel temaları simgeleyen figürler ve motifler kullanılır.

Benzerlik: Her iki sanatçı da sembolizmi kullanarak izleyiciye derin düşünsel mesajlar iletme çabası.

ChatGPT uygulamasına iletir gönder

+ Ara Akıl Yürüt

ChatGPT ▾

3. Ruhani ve Manevi Temalar

- Osman Hamdi Bey:** Terbiyeciyi figürü, tasavvuf geleneğinden izler taşır. Ney, bir tasavvuf sembolüdür ve ruhsal bir huzur ile sabrı ifade eder.
- Gustav Klimt:** Klimt'in eserlerinde, özellikle kadın figürlerinde, ruhani bir atmosfer ve yaşamın anlamına dair duygusal bir derinlik bulunur.

Benzerlik: İki sanatçı da eserlerinde maneviyatı ve ruhsal huzuru işler, ancak bunu farklı kültürel bağlamlarda yaparlar.

4. Doğu ve Batı Kültürlerinin Etkileşimi

ChatGPT uygulamasına iletir gönder

+ Ara Akıl Yürüt

Figure 8.

Later, students individually repeated the same course outcomes on different artists and their works using artificial intelligence applications. The artists and works chosen by the students were projected on screens that the whole class could see and a class discussion was held. In the control group, the same outcomes were processed and realized in equal time within the framework of the current middle school sixth grade curriculum guidelines. In the final stage, the “Visual Arts Achievement Test and Attitude Scale” was applied to both groups simultaneously and as a post-test.

Data Collection Tools

Attitude Scale Towards Visual Arts Course

The Attitude Scale Towards Visual Arts Course was developed by Yanal (2019). The scale, consisting of 14 items, 8 positive and 6 negative, was prepared by taking into account the cognitive, affective and behavioral dimensions of attitude. The items, which are in the form of a five-point Likert-type rating scale, were rated as completely disagree (1) and completely agree (5). Factor analysis was conducted regarding the validity and reliability of the scale, and as a result, a one-dimensional structure emerged. The Cronbach Alpha coefficient of the 14 items in the scale regarding the reliability of the scale is 0.91.

Visual Arts Course Achievement Scale

The Middle School 6th Grade Visual Arts Course Achievement Scale was developed to measure the art course achievements of students at this grade level. While developing the Middle School 6th Grade Visual Arts Course Achievement Scale, the course curriculum was examined, and the opinions of art course teachers and measurement and evaluation experts were consulted. The experts consulted were, respectively, an academician with a doctorate in Visual Arts Education, a professor in the field of Curriculum and Instruction, and a faculty member in the field of Measurement and Evaluation. In this context, statements representing the achievements of the 6th grade visual arts course were included in the scale. In this way, 10 questions were prepared and the content validity of the Middle School 6th Grade Visual Arts Course Achievement Scale was tried to be ensured. A 5-point grading system was used in scoring the scale. If the student achieved the relevant achievement completely, 5 points were given, and if he/she achieved it very little, 1 point was given. The lowest score a student can get for each item of the scale is 1 and the highest score is 5. Item analyses were conducted during the validity process of the Middle School 6th Grade Visual Arts Course Achievement Scale, and then the Cronbach reliability coefficient was calculated as 0.89.

Data Collection Process

During the research process, the problem of the research, the sub-problems of the research were determined and after a comprehensive literature review, the most appropriate model for the research was determined. In the preparation process before the

application, a detailed planning of the experimental group education process was made and an activity plan for the weeks was prepared. During the application process, the Personal Information Form, Course Achievement Scale and Attitude Scale Towards Visual Arts Course were applied to the experimental and control groups as pre-test s. While the program regarding the artificial intelligence-based education process was applied in the experimental group, the current education program was applied. After the application, the equivalent forms of Course Achievement Scale and Attitude Scale Towards Visual Arts Course were applied to the experimental and control groups as post-test s. After the application, the data were analyzed and reported.

Data Analysis Techniques

Checking the distribution of data helps to select appropriate statistical models and methods for data analysis. For example, if the data follow a normal distribution, parametric techniques such as t-test and ANOVA can be applied. Conversely, if the data do not follow a normal distribution, non-parametric methods should be used (Brooks, 2008). Therefore, in order to decide on the type of analysis to be used, it was first examined whether the pre-test and post-test mean scores of the students in the experimental and control groups met the normality assumptions. The Shapiro-Wilk test was used to examine whether the data on the achievement and attitude scale applied to the students in the study group showed a normal distribution. de Souza et al (2023) recommend using the Shapiro Wilk Test to test for normal distribution in groups of less than 50 participants. The data obtained from the Shapiro-Wilk tests did not meet the normal distribution assumptions. In this context, the Mann Whitney U Test, one of the non-parametric analysis techniques, was used in the study.

Ethical Considerations

Before starting the research, ethical principles were applied to the Kastamonu University Social and Human Sciences Research and Publication Ethics Committee, and an ethics committee approval certificate numbered was obtained.

Ethical Review Board: [Kastamonu University Social and Human Sciences Research and Publication Ethics Committee]

Date of Ethics Review Decision: [07.01.2025]

Ethics Assessment Document Issue Number: [1/36-HP39AEA]

FINDINGS

Table 1 and Table 2 show the results of the visual arts course attitude scale applied to the groups before the experimental applications.

Table 1

Descriptive Analysis of Visual Arts Course Attitude Scale Pre-test Scores of Students in Experimental and Control Groups

Pre-Test	Group	N	Mean	Std. Deviation
Attitude	Experimental	20	3,66	0,50
	Control	20	3,73	0,44

The descriptive statistics of the middle school students' pre-test results on the visual arts course attitude scale before to the experimental procedures are displayed in Table 1. The study shows that the experimental group's students' overall pre-test score average on the attitude scale is 3.66, with a standard deviation of 0.50. Students in the control group had an average pre-test attitude score of 3.73, with a standard deviation of 0.44. Table 2 presents the findings of the Mann Whitney U test that was performed between the two groups' pre-test attitude scores.

Table 2

Mann Whitney U Test Results Regarding Pre-test Scores of Visual Arts Course Attitude Scale of Students in Experimental and Control Groups

Pre-Test	Grup	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	p
Attitude	Experimental	20	18,85	377,00	167,00	-0,90	0,37
	Control	20	22,15	443,00			

According to Table 2, the students in the experimental group had a mean pre-test score of 18.85 on the visual arts course attitude scale, compared to their counterparts in the control group who have a mean of 22.15. The Mann Whitney U test value computed between the pre-test attitude score rankings of the groups was 167.00. This figure indicates that students in both groups had similar sentiments toward the visual arts course prior to the experimental methods. Tables 3 and 4 show the outcomes of the visual arts course achievement scales administered to the groups prior to the experimental applications.

Table 3

Descriptive Analysis of Visual Arts Course Achievement Scale Pre-test Scores of Students in Experimental and Control Groups

Pre-test	Group	N	Mean	Std. Deviation
Achievement	Experimental	20	3,54	0,24
	Control	20	3,56	0,47

Table 3 shows the descriptive statistics of the visual arts course achievement scale pre-test scores of the middle school students before the experimental procedures. According to the analysis, the achievement scale pre-test score average of the students in the experimental group is 3.54, and the standard deviation is 0.24. The achievement scale pre-test score average of the students in the control group is 3.56, and the standard deviation is 0.47. The results of the Mann Whitney U test conducted between the pre-test achievement scores of the two groups are given in Table 4.

Table 4

Mann Whitney U Test Results Regarding Visual Arts Course Achievement Scale Pre-test Scores of Students in Experimental and Control Groups

			Mean	Sum of	Mann-	Z	P
Pre-test		N	Rank	Ranks	Whitney U		
Achievement	Experimental	20	19,10	382,00	172,00	-0,76	0,45
	Control	20	21,90	438,00			

According to Table 4, the mean rank of the pre-test scores of the visual arts course achievement scale of the students in the experimental group is 19.10, while the mean of their peers in the control group is 21.90. The Mann Whitney U test value calculated between the pre-test achievement score ranking means of the groups was calculated as 172.00. This value shows that the visual arts course achievements of the students in both groups were equal before the experimental procedures. Table 5 and Table 6 show the results of the visual arts course attitude scale applied to the groups after the experimental applications.

Table 5

Descriptive Analysis of Visual Arts Course Attitude Scale Post-test Scores of Students in Experimental and Control Groups

Post-test	Group	N	Mean	Std. Deviation
Attitude	Experimental	20	4,42	0,38
	Control	20	3,94	0,36

Table 5 shows the descriptive statistics regarding the post-test scores of the visual arts course attitude scale of the middle school students after the experimental procedures. According to the analyses, the attitude scale post-test score average of the students in the experimental group is 4.42, and its standard deviation is 0.38. The attitude scale post-test score average of the students in the control group is 3.94, and its standard deviation is 0.36. The results of the Mann Whitney U test conducted between the post-test attitude scores of the two groups are given in Table 6.

Table 6

Mann Whitney U Test Results Regarding Visual Arts Course Attitude Scale Post-test Scores of Students in Experimental and Control Groups

Post-test		N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	p
Attitude	Experimental	20	26,95	539,00	71,00	-3,51	0,00
	Control	20	14,05	281,00			

According to Table 6, the mean rank of the post-test attitude scale scores of the students in the experimental group on the visual arts course is 26.95, while the mean of their peers in the control group is 14.05. The Mann Whitney U test value calculated between the post-test attitude score ranking averages of the groups was calculated as 71.00. This value shows that there is a significant difference between the visual arts course attitudes of the students in both groups after the experimental procedures ($p < 0.05$). As a result of the experimental procedures, it was seen that the attitudes of the students in the experimental group towards the visual arts course were significantly higher and more positive compared to their peers in the control group. Table 7 and Table 8 show the results of the visual arts course achievement scale applied to the groups after the experimental procedures.

Table 7

Descriptive Analysis of Visual Arts Course Achievement Scale Post-test Scores of Students in Experimental and Control Groups

Post-test	Group	N	Mean	Std. Deviation
Achievement	Experimental	20	4,23	0,35
	Control	20	3,99	0,30

Table 7 provides the descriptive statistics for middle school students' post-test scores on the visual arts course achievement scale following the experimental procedures.

According to the analyses, the children in the experimental group have an average achievement scale post-test score of 4.23 with a standard deviation of 0.35. The achievement scale post-test score average for kids in the control group is 3.99, with a standard deviation of 0.30. Table 8 shows the results of the Mann Whitney U test, which was done between the post-test achievement scores of two groups.

Table 8

Mann Whitney U Test Results Regarding Visual Arts Course Achievement Scale Post-test Scores of Students in Experimental and Control Groups

			Mean	Sum of	Mann-	Z	p
Post-test		N	Rank	Ranks	Whitney U		
Achievement	Experimental	20	24,50	490,00	120,00	-2,23	0,03
	Control	20	16,50	330,00			

According to Table 8, the mean rank of the experimental group's post-test scores on the visual arts course achievement scale is 24.50, while their counterparts in the control group had a mean of 16.50. The Mann Whitney U test value calculated between the post-test accomplishment ranking averages of the groups was 120.00. The experimental techniques resulted in a substantial difference in students' visual arts course outcomes between the two groups ($p < 0.05$). The experimental techniques revealed that students in the experimental group performed much better in visual arts courses than their classmates in the control group.

DISCUSSION AND CONCLUSION

This study aimed to determine the effects of artificial intelligence applications on student attitudes and course outcomes in the 6th grade visual arts course of middle school. The findings obtained in the study will contribute to the increasing interest and discussions on the use of artificial intelligence technologies in education in recent years.

The research findings show that the attitude scores of the students in the experimental group towards the visual arts course were statistically significantly higher than those of the control group, where the traditional method was applied. This result suggests that artificial intelligence-based applications caused students to experience a more active and participatory process in the visual arts teaching process, which positively affected their approach to the course. There are findings in the literature that teaching environments supported by artificial intelligence attract students' attention, involve them in the learning process, and increase their attitudes and motivation (Chauhan & Soni, 2024; Choi, Yang & Goo, 2024; Kharroubi et al., 2024).

The current study confirms these findings in the context of the visual arts course. It has been determined that especially 6th grade students are more interested in the lesson and

a positive atmosphere is created when they work with artificial intelligence tools that enable them to obtain concrete outputs. In this process, student-student interaction also increases significantly with the guidance of teachers, and in-class sharing increases. Indeed, although the positive effect of the activities carried out within the framework of the traditional program on the attitude scores was observed in the control group, it was observed that it did not create a significant difference compared to the experimental group. This difference reveals the additional source of motivation that technological innovations provide to art education (Wood & Moss, 2024). This situation makes the lesson more attractive by encouraging students' original expressions and experimental studies.

Another finding is the significant increase in the visual arts course achievements of the students in the experimental group. The results of the study showed that most of the course objectives were achieved at a higher rate in the group where artificial intelligence-supported applications were used. This may be related to the fact that artificial intelligence tools diversify learning materials and appeal to different learning styles of students (Xie, Lin & Yu, 2024). In particular, instant feedback mechanisms and error correction systems provide students with the opportunity to grasp artistic techniques faster and improve their works (Derinalp & Ozyurt, 2024). This finding becomes even more evident when compared to the achievement scores obtained as a result of the course being taught with traditional methods in the control group. According to the results of the study, artificial intelligence tools make it easier for students to explore basic art concepts such as color, composition, and texture through applied examples and keep their interest constantly alive (Kim, 2023; Black & Chaput, 2024).

According to Mahsan et al. (2023), artificial intelligence is not only a tool in the artistic process, but also a factor that triggers creativity. Guo and Wang (2025) stated in their research that the use of artificial intelligence has taken students to a more advanced level in developing an aesthetic perspective. In this research, the increase in students' creativity levels is also reflected in course achievements and coincides with positive scores on the attitude scale. With the aid of artificial intelligence tools, students can make more visual experiments, receive instant feedback, and this accelerates the learning process. Furthermore, the scale results used in the research show that artificial intelligence-based applications provide multifaceted contributions to students' cognitive, affective, and psychomotor development.

The research results show that the artworks of the students in the experimental group contain much more diverse and innovative elements. This finding shows that artificial intelligence tools open new horizons for students and encourage them to try different styles, materials and techniques (Ren, Edwards & Jamiat, 2024). In addition, it is observed that the approach of transforming the error and generating a new idea from there, instead of avoiding mistakes, is more common in artificial intelligence-supported environments. This approach enriches the trial-error and discovery processes that underlie creativity (Chauhan & Soni, 2024). Thanks to the automatic arrangements or suggestions provided by artificial intelligence, students do not hesitate to take risks and tend to produce original products. In addition, the observation of the positive effect of the use of artificial intelligence on course outcomes shows that the positive findings in previous studies in mathematics and science (Asio & Gadia, 2024; Guo & Wang, 2025) may also be valid for art education. However, the results found within the scope of the research also confirm that the applications are largely

dependent on the class level, students' digital skills and teacher guidance. Examples of applications in visual arts classes allow students to produce more advanced works in terms of aesthetics and technique by providing instant feedback from artificial intelligence (Kugel, 1981; Choi, Yang & Goo, 2024). However, this situation emphasizes the importance of not only technological infrastructure but also elements such as pedagogical design and teacher guidance (Taskiran, 2023).

According to Yim and Wegerif (2024), the integration of artificial intelligence technologies into visual arts classes provides significant benefits, but it is a process that needs to be kept constantly up-to-date. Students need to adapt to rapidly changing technological innovations, and teachers need to follow these innovations and blend them with pedagogical content knowledge. It is stated that schools need roadmaps on infrastructure, licenses, data security, and ethical issues (Su & Mokmin, 2024). In addition, issues such as how artificial intelligence tools affect the boundaries of originality in student works and who owns the artistic property of these works also come to the fore (Choi, Yang, & Goo, 2024). At this point, school policies play a critical role in determining the framework of artificial intelligence use in art classes. Similarly, it is important to observe digital privacy principles in the storage of artificial intelligence data and the storage of student information (Chauhan & Soni, 2024). Moreover, it is one of the core values of artistic education that students understand the difference between works produced with artificial intelligence and that technology is a support tool and that human creativity is still at the center (Guo & Wang, 2025).

The findings of this study are generally considered reliable since they are based on a quasi-experimental design with an experimental-control group, but they have certain limitations. First of all, the study was implemented only at the 6th grade level in a private school in Mersin province, and the results may vary depending on regional or institutional differences. Therefore, studies conducted with larger samples and in different types of schools are important in terms of increasing generalizability. Data on students' attitudes and achievements were collected using self-reported scales. This carries the risk of partially skewing the data due to social desirability bias or students' tendency to present themselves more positively (Fraenkel & Wallen, 1996). In addition, the data collection tools used in the study reflect limited quantitative feedback on AI-based activities. The emotions, difficulties experienced by students, and changes in the process can be supported by more in-depth interviews or observation methods (Holmes, 2020). In addition, the duration of the application is relatively short, and it is not yet clear how students will develop in the long term with AI tools. Long-term follow-ups can provide clearer data on students' sustained progress and skill transfer (Guo & Wang, 2025). Finally, the adequacy of the teacher's and school's technology infrastructure may have played a major role in the experimental group's successful results. This raises the possibility that similar results may not be achieved in schools with lower equipment levels.

The choice of AI tools and access to these tools during the study can also be considered as limitations. Although there are many AI-based art applications, only certain software was used in the study. This choice may have restrictive aspects in terms of the functions and features experienced by the students. In addition, the research teacher's aptitude for AI technologies and the ability to integrate them into the lesson are also seen as a determining factor in the success of the application (Aliabadi, 2023). Another teacher having a different

level of technical knowledge may make it difficult to reach similar results. It should not be ignored that the number of students in the study group was limited to 40 and that demographic factors such as students' age, interests, and family support may also affect the data.

RECOMMENDATIONS

In future studies, it is recommended that similar studies be conducted in different age groups and education levels. In particular, by examining the effects of artificial intelligence use on art education at the primary or high school level, it is possible to discover how developmental differences that emerge with age are shaped. In addition, interdisciplinary approaches can shed light on future studies. For example, similar application of artificial intelligence tools in music, drama or literature courses can make it possible to evaluate the development of creativity and aesthetic sensitivity from a transdisciplinary perspective. In addition, studies to be conducted in different cultural environments and socioeconomic conditions can reveal more clearly the universal or culture-specific effects of artificial intelligence-based applications. The inclusion of artificial intelligence technologies in teacher education curricula and the impact of this process on the professional competencies of teacher candidates can also be the focus of future studies. In particular, it should not be forgotten that the success of field applications largely depends on the knowledge, skills and attitudes of teachers.

In future studies, the ethical and security dimensions of AI technologies in the education-training process should be examined more comprehensively. The protection of confidentiality and ethical standards in the processes of collecting, storing and analyzing student data continues to be a critical issue (Chauhan & Soni, 2024). It is important for researchers to clarify how AI-based applications use student data during art education and with whom this data can be shared. At the same time, the originality and copyright of the content automatically produced by AI tools are also among the priority issues in the field of art education. Future studies can focus on defining the ownership of works produced by AI systems, determining students' creativity share and evaluating possible copying or imitation risks.

However, the development of content that discusses the social and cultural reflections of artificial intelligence in art classes supported by artificial intelligence and provides students with a critical perspective can be qualified examples of studies in this field. Subjective evaluations of students about the works they produce with artificial intelligence, and peer and teacher opinions about how creative or inspiring these works are found, can provide rich content for future studies. The performance differences of different artificial intelligence models and software in art education can also be a subject of future research. The advantages or disadvantages of different artificial intelligence tools specialized in areas such as image processing, natural language processing or object recognition can be evaluated in terms of visual arts classes.

REFERENCES

- Alan, S., Yurt, E. (2024). Flipped Learning: An Innovative Model for Enhancing Education Through ChatGPT. *International Journal of Modern Education Studies*, 8(1), 124-148 <https://doi.org/10.51383/ijonmes.2024.328>
- Aliabadi, R. (2023). *The Impact of an Artificial Intelligence (AI) Project-Based Learning (PBL) Course on Middle-School Students' Interest, Knowledge, and Career Aspiration in the AI Field*. Robert Morris University.
- Almasri, F. (2024). Exploring the impact of artificial intelligence in teaching and learning of science: A systematic review of empirical research. *Research in Science Education*, 54(5), 977–997. <https://doi.org/10.1007/s11165-024-10176-3>
- Alshammari, A., & Al-Enezi, S. (2024). Role of artificial intelligence in enhancing learning outcomes of pre-service social studies teachers. *Journal of Social Studies Education Research*, 15(4), 163-196.
- Asio, J. M. R., & Gadia, E. D. (2024). Predictors of student attitudes towards artificial intelligence: Implications and relevance to the higher education institutions. *International Journal of Didactical Studies*, 5(2), 27763. <https://doi.org/10.33902/ijods.202427763>
- Baltezarević, R., & Baltezarević, I. (2024). Students' Attitudes on The Role of Artificial Intelligence (Ai) In Personalized Learning. *International Journal of Cognitive Research in Science, Engineering and Education*, 12(2), 387–397. <https://doi.org/10.23947/2334-8496-2024-12-2-387-397>
- Black, J., & Chaput, T. (2024). A Discussion of Artificial Intelligence in Visual Art Education. *Journal of Computer and Communications*, 12(5), 71–85. <https://doi.org/10.4236/jcc.2024.125005>
- Bosh, C. (2017). *Promoting self-directed learning through the implementation of cooperative learning in a higher education blended learning environment*. PhD Thesis. North-West University (Potchefstroom Campus), Computer Science Education.
- Brooks, C. (2008). *Introductory econometrics for finance, second edition*. The ICMA Centre: University of Reading.

- Chai, C. S., Lin, P.-Y., Jong, M. S.-Y., Dai, Y., Chiu, T. K. F., & Qin, J. (2021). Perceptions of and behavioral intentions towards learning artificial intelligence in primary school students. *Educational Technology & Society*, 24(3), 89–101.
- Chauhan, S., & Soni, S. (2024). Relationship between Artificial Intelligence and Attitude along with Creativity and Self Esteem among Students. *International Journal of Interdisciplinary Approaches in Psychology*, 2(5), 1225-1251.
- Choi, J., Yang, E., & Goo, E. (2024). The effects of an ethics education program on artificial intelligence among middle school students: Analysis of perception and attitude changes. *Applied Sciences*, 14(4), 1588. <https://doi.org/10.3390/app14041588>
- Derinalp, P., & Ozyurt, M. (2024). Adaptation of the Student Attitudes Toward Artificial Intelligence Scale to the Turkish Context: Validity and Reliability Study. *International Journal of Human-Computer Interaction*, 1–15. <https://doi.org/10.1080/10447318.2024.2352921>
- de Souza, R. R., Toebe, M., Mello, A. C., & Bittencourt, K. C. (2023). Sample size and Shapiro-Wilk test: An analysis for soybean grain yield. *European Journal of Agronomy*, 142, 126666.
- Eltahir, M. E., & Babiker, F. M. E. (2024). The Influence of Artificial Intelligence Tools on Student Performance in e-Learning Environments: Case Study. *Electronic Journal of E-Learning*, 22(9), 91–110. <https://doi.org/10.34190/ejel.22.9.3639>
- Fraenkel, J. R., and Wallen, N. E. (1996). *How to design and evaluate research in education*. NY, USA: McGraw-Hill.
- Galindo-Domínguez, H., Delgado, N., Campo, L., & Losada, D. (2024). Relationship between teachers' digital competence and attitudes towards artificial intelligence in education. *International Journal of Educational Research*, 126, 102381. <https://doi.org/10.1016/j.ijer.2024.102381>
- Grájeda, A., Córdova, P., Córdova, J. P., Laguna-Tapia, A., Burgos, J., Rodríguez, L., ... Sanjinés, A. (2024). Embracing artificial intelligence in the arts classroom: understanding student perceptions and emotional reactions to AI tools. *Cogent Education*, 11(1), 2378271. <https://doi.org/10.1080/2331186x.2024.2378271>

- Guo, Y., & Wang, Y. (2025). Exploring the Effects of Artificial Intelligence Application on EFL Students' Academic Engagement and Emotional Experiences: A Mixed-Methods Study. *European Journal of Education*, 60(1), e12812. <https://doi.org/10.1111/ejed.12812>
- Guo, Y., & Wang, Y. (2025). Exploring the effects of artificial intelligence application on EFL students' academic engagement and emotional experiences: A Mixed-Methods study. *European Journal of Education*, 60(1), 45-65. <https://doi.org/10.1111/ejed.12812>
- Han, J.-W., Park, J., & Lee, H. (2022). Analysis of the effect of an artificial intelligence chatbot educational program on non-face-to-face classes: a quasi-experimental study. *BMC Medical Education*, 22(1), 830. <https://doi.org/10.1186/s12909-022-03898-3>
- Holmes, W. (2020). Artificial intelligence in education. In *Encyclopedia of education and information technologies* (pp. 88–103). Springer.
- Hwang, S. (2022). Examining the effects of artificial intelligence on elementary students' mathematics achievement: A meta-analysis. *Sustainability*, 14(20), 13185. <https://doi.org/10.3390/su142013185>
- Jindal, A., & Kumar, P. (2024). *The Future of Education: Student Attitudes Toward AI-Enhanced Online Courses*. Springer.
- Kasih, E. N. E. W., Indriyanto, K., & Putra, A. V. L. (2024). *Artificial Intelligence for Literature Class: Trends and Attitude*. IEEE.
- Kharroubi, S. A., Tannir, I., Abu El Hassan, R., & Ballout, R. (2024). Knowledge, Attitude, and Practices toward Artificial Intelligence among University Students in Lebanon. *Education Sciences*, 14(8), 863. <https://doi.org/10.3390/educsci14080863>
- Kibici, V. B. (2022). Effects of Online Constructivist 5E Instructional Model on Secondary School Music Lessons. *International Journal of Technology in Education*, 5(1), 117-131.
- Kim, S.-W. (2023). Change in Attitude toward Artificial Intelligence through Experiential Learning in Artificial Intelligence Education. *International Journal on Advanced Science, Engineering & Information Technology*, 13(5), 129-145. <https://doi.org/10.18517/ijaseit.13.5.19039>
- Kugel, P. (1981). Artificial intelligence and visual art. *Leonardo*, 14(2), 137–139.

- Lin, H., & Chen, Q. (2024). Artificial intelligence (AI) -integrated educational applications and college students' creativity and academic emotions: Students and teachers' perceptions and attitudes. *BMC Psychology*, 12(1), 487-16. <https://doi.org/10.1186/s40359-024-01979-0>
- Mahsan, I. P., Yeh, L. H., Abd Arif, H., Nor, N. M., & Ladin, C. A. (2023). ARTech review: E-learning of visual arts education. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, 33(2), 40–54. <https://doi.org/10.37934/araset.33.2.4054>
- Makeleni, S., Mutongoza, B., & Linake, M. (2023). Language Education and Artificial Intelligence: An Exploration of Challenges Confronting Academics in Global South Universities. *Journal of Culture and Values in Education*, 6(2), 158-171. <https://doi.org/10.46303/jcve.2023.14>
- Özkan, Z. C. (2022). The Effect of STEAM Applications on Lesson Outcomes and Attitudes in Secondary School Visual Arts Lesson. *International Journal of Technology in Education*, 5(4), 621-636.
- Ren, J., Edwards, B. I., & Jamiat, N. (2024). Impact of AI Software on Improving Learning Outcomes and Attitudes of Music Students in Chinese Vocational Schools. *Journal of Technical Education and Training*, 16(3), 132–146. <https://doi.org/10.30880/jtet.2024.16.03.010>
- Su, H., & Mokmin, N. A. M. (2024). Unveiling the Canvas: Sustainable Integration of AI in Visual Art Education. *Sustainability*, 16(17), 7849.
- T, S. T., & S B, I. A. (2024). Artificial intelligence effects on student learning outcomes in higher education. Paper presented at the 1-5. <https://doi.org/10.1109/ICONSTEM60960.2024.10568868>
- Taskiran, N. (2023). Effect of artificial intelligence course in nursing on students' medical artificial intelligence readiness: A comparative quasi-experimental study. *Nurse Educator*, <https://doi.org/10.1097/NNE.0000000000001446>
- Valente, M. J., & MacKinnon, D. P. (2017). Comparing models of change to estimate the mediated effect in the pre-test –post-test control group design. *Structural equation modeling: a multidisciplinary journal*, 24(3), 428-450.

- Villegas-Ch, W., Garcia-Ortiz, J., & Sanchez-Viteri, S. (2024). Application of artificial intelligence in online education: Influence of student participation on academic retention in virtual courses. *IEEE Access*, 12, 73045-73065. <https://doi.org/10.1109/ACCESS.2024.3403758>
- Vu, N. T., & Tran, M. H. N. (2022). Synchronous Online Learning in Higher Education: Vietnamese University Students' Perspectives. *Journal of Ethnic and Cultural Studies*, 9(1), 131–160. <https://doi.org/10.29333/ejecs/970>
- Wood, D., & Moss, S. H. (2024). Evaluating the impact of students' generative AI use in educational contexts. *Journal of Research in Innovative Teaching & Learning*, 17(2), 152-167. <https://doi.org/10.1108/JRIT-06-2024-0151>
- Xie, Y., Lin, W., & Yu, X. (2024). *How Artificial Intelligence has influenced Students' Learning: A Survey Exploring Attitudes towards Tool Usage*.
- Yanal, S. (2019). *Türk ve Suriyeli ortaokul öğrencilerinin görsel sanatlar dersi kazanımları, tutumları ve akademik benlik kavramlarının incelenmesi* [An investigation of Turkish and Syrian middle school students' achievements, attitudes, and academic self-concepts in visual arts course] (Master's thesis, Necmettin Erbakan University).
- Yılmaz, C., Erdem, R. Z., & Uygun, L. A. (2024). Artificial intelligence knowledge, attitudes and application perspectives of undergraduate and specialty students of faculty of dentistry in turkey: An online survey research. *BMC Medical Education*, 24(1), 1149-12. <https://doi.org/10.1186/s12909-024-06106-6>
- Yim, I. H. Y., & Wegerif, R. (2024). Teachers' perceptions, attitudes, and acceptance of artificial intelligence (AI) educational learning tools: An exploratory study on AI literacy for young students. *Future in Educational Research*, 2(4), 318–345. <https://doi.org/10.1002/fer3.65>
- Yuan, L., & Liu, X. (2025). The effect of artificial intelligence tools on EFL learners' engagement, enjoyment, and motivation. *Computers in Human Behavior*, 162, 108474.
- Yue, M., Jong, M. S.-Y., & Dai, Y. (2022). Pedagogical design of K-12 artificial intelligence education: A systematic review. *Sustainability*, 14(23), 15620. <https://doi.org/10.3390/su142315620>

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School Administrators' Global Leadership Attributes and Behaviors¹

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Abstract:

The purpose of the study is examine school administrators' global leadership attributes and behaviors. A simultaneous parallel design, a mixed-method research approach, was employed. In the quantitative dimension, data were collected from 502 volunteer teachers selected through simple random sampling. The qualitative dimension utilized a phenomenological design with a purposive sample of 20 volunteer school administrators. Quantitative data were analyzed using descriptive statistics and parametric tests, while qualitative data were analyzed for themes and patterns. Quantitative findings revealed that teachers' perceptions of school administrators' global leadership attributes and behaviors were influenced by the gender variable. Qualitative findings indicated that school administrators demonstrated strong global leadership attributes and behaviors rooted in universal values. However, administrators tended to respond proactively in some instances and reactively in most cases when addressing challenges related to cultural differences. The quantitative and qualitative findings, analyzed within the framework of the simultaneous parallel design, were found to complement and support each other.

Keywords:


Global leadership; leadership attributes; leadership behaviors; school administrators

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INTRODUCTION

In the first quarter of the 21st century, one of the primary challenges in educational management is navigating the uncertainty brought about by rapid change. As instability continues to rise, educational administrators are increasingly viewed as key contributors to addressing the complex problems and challenges associated with globalization. In a world that is becoming ever more interconnected, school administrators are expected to step into the role of global leaders.

Educational leaders recognize that educational problems in their countries are similar to those in other countries and that some problems transcend national borders. It is through leadership that attention can be directed to common interests in the face of similar problems (Lewis & Malmgren, 2018). Leaders operating on a global scale need to be able to manage uncertain and complex situations and communicate effectively. All these point to the need for leaders to be “masters of reinvention” (Javidan et al., 2016). In the last quarter of a century, globalization has moved educational management and leadership from local to universal (Lewis & Malmgren, 2018). Several factors contribute to the growing expectation for school administrators to function as global leaders:

(1) The global outbreak of COVID-19 marked a significant turning point in education (Daniel, 2020). Universities and schools worldwide were compelled to suspend or cancel on-campus activities such as conferences, concerts, and sports events due to widespread public concern and panic. To adapt, educational institutions rapidly transitioned from face-to-face learning to distance education (Gewin, 2020). In this context, educational administrators are expected to cultivate global leadership skills to understand and respond to the micro-level impacts of macro-scale crises. Managing the disruptions caused by unexpected global events like pandemics requires leaders who can navigate chaos effectively, ensuring continuity and stability in schools.

(2) Given the interconnectedness of the modern world, the need to create globally conscious students has increased (Armstrong, 2023). Cultural diversity in schools is increasing due to internationalization and migration in education. This situation necessitates new strategies and decisions in education management (Juang & Schachner, 2020). The presence of global leaders is important to address and integrate the challenges posed by increasing diversity and demographic movements.

(3) Generation Z, defined as digital natives (Prensky, 2001), is now entering the workforce, and it is predicted that their career trends will be different from previous generations. Especially for the new generation, geographical borders are becoming less and less binding. It is predicted that digital natives will create radical changes in the workforce worldwide in the coming decades (Agarwal & Vaghela, 2018). In this context, it is necessary to meet the educational needs of generations oriented towards new lifestyles.

Today, many problems such as the climate crisis, financial crises, neo-liberal movements, and post-modern imperialist attacks have manifested as educational problems, raising awareness of globalization (Lewis & Malmgren, 2018). The impact of each global issue on schools requires an understanding of globalization. In this context, the accumulation of intellectual capital, including global leadership attributes and behaviors, education and experience abroad, and the acquisition of a global mindset, has become important in leadership education.

Global Leadership

Global leadership, which first emerged in the 1990s and was introduced into the literature in 2001, involves managing organizations and processes that engage with multiple cross-border stakeholders, navigating complexities arising from geographical and cultural differences (Mendenhall, 2018). Unlike traditional leadership, global leadership is an evolving field that extends beyond local leadership research and encompasses intricate theoretical frameworks. It continues to develop as scholars explore its complexities and broader implications (Maznevski & Chui, 2018).

The two main dimensions of globalization are “complexity” and “crossing borders”. Complexity, which is effective in the emergence of global leadership, creates unpredictable situations involving four factors: multiplicity, interdependence, uncertainty, and flow. These four factors can be briefly explained as follows (Mendenhall & Bird, 2013):

(1) *Multiplicity*: As globalization involves not just “more” but “more and different”, these leaders engage with different competitors and stakeholders, governmental and non-governmental organizations. Multiplicity represents a situation in which the leader has to deal with a variety of problems and make the right choice from an infinite number of possibilities.

(2) *Interdependence*: Interdependence has a high degree of difficulty because it requires diversity management. Factors that increase interdependence, such as alliances, initiatives, shared value chains, and virtual teamwork, set the bar for performance.

(3) *Uncertainty*: *The information pollution in global business environments includes foggy situations, such as the validity of interpretations that vary according to cultural norms, making cross-border management difficult.*

(4) *Flow and Continuous Change*: Continuous change is characterized by a dynamic and complex meta-context that influences educational environments. This dynamic involves non-linear patterns of flow, including shifts in values, organizational structures, socioeconomic trends, and political stability.

School administrators operating in this environment must develop the ability to anticipate and adapt to these non-linear changes. This requires global leadership skills to navigate uncertainties, balance competing priorities, and foster resilience within their institutions amid evolving external conditions.

The boundaries of global organizations are more permeable and ambiguous than traditional structures. In this context, global leadership requires more than local leadership (Maznevski & Chui, 2018). Global leaders need flexible boundaries, within and outside the organization, in the complex environments in which they operate, so they can physically move anywhere in the world. These elements are the main attributes that distinguish global leaders from other leaders. Another distinguishing feature of global leadership is the ability to influence different communities and focus on the world at large (Javidan & Walker, 2012; Quirk & Gustafson, 2019). These leaders must possess the specific skills required by global leadership and do so without relying on traditional sources of authority (Mendenhall, 2018). Global leadership embodies holism, and the literature frequently emphasizes the ability of these leaders to manage differences (Chin & Trimble, 2015). Developing a global mindset for leaders to master managing fragile, complex, and interdependent relationships is an important factor for success (Story, 2011).

Global Mindset

Global mindset is defined as the awareness of cultural and organizational diversity (Story, 2011). Global mindset is a concept that includes many elements such as attitudes, competencies, behaviors, strategies, and practices (Levy et al., 2007). Managing organizations on a global scale requires a new mindset. According to the 2004 Global Mindset Project (GMP), a worldwide study, there are three main components of global mindset: intellectual, psychological, and social capital (Javidan & Walker, 2012).

Zhang, Bohley, and Wheeler's (2017) study on educational leaders' understanding of global literacy in the United States explored how educators align their leadership skills with global literacy and global-local competencies. Saltsman and Shelton (2019) concluded that while generic leadership competencies remain relevant, global leadership competencies are valued more highly than local leadership skills and even more than management-oriented educational competencies. Similarly, Bainbridge and Thomas (2006) emphasized that effective educational leaders should embody both idealism and practicality, demonstrating a commitment to universal principles and the practical value of education.

An examination of the literature reveals a limited number of studies investigating the practical implications of global leadership attributes and behaviors of school administrators. This study aims to explore the global leadership attributes and behaviors of school administrators. Specifically, the quantitative aspect of the study seeks to determine whether the six themes and 21 items from the GLOBE scale developed by House et al. (2004)—“charismatic/value-based”, “team-oriented”, “self-protective”, “participative”, “humane-oriented” and “autonomous”—vary based on the variables of (1) gender, (2) education level, (3) professional seniority, and (4) duration of employment at their schools. The qualitative component of the study aims to examine school administrators' perceptions of global leadership attributes and behaviors.

METHOD

Research Model

This study, which investigates the global leadership attributes and behaviors of school administrators, employs the triangulation design, - one of the mixed-methods approaches that integrates qualitative and quantitative methodologies. In triangulation, simultaneous parallel, design, data collection, evaluation, and interpretation occur concurrently (Creswell, 2021). For the qualitative dimension of the study, data were gathered from school administrators; while for the quantitative dimension, data were collected from teachers who evaluated the school administrators. The model used within the scope of this research is given in Figure 1.

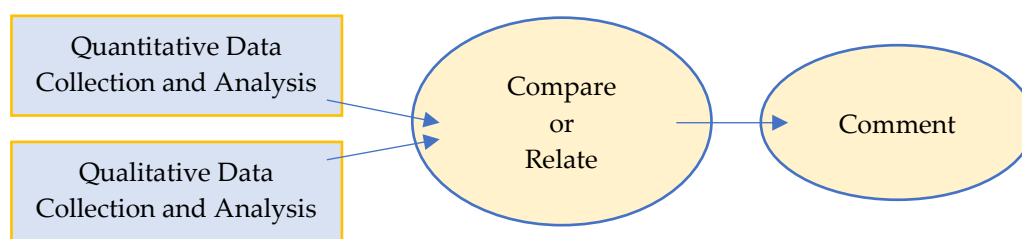


Figure 1. The Convergent Parallel Pattern (Creswell, 2021)

The general survey model was used in the quantitative dimension of the study. The survey model is a research model that aims to describe a past or existing situation as it is (Karasar, 2008). In the qualitative dimension of the study, the phenomenological design was preferred, and the essence of the subject was to be explored in depth. Accordingly, a literature review for global leadership was conducted, and then a semi-structured interview form was prepared. The interview questions were first subjected to a pilot study. After the necessary corrections were made, the questions were directed to the participants, who were school administrators.

The Study Group

The population for the quantitative dimension of the study comprises teachers working in public and private middle and high schools in Istanbul during the 2021-2022 academic year. The sample group includes 502 volunteer teachers selected using the simple random sampling method. Demographic information on the participant teachers is provided in Table 1.

Table 1*Demographic Information of the Participant Teachers*

Variable	Group	N	%
Gender	Female	337	67.1
	Male	165	32.9
Education level	Bachelor	377	75.1
	Postgraduate	125	24.9
Seniority	1-5 year	146	29.1
	6-10 year	85	16.9
	11-15 year	81	16.1
	16-20 year	66	13.1
	+20 year	124	24.7
Duration of employment at their current school	1-5 year	327	65.1
	6-10 year	110	21.9
	11-15 year	37	7.4
	16-20 year	16	3.2
	+20 year	12	2.4

The study group for the qualitative dimension of the research consists of school administrators working in middle and high schools in Istanbul during the 2021-2022 academic year. A total of 20 school administrators were selected using affinity sampling, a subtype of purposive sampling method. Demographic information of the participant school administrators is presented in Table 2.

Table 2*Demographic Information of the Participant School Administrators*

	Age	Gender	Position	Seniority (Year)	Experience abroad	Multicultural school experience	Master's Degree
P1	44	M	Principal	22	Experienced	In part	Yes
P2	49	M	Principal	19	Experienced	In part	Yes
P3	40	F	Vice Principal	4	Experienced	Experienced	Yes
P4	43	F	Vice Principal	7	None	Experienced	No
P5	49	F	Principal	20	Experienced	Experienced	Yes
P6	30	M	Principal	1	None	None	Continues
P7	31	M	Principal	5	None	In part	Continues
P8	53	M	Principal	24	None	None	No
P9	35	M	Principal	1	None	None	Yes
P10	40	M	Principal	10	Experienced	Experienced	No
P11	42	M	Principal	9	Experienced	In part	No
P12	39	F	Principal	4	Experienced	None	Yes
P13	37	F	Vice Principal	5	None	None	No
P14	50	M	Principal	21	None	None	No
P15	35	M	Principal	7	Experienced	In part	Continues
P16	43	M	Principal	12	None	None	No
P17	49	M	Principal	14	None	In part	No
P18	58	F	Principal	19	None	None	No
P19	50	F	Principal	13	None	None	No
P20	55	M	Principal	20	Experienced	In part	No

Data Collection Tools

In the quantitative dimension of the study, the Global Leadership and Organizational Behavior Effectiveness (GLOBE) Scale prepared by House et al. (2004) was used. In the GLOBE study, 21 sub-dimensions emerged under six main global leadership dimensions that contribute to or hinder effective leadership. The item matching of the six dimensions in the culturally validated implicit leadership theory with the 21 sub-dimensions is presented in Table 3.

Table 3

Global Culturally Endorsed Implicit Leadership (CLT) Dimensions

1. Charismatic/Value-Based <ul style="list-style-type: none"> • Charismatic I: Visionary • Charismatic II: Inspirational • Charismatic III: Self-sacrifice • Integrity • Decisive • Performance oriented 	2. Team-Oriented <ul style="list-style-type: none"> • Team I: Collaborative Team Orientation • Team II: Team Integrator • Diplomatic • Malevolent (reverse scored) • Administratively competent
3. Self-Protective <ul style="list-style-type: none"> • Self-centered • Status conscious • Conflict inducer • Face saver • Procedural 	4. Participative <ul style="list-style-type: none"> • Autocratic (reverse scored) • Nonparticipative (reverse scored)
5. Humane-Oriented <ul style="list-style-type: none"> • Modest • Humane orientation 	6. Autonomous <ul style="list-style-type: none"> • Autonomous

To assess the reliability of the Global Leadership and Organizational Behavior Effectiveness (GLOBE) scale, internal consistency was measured using Cronbach's alpha. The 21 leadership sub-dimensions had an average internal consistency value of 0.75, demonstrating sufficient reliability. Sub-dimensions with lower internal consistency were retained in the scale, as they were considered valuable for predicting specific leadership traits, and inter-item correlation tests were conducted to further evaluate the scale's reliability. The results indicate that the scale items demonstrated an adequate level of reliability.

In the qualitative dimension of the study, data were collected using a semi-structured interview form comprising seven questions. These questions were developed based on a literature review and initially tested with pilot practitioners. Following the feedback received, necessary revisions were made, and the questions were finalized with input from experts. The finalized semi-structured interview form was administered to the participants, who were school administrators, through face-to-face interviews.

Data Analysis

The data in the quantitative dimension of the research were analyzed using a statistical software package. To assess the reliability of the sub-dimensions of the GLOBE Scale, Cronbach's alpha internal consistency coefficients were calculated. Descriptive statistics were used to analyze the distribution of teachers according to demographic characteristics. For categorical demographic variables, percentage and frequency statistics were calculated, while for continuous variables, mean, standard deviation, minimum, and maximum values were determined. To evaluate the global leadership levels of school administrators, mean and standard deviation values were calculated. Difference tests were then conducted to assess whether the mean scores obtained by teachers for the sub-dimensions and themes of the scale, varied based on gender, educational level, professional seniority, and length of service in their schools. Due to the insufficient number of teachers with doctoral degrees, participants with master's and doctoral degrees were grouped into a single category. Independent samples t-tests were used for the gender and education level variables, while one-way analysis of variance (ANOVA) was applied for seniority and working time variables. All inferential analyses used a significance threshold of $p < 0.05$. To verify the normality of the scale distribution, kurtosis and skewness values were examined and found to be within the range of -2 to +2. These results indicated no violation of the normal distribution, allowing for the use of parametric analyses in the study.

Qualitative data were collected through face-to-face interviews, with the participants' permission to audio record the conversations. The collected data were then transferred to the MAXQDA 2022 program and analyzed using content analysis. As a result of the analysis, themes, sub-themes, and codes were identified.

Ethical considerations

In the course of this research, we paid scrupulous attention to ethical guidelines, ensuring that the integrity and reliability of the study were never compromised. For the quantitative phase, data were meticulously harvested electronically, ensuring the privacy and anonymity of respondents. The absence of demographic data collection further cemented this confidentiality. Moving onto the qualitative portion, every interviewee was formally apprised of the research's objectives, methodologies, and potential implications. Importantly, they were reassured in writing about their right to withdraw from the study without any repercussions. All data acquired, including the interview tools and participants' consent documents, were securely stored on the researcher's personal computer, fortified by stringent password protection measures.

Ethical Review Board: Marmara University, Institute of Educational Sciences

Date of Ethics Review Decision: 15.08.2022

Ethics Assessment Document Issue Number: 22.06.2022/05-53

FINDINGS

1. Quantitative Dimension of the Study

School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Gender

The findings from the independent samples t-test to assess differences in the charismatic/value-based dimension of school administrators' global leadership attributes and behaviors are presented in Table 4, as perceived by participant teachers based on their gender.

Table 4

Independent Samples t-test Results for Differences in the Charismatic/Value-Based Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Gender

	Group	N	\bar{X}	SD	t	df	p
Visionary	Female	337	6.78	0.52	4.27	500	0.001**
	Male	165	6.53	0.80			
Inspirational	Female	337	6.54	0.63	2.73	500	0.007**
	Male	165	6.35	0.86			
Self-sacrifice	Female	337	4.95	1.29	-3.07	500	0.002**
	Male	165	5.31	1.12			
Integrity	Female	337	6.71	0.57	2.31	500	0.021*
	Male	165	6.57	0.80			
Decisive	Female	337	6.57	0.69	3.06	500	0.002**
	Male	165	6.35	0.86			
Performance oriented	Female	337	5.68	1.06	-1.36	500	0.174
	Male	165	5.82	1.08			
Subscale Total	Female	337	2.10	0.96	0.90	500	0.370
	Male	165	2.59	1.21			

*p<0.05; **p<0.01

As shown in Table 4, the mean scores obtained from female and male teachers for the “visionary” and “inspirational” sub-dimensions differ significantly ($p<0.01$), with female teachers scoring significantly higher. Similarly, for the “self-sacrifice” sub-dimension, there was a statistically significant difference based on gender ($p<0.01$), with male teachers obtaining significantly higher mean scores. The independent samples t-test for the “Integrity” sub-dimension revealed a statistically significant differentiation in mean scores ($p<0.05$) with female teachers scoring significantly higher. Regarding the “Decisive” sub-dimension, a statistically significant difference was observed between female and male teachers ($p<0.01$), with female teachers again scoring significantly higher. However, no significant difference was found between female and male participants in the “performance-oriented” sub-dimension or the overall “charismatic/value-based” dimension ($p>0.05$).

To determine whether the global leadership attributes and behavior levels of school administrators differed based on teachers' gender in the team-oriented dimension, an independent samples t-test was applied. The findings are presented in Table 5.

Table 5

Independent Samples t-test Results for Differences in the Team-Oriented Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Gender

	Group	N	\bar{X}	SD	t	df	p
Collaborative team orientation	Female	337	6.21	0.52	2.21	500	0.028*
	Male	165	6.15	0.72			
Team integrator	Female	337	6.55	0.61	4.50	500	0.001**
	Male	165	6.41	0.86			
Diplomatic	Female	337	6.77	0.50	5.17	500	0.001**
	Male	165	6.49	0.88			
Malevolent (reverse scored)	Female	337	6.39	0.72	-5.42	500	0.001**
	Male	165	6.01	0.87			
Administratively competent	Female	337	1.21	0.60	4.44	500	0.001**
	Male	165	1.62	1.13			
Subscale Total	Female	337	4.90	1.31	3.29	500	0.001**
	Male	165	5.14	1.17			

* $p < 0.05$; ** $p < 0.01$

As seen in Table 5, the independent samples t-test conducted to determine the differences in mean scores for the sub-dimensions of "collaborative team orientation", "team integrator", "diplomatic", and "malevolent" based on gender revealed significant differences ($p < 0.05$, $p < 0.01$). This differentiation is due to higher mean scores from female teachers, in these sub-dimensions. However, in terms of the 'administratively competent' and 'team-oriented' sub-dimensions, a statistically significant difference was found between the mean scores of female and male teachers ($p < 0.01$), with male teachers reporting higher mean scores.

An independent samples t-test was conducted to determine whether the global leadership attributes and behaviors levels of school administrators differed based on the gender of teachers in the self-protective dimension. The findings are presented in Table 6.

Table 6

Independent Samples t-test Results for Differences in the Self-Protective Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Gender

	Group	N	\bar{X}	SD	t	df	p
Self-Centered	Female	337	6.74	0.57	-6.17	500	0.001**
	Male	165	6.46	0.81			
Status Conscious	Female	337	5.53	0.34	-1.21	500	0.227
	Male	165	5.40	0.57			
Conflict Inducer	Female	337	1.55	0.73	-3.09	500	0.002**
	Male	165	2.08	1.20			

Face Saver	Female	337	4.35	1.42	-3.93	500	0.001**
	Male	165	4.51	1.31			
Procedural	Female	337	3.74	1.20	-1.50	500	0.134
	Male	165	4.08	1.11			
Subscale Total	Female	337	6.26	1.01	-4.61	500	0.001**
	Male	165	6.14	1.07			

**p<0.01

As seen in Table 6, the results of the independent samples t-test, conducted to determine the differences in the mean scores for the egocentric sub-dimension and the total dimension based on gender, show a statistically significant difference ($p<0.01$). This difference is due to the higher mean scores obtained from female teachers. Additionally, the mean scores for the “conflict inducer” and “face saver” sub-dimensions differed statistically significantly ($p<0.01$), with male teachers obtaining higher mean scores. However, for the “status conscious” and “procedural” sub-dimensions, no significant difference was found based on gender ($p>0.05$).

An independent samples t-test was applied to determine whether the global leadership attributes and behavior levels of school administrators differed in relation to the gender of teachers, within the participative dimension. The findings are presented in Table 7.

Table 7

Independent Samples t-test Results for Differences in the Participative Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Gender

	Group	N	\bar{X}	SD	t	df	p
Autocratic	Female	337	2.47	1.31	-3.89	500	0.001**
	Male	165	2.97	1.45			
Nonparticipative	Female	337	4.11	1.24	-4.66	500	0.001**
	Male	165	4.29	1.28			
Subscale Total	Female	337	5.58	0.93	-4.89	500	0.001**
	Male	165	5.64	0.92			

**p<0.01

As shown in Table 7, the independent samples t-test results indicate that the scores for the “autocratic” and “non-participatory” sub-dimensions, as well as the “total sub-dimension”, differ statistically significantly between female and male teachers ($p<0.01$). This difference is attributed to the higher scores obtained by male teachers.

An independent samples t-test was conducted to determine whether the global leadership attributes and behaviors levels of school administrators in the humane-oriented dimension differed based on the gender of the teachers. The findings are presented in Table 8.

Table 8

Independent Samples t-test Results for Differences in the Humane-Oriented Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Gender

	Group	N	\bar{X}	SD	t	df	p
Modest	Female	337	2.08	1.11	1.23	500	0.219
	Male	165	2.52	1.32			
Humane orientation	Female	337	4.00	1.20	-0.68	500	0.500
	Male	165	4.54	1.27			
Subscale Total	Female	337	3.24	0.73	-1.98	500	0.048*
	Male	165	3.59	0.88			

* $p < 0.05$

As shown in Table 8, the independent samples t-test results indicate that the scores of female and male teachers did not differ statistically significant in the “humane orientation” sub-dimension and the “modest” sub-dimension ($p > 0.05$). However, the test results for the total sub-dimension scores revealed a statistically significant difference ($p < 0.05$), with male teachers achieving higher scores.

An independent samples t-test was conducted to determine whether the global leadership attributes and behaviors levels of school administrators differed based on teachers' gender in the autonomous dimension. The findings are presented in Table 9.

Table 9

Independent Samples t-test Results for Differences in the Autonomous Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Gender

	Group	N	\bar{X}	SD	t	df	p
Autonomous	Female	337	2.12	1.15	-4.63	500	0.001**
	Male	165	2.66	1.35			

** $p < 0.01$

As shown in Table 9, the results of the independent samples t-test conducted for the “autonomous” sub-dimension indicate a statistically significant difference in the scores of female and male teachers ($p < 0.01$). This difference is attributed to the higher mean scores obtained from male teachers.

School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Education Level

The findings of the independent samples t-test, conducted to determine whether school administrators' global leadership attributes and behaviors differ based on the teachers' education level, are presented in Table 10.

Table 10

Independent Samples t-test Results on the Differences in School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Education Level

Dimensions	Sub-dimensions	Group	p
Charismatic/Value-Based	Visionary	Bachelor's degree & Postgraduate	$p>0.05$
	Inspirational		
	Self-sacrifice		
	Integrity		
	Decisive		
	Performance oriented		
	Collaborative Team Orientation		
Team Oriented	Team Integrator	Bachelor's degree & Postgraduate	$p>0.05$
	Diplomatic		
	Malevolent		
	Administratively competent		
Self-Protective	Self-centered	Bachelor's degree & Postgraduate	$p>0.05$
	Status consciousness		
	Conflict inducer		
	Face saver		
Participative	Procedural	Bachelor's degree & Postgraduate	$p>0.05$
	Autocratic		
	Nonparticipative		
Humane Oriented	Modest	Bachelor's degree & Postgraduate	$p>0.05$
	Humane orientation		
Autonomous	Autonomous	Bachelor's degree & Postgraduate	$p>0.05$

As shown in Table 10, the results of the independent samples t-test revealed no statistically significant differences between the scores of male and female teachers ($p>0.05$).

The test was conducted to analyze the distribution of school administrators' global leadership attributes and behaviors across the sub-dimensions of the scale, based on the education level of teachers.

School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Professional Seniority

According to the results of the one-way analysis of variance conducted to determine whether the score distributions of school administrators in the "participatory", "humane oriented", and "autonomous" dimensions differed based on the professional seniority of teachers, no statistically significant difference was found ($p>0.05$).

An Independent samples t-test was applied to determine whether the global leadership attributes and behaviors of school administrators differed based on the professional seniority of teachers in the charismatic/value-based dimension, and the findings are presented in Table 11.

Table 11

Independent Samples t-test Results for Differences in the Charismatic/Value-Based Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Professional Seniority

	Group	N	Mean	Sd.		Sum of Square	Sd	Mean Square	F	p
Visionary	1-5	146	6.69	0.64	B.Groups	3	4	0.63	1.57	0.180
	6-10	85	6.64	0.67	W.Groups	199	497	0.40		
	11-15	81	6.85	0.36	Total	202	501			
	16-20	66	6.64	0.71						
	+20 year	124	6.68	0.69						
Inspirational	1-5	146	6.41	0.78	B.Groups	2	4	0.55	1.06	0.374
	6-10	85	6.47	0.64	W.Groups	257	497	0.52		
	11-15	81	6.61	0.54	Total	259	501			
	16-20	66	6.51	0.66						
	+20 year	124	6.46	0.82						
Self-sacrifice	1-5	146	4.87	1.17	B.Groups	16	4	4.11	2.70	0.030*
	6-10	85	4.96	1.08	W.Groups	757	497	1.52		
	11-15	81	5.03	1.46	Total	774	501			
	16-20	66	5.41	1.21						
	+20 year	124	5.20	1.25						
Integrity	1-5	146	6.59	0.67	B.Groups	3	4	0.70	1.62	0.168
	6-10	85	6.65	0.62	W.Groups	214	497	0.43		
	11-15	81	6.82	0.44	Total	217	501			
	16-20	66	6.69	0.64						
	+20 year	124	6.64	0.78						
Decisive	1-5	146	6.50	0.79	B.Groups	1	4	0.37	0.64	0.633
	6-10	85	6.51	0.63	W.Groups	286	497	0.58		
	11-15	81	6.58	0.62	Total	288	501			
	16-20	66	6.38	0.82						
	+20 year	124	6.50	0.84						

Performance oriented	1-5	146	5.54	1.03	B.Groups	15	4	3.83	3.44	0.009**
	6-10	85	5.65	1.07	W.Groups	553	497	1.11		
	11-15	81	5.62	1.10	Total	569	501			
	16-20	66	5.89	1.05						
	+20 year	124	5.97	1.05						
Total	1-5	146	6.10	0.54	B.Groups	2	4	0.55	1.57	0.181
	6-10	85	6.15	0.51	W.Groups	174	497	0.35		
	11-15	81	6.25	0.51	Total	176	501			
	16-20	66	6.25	0.67						
	+20 year	124	6.24	0.70						

**p<0.01

As seen in Table 11, it was determined that the mean scores obtained for the "performance-oriented" sub-dimension differed significantly among teachers with different professional seniority ($p<0.01$). Tukey HSD post hoc analysis was performed to identify which subgroups this differentiation was attributed to. It was found that the result was caused by differences between teachers with 1-5 years of seniority and those with over 20 years of seniority ($p<0.01$). There was no significant difference was observed between the other subgroups ($p>0.05$).

To determine whether the global leadership attributes and behaviors of school administrators differ according to the professional seniority of teachers in the team-oriented dimension, an independent samples t-test was applied, and the findings are presented in Table 12.

Table 12

Independent Samples t-test Results for Differences in the Team-Oriented Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Professional Seniority

	Group	N	Mean	Sd.		Sum of Square	Sd	Mean Square	F	p
Collaborative Team-Orientation	1-5	146	6.50	0.66	B.Groups	5	4	1.14	2.32	0.056
	6-10	85	6.54	0.70	W.Groups	245	497	0.49		
	11-15	81	6.55	0.56	Total	250	501			
	16-20	66	6.27	0.86						
	+20 year	124	6.58	0.74						
Team Integrator	1-5	146	6.69	0.60	B.Groups	1	4	0.21	0.48	0.748
	6-10	85	6.66	0.64	W.Groups	220	497	0.44		
	11-15	81	6.76	0.45	Total	221	501			
	16-20	66	6.68	0.66						
	+20 year	124	6.63	0.84						
Diplomatic	1-5	146	6.35	0.76	B.Groups	7	4	1.81	2.95	0.020*
	6-10	85	6.25	0.84	W.Groups	306	497	0.62		
	11-15	81	6.43	0.61	Total	313	501			
	16-20	66	6.16	0.89						
	+20 year	124	6.11	0.81						
Malevolent	1-5	146	1.39	0.88	B.Groups	2	4	0.44	0.63	0.645
	6-10	85	1.41	1.08	W.Groups	347	497	0.70		
	11-15	81	1.28	0.83	Total	349	501			

	16-20	66	1.24	0.56						
	+20 year	124	1.34	0.71						
	1-5	146	6.70	0.67	B.Groups	2	4	0.49	1.08	0.364
	6-10	85	6.62	0.66	W.Groups	225	497	0.45		
	11-15	81	6.73	0.56	Total	227	501			
Administratively competent	16-20	66	6.53	0.71						
	+20 year	124	6.62	0.73						
	1-5	146	5.53	0.39	B.Groups	2	4	0.38	2.04	0.087
	6-10	85	5.50	0.34	W.Groups	91	497	0.18		
	11-15	81	5.55	0.32	Total	93	501			
	16-20	66	5.37	0.47						
Total	+20 year	124	5.46	0.55						

**p<0.05

As seen in Table 12, the mean scores for the “diplomatic” sub-dimension differed significantly based on the professional seniority of teachers ($p<0.05$). To further explore this differentiation, Tukey HSD post hoc analysis was conducted, revealing that the significant difference was primarily between teachers with 11-15 years of seniority and those with more than 20 years of seniority ($p<0.05$).

An independent samples t-test was applied to determine whether school administrators' global leadership attributes and behaviors differed, based on teachers' professional seniority, in the “self-protective” dimension, and the findings are presented in Table 13.

Table 13

Independent Samples t-test Results for Differences in the Self-Protective Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Professional Seniority

	Group	N	M	SD.		Sum of Square	Sd	Mean Square	F	p
Self-centered	1-5	146	1.80	0.96	B.Groups	4	4	1.09	1.22	0.300
	6-10	85	1.83	1.13	W.Groups	444	497	0.89		
	11-15	81	1.60	0.86	Total	448	501			
	16-20	66	1.60	0.73						
	+20 year	124	1.71	0.95						
Status consciousness	1-5	146	4.37	1.43	B.Groups	4	4	0.91	0.47	0.756
	6-10	85	4.51	1.23	W.Groups	955	497	1.92		
	11-15	81	4.35	1.21	Total	959	501			
	16-20	66	4.25	1.49						
	+20 year	124	4.48	1.48						
	1-5	146	3.79	1.25	B.Groups	10	4	2.51	1.82	0.124
	6-10	85	3.85	1.16	W.Groups	685	497	1.38		
Conflict inducer	11-15	81	3.66	1.07	Total	695	501			
	16-20	66	3.81	1.21						
	+20 year	124	4.08	1.13						
	1-5	146	2.59	1.37	B.Groups	21	4	5.19	2.78	0.026*
	6-10	85	2.59	1.38	W.Groups	929	497	1.87		
	11-15	81	2.29	1.17	Total	949	501			
Face saver	16-20	66	2.67	1.45						
	+20 year	124	2.92	1.43						
Procedural	1-5	146	4.33	1.29	B.Groups	12	4	3.01	1.92	0.105
	6-10	85	4.03	1.14	W.Groups	779	497	1.57		

	11-15	81	3.97	1.22	Total	791	501			
	16-20	66	4.00	1.37						
	+20 year	124	4.29	1.23						
	1-5	146	3.38	0.84	B.Groups	6	4	1.44	2.25	0.062
	6-10	85	3.36	0.79	W.Groups	317	497	0.64		
	11-15	81	3.17	0.69	Total	322	501			
	16-20	66	3.27	0.71						
Total	+20 year	124	3.50	0.86						

**p<0.05

As seen in Table 13, the mean scores for the “face saver” sub-dimension significantly differed among teachers with varying professional seniority ($p<0.05$). Tukey HSD post hoc analysis revealed that this difference was due specifically to the distinction between teachers with 11-15 years of seniority and those with over 20 years of seniority ($p<0.05$).

School Administrators’ Global Leadership Attributes and Behaviors based on Teachers’ Length of Service

According to the results of the one-way analysis of variance (ANOVA) conducted to determine whether the score distributions of school administrators in the “autonomous”, “charismatic/value-based”, “self-protective”, and “participatory” dimensions differed based on the teachers' length of service in their schools, it was found that there was no statistically significant difference ($p > 0.05$).

An independent samples t-test was conducted to determine whether the global leadership attributes and behavior levels of school administrators differed based on the teachers' length of service in their schools, in the team-oriented dimension. The findings are presented in Table 14.

Table 14

Independent Samples t-test Results for Differences in the Team-Oriented Dimension of School Administrators’ Global Leadership Attributes and Behaviors based on Teachers’ Length of Service in their schools

	Group	n	Mean	SD		Sum of Square	Sd	Mean Square	F	p
Collaborative Team-Orientation	1-5	327	6.49	0.75	B.Groups	4	2	1.94	3.95	0.020*
	6-10	110	6.64	0.51	W.Groups	246	499	0.49		
	10+ year	65	6.34	0.75	Total	250	501			
Team Integrator	1-5	327	6.67	0.66	B.Groups	2	2	1.00	2.29	0.102
	6-10	110	6.77	0.51	W.Groups	219	499	0.44		
	10+ year	65	6.55	0.88	Total	221	501			
Diplomatic	1-5	327	6.28	0.80	B.Groups	1	2	0.49	0.78	0.458
	6-10	110	6.26	0.72	W.Groups	312	499	0.63		
	10+ year	65	6.15	0.85	Total	313	501			
Malevolent	1-5	327	1.37	0.87	B.Groups	2	2	0.96	1.38	0.254
	6-10	110	1.23	0.75	W.Groups	347	499	0.70		
	10+ year	65	1.42	0.79	Total	349	501			
Administratively competent	1-5	327	6.64	0.72	B.Groups	1	2	0.54	1.18	0.307
	6-10	110	6.73	0.48	W.Groups	226	499	0.45		
	10+ year	65	6.58	0.71	Total	227	501			

	1-5	327	5.49	0.44	B.Groups	1	2	0.30	1.60	0.203
	6-10	110	5.53	0.29	W.Groups	92	499	0.19		
Total	10+ year	65	5.41	0.54	Total	93	501			

As seen in Table 14, it was determined that the mean scores obtained for the "collaborative team orientation" sub-dimension differed significantly among the teachers based on their length of service in their schools ($p < 0.05$). Tukey HSD post-hoc analysis revealed that this differentiation was primarily due to the differences between teachers with 16-20 years of service in their schools ($p < 0.05$).

An independent samples t-test was applied to determine whether the global leadership attributes and behaviors of school administrators in the human-oriented dimension differed based on teachers' length of service in their schools. The findings are given in Table 15.

Table 15

Independent Samples t-test Results for Differences in the Human-Oriented Dimension of School Administrators' Global Leadership Attributes and Behaviors based on Teachers' Length of Service in their schools

	Group	n	Mean	Sd		Sum of Square	Sd	Mean Square	F	p
Modest	1-5	327	5.00	1.28	B.Groups	0	2	0.08	0.05	0.949
	6-10	110	4.96	1.29	W.Groups	809	499	1.62		
	10+ year	65	4.95	1.19	Total	809	501			
Humane Oriented	1-5	327	6.15	1.09	B.Groups	9	2	4.55	4.36	0.013*
	6-10	110	6.48	0.71	W.Groups	521	499	1.05		
	10+ year	65	6.15	1.12	Total	531	501			
Total	1-5	327	5.57	0.95	B.Groups	2	2	0.96	1.12	0.327
	6-10	110	5.72	0.81	W.Groups	426	499	0.85		
	10+ year	65	5.55	0.96	Total	428	501			

** $p < 0.05$

As shown in Table 15, the mean scores obtained for the 'humanistic' sub-dimension differed significantly based on the length of service of the teachers in their schools ($p < 0.05$). Tukey HSD post hoc analysis was conducted to identify the specific groups contributing to this difference. The significant difference was caused by the variation between teachers with 1-5 years of service and those with 6-10 years of service ($p < 0.05$).

2. Qualitative Dimension of the Study

As a result of the content analysis of the data obtained from the interviews with the school administrators in the study group, two themes emerged regarding the global leadership attributes and behaviors of school administrators. The first theme focuses on the global leadership attributes, while the second theme addresses the global leadership

behaviors of the school administrators. The participants' opinions on the global leadership attributes of school administrators are presented in Table 16.

Table 16

Global Leadership Attributes of School Administrators

Sub-theme	Code	Participants
Psychological Capital	Positive perspective	P1, P2, P3, P4, P5, P7, P8, P10, P11, P13, P14, P15, P16, P17, P18, P19, P20
	Empathy skills	P1, P2, P3, P4, P7, P8, P10, P13, P14, P15, P16, P17, P18, P19, P20
	Self-confidence	P1, P2, P3, P5, P7, P8, P9, P11, P15, P17, P18, P19, P20
	Authenticity	P1, P2, P4, P5, P6, P8, P11, P13, P15, P16, P18
	Reactivity	P1, P7, P13, P14, P15, P16, P17, P18, P20
	Peaceful	P1, P2, P3, P4, P9, P12, P13, P15, P17
	Development orientated	P2, P3, P7, P8, P9, P15, P16, P17, P20
	Collective consciousness	P1, P8, P9, P10, P17, P19, P20
	Leadership	P1, P2, P15, P17, P18
	Pro-activity	P2, P5, P15
Social Capital	Communication skills	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P17, P18, P20
	Relationship management	P1, P3, P6, P7, P8, P10, P13, P15, P16, P17, P18, P19, P20
	Creating synergy for teamwork	P1, P4, P5, P13, P15, P16, P17, P18, P19, P20
	The art of rhetoric	P1, P2
	Information literacy	P1, P3, P5, P6, P8, P9, P11, P12, P13, P15, P16, P17, P18, P20
Intellectual Capital	Digital literacy	P1, P3, P4, P5, P7, P11, P12, P13, P14, P15, P17, P19
	Strategic thinking	P1, P2, P3, P7, P8, P12, P13, P17, P18, P19
	Visionary	P1, P6, P8, P12, P15, P17
	Master's degree graduation	P1, P2, P3, P5, P9, P12
	Organiser	P2, P5, P7, P9, P15
	Foreign language proficiency	P1, P3, P7, P8, P16
	Experience abroad	P1, P10, P18
	Intellectual property	P1, P7

When the "psychological capital" theme under the "global leadership attributes" theme was analyzed, the most frequently cited code was "positive perspective". While the code 'communication skills' was the most cited code in the social capital sub-theme, 'information literacy' was the most cited code in the 'intellectual capital' sub-theme. Some of the participant opinions on this theme are given below:

"...There was considerable turmoil arising from differences. Our Syrian students created a tense atmosphere in the school due to forming groups, and fights increased. We saw children who did not understand this. We experienced conflicts with parents who expressed that they

did not want Syrian parents. For a solution, we held meetings to explain that this was a difficult process everyone was going through and that we should get used to living together. Our counselling service stepped in. Our counselling service attempted to address questions such as whether the problem stems from the child's own psychology, whether it arises from dynamics within the group, or whether cultural differences create problems, all in collaboration with stakeholders throughout the school. These were problems related to the tension and shyness that occur when you enter a new environment, and they were related to the orientation process. We solved this in the process." (P4)

"There are foreign minority schools in our country. I have also observed schools where refugees are concentrated. Our policy there is: We will not turkify them. There are assimilation indices and migration policy indices, and countries are given assimilation grades. We should keep their culture alive so that we can attract more talented and qualified human resources from among them in our country. Discussing what different cultures do promotes peace and friendship among people and encourages empathetic thinking. For example, if a Russian and a Ukrainian came to our school after a war, how should we behave. Let the scenario be so clear. They do not understand each other and are in constant conflict. We always encounter people who are different, not only in terms of race or in a war situation, but also among teachers in the same school, who have different ideas. It is essential that we can manage differences here. Do you know what our first strategy should be in this regard? We need to respect different cultures." (P1)

"...I for my part do not want to be managed by my manager or supervisor when I witness issues that they are not competent handling. I do not see them as role models. On the contrary, I do not want them to be there; I want those who know this job to do it and those who can set an example for us to continue. Young people express this much more sharply: 'He doesn't know anything, what can he teach me?' or 'What kind of competence does he have that he can manage us?'. Here again, the subject comes to digitalisation. I am talking about Generation Z. They are very familiar with the internet. Very young children can easily play a game, make software, create a game, and sell it to the world. Some children became millionaires at the age of 12-13. With the intelligence of these children, the people we now call managers or leaders need to be digitally literate." (P4)

Participants' opinions on global leadership behaviours of school administrators are given in Table 17.

Table 17*Global Leadership Behaviours of School Administrators*

Sub-theme	Code	Participants
Approaches to problems arising from cultural differences	Adopting universal principles	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P17, P18, P19, P20
	Understanding that diversity is richness	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P17, P18, P20
	Developing a common vision	P1, P2, P3, P5, P7, P8, P14, P15, P17, P18, P20
	Conducting orientation activities	P1, P3, P4, P5, P7, P8, P10, P14, P15, P17
	Global reality awareness	P1, P2, P5, P6, P7, P10, P14, P15
	Effective use of communication channels	P1, P2, P11, P13, P14, P16, P18, P20
	Creating synergy with stakeholders	P1, P3, P8, P9, P10, P15, P16
	Creating an environment of trust	P10, P11, P14, P15, P20
	Setting a common goal	P1, P9, P15, P16
	Inspirational	P15, P19
	Developing a common mission	P1, P2, P3, P4, P7, P8, P14, P15, P16, P17, P18, P19
	Managing conflicts effectively	P1, P3, P4, P7, P8, P9, P10, P12, P13, P14, P15, P18
Strategies followed in multicultural school management	Team building	P1, P5, P7, P8, P10, P15, P17, P18
	Stakeholder synchronisation	P1, P3, P8, P9, P10, P15, P16
	To develop technological pedagogy infrastructure	P1, P15, P16, P18, P19, P20
	To make a needs analysis	P1, P2, P5, P15, P18
	Overcoming the language barrier	P1, P6, P15, P18
	Accountability	P10, P15, P19
	Sharing authority	P1, P2, P19
	Effective use of motivational tools	P17, P19

Under the theme global leadership behaviors, the most frequent reference to the theme “approaches to problems arising from cultural differences” was the code “adopting universal principles.” When the sub-theme “strategies followed in multicultural school management” was examined, the statements from school administrators were grouped under the code “developing a common mission.” Some of the participant opinions on these codes are as follows:

“... Firstly, a global leader must be an educated individual. They should not adopt positions based on their own religion and culture when forming perspectives and behaviors. Instead, they should consider all human beings as equal. Being objective is therefore critical. Leaders should enter a global educational environment without religious and national biases. They should treat all students equally, regardless of religion, language, and race, because children

are innocent. What prevents this? Universal values, such as understanding the essence of humanity, require a high level of empathy and understanding. We have this in our soul and we have it in our culture. There is Mevlana who said, 'Come, come again no matter what you are.' Can you understand the inclusiveness? Our history is full of examples that should be taught to global leaders." (P13)

"...Our school activities contribute to aligning with a common vision and mission. For example, we organised a competition for reading the National Anthem well, and the winner of the competition was a Syrian child. We examined harmonious and emotional reading. On the day of commemoration of the anniversary of March 18 Martyrs' Remembrance and Çanakkale Victory Day, we organised painting competitions, and a foreign student came among the top three. Here, the common vision and mission are realised through orientation activities. In activities such as running competitions, we give everyone the chance to participate together. We create a spirit of competition, and the children participate in these activities, engaging actively." (P3)

"...In our school, we encourage everyone to respect cultural diversity and treat all students equally in this regard. At the same time, we recognise each student as an equal and allow everyone to express himself or herself freely. Together with all our students, we strive to develop mutual trust and understanding by recognising our cultural differences and adopting universal principles such as equality, diversity and respect." (P17)

DISCUSSION

Discussion on the Quantitative Dimension of the Study

The findings obtained from the quantitative dimension of the study significantly predicted the global leadership attributes and behaviors of school administrators. When analyzing the scores from teachers who evaluated the global leadership attributes and behaviors of school administrators in six sub-dimensions – “charismatic/value-based”, “team-oriented”, “self-protection”, “participatory”, “humane-oriented” and “autonomous”-, a significant difference was found based on the gender variable. Specifically, gender emerged as a significant factor in teachers' perceptions of school administrators' leadership styles. However, no significant differences were found in the variables of "level of education", "professional seniority" or "working time in own school", suggesting that these factors did not influence how teachers evaluated the global leadership attributes and behaviors of school administrators. This result contrasts with previous studies, such as Cemaloğlu's (2007) research, which found significant differences in leadership styles, based on the gender of teachers. In contrast, Sakız et al. (2020) found no significant difference in the perceived self-efficacy and managerial skills of school administrators between male and female teachers. The most significant variable affecting school administrators' global leadership attributes and behaviors in this study was gender, with female teachers expressing both positive and negative attributes regarding school administrators. These findings align with the results of the GLOBE study, which identified

universally positive leadership attributes and universally negative leadership attributes. Leadership attributes that vary by culture include being autonomous, valuing status, and taking risks. Considering the universally positive and negative leadership attributes identified in the GLOBE study, the result of this study closely aligns with these highlighting the importance of attributes such as trust-building, fairness, and foresight in global leadership.

The study examined whether school administrators' global leadership attributes and behaviors differed according to teachers' professional seniority levels. The findings indicated significant variations in certain global leadership attributes and behaviors across different seniority groups. These results suggest that teachers' years of experience influence their perceptions of global leadership.

1. *Charismatic/Value-Based Leadership Attributes:* In the sub-themes of selfless-sacrifice and performance-oriented leadership, a significant difference was found based on teachers' professional seniority. Teachers with 1-5 years of experience were found to perceive school administrators as more selfless-sacrifice and performance-oriented compared to teachers with over 20 years of seniority. This could be attributed to the excitement and idealism of the early years of teaching, when novice teachers may view administrators as guides or mentors. As teachers gain more experience and seniority, they may interpret the behaviors and attributes of school administrators in a more professional or critical manner.

2. *Team-Oriented Leadership Attributes:* The study found that teachers' professional seniority influenced their perceptions of school administrators' diplomatic characteristics. Teachers with 11-15 years of seniority rated school administrators as more diplomatic than teachers with 20 or more years of experience. This difference may stem from the development of professional relationships over time. Teachers with mid-level experience may be more attuned to the diplomatic qualities of school leaders, while more experienced teachers may have developed their own strategies for navigating school dynamics, making them less reliant on the diplomacy of administrators.

3. *Self-Protective Leadership Attributes:* In terms of "self-protective" leadership attributes, a difference was observed in the "face saver" sub-dimension. Teachers with 11-15 years of seniority perceived school administrators as more "face saver" than those with over 20 years of experience. This could indicate that teachers with mid-level seniority are more focused on protecting their own reputation and may value the support of administrators in this regard. Conversely, teachers with more experience may have developed their own methods of managing their professional image and may place less importance on administrators' protective behaviors.

The study further explored whether the "team-oriented" leadership attributes and behaviors of school administrators differed based on teachers' length of service in their schools. The analysis found a significant difference in the 'collaborative' characteristic of school leaders. Specifically, teachers with 6-10 years of experience in their schools rated

school administrators as more collaborative than those with 16-20 years of experience. This difference is likely since the second five years of a teacher's career, often considered the period of professional development and productivity, is when teachers are more inclined to collaborate with colleagues and administrators. As teachers become more established in their roles, they may take a more independent approach to their work, which could reduce their perceived need for collaborative leadership from administrators.

In addition, the study examined whether “humane-oriented” leadership attributes and behaviors of school administrators differed based on teachers' length of service in their schools. A significant difference was found in the “modest” sub-dimension between teachers with one to five years of experience and those with six to ten years of experience. Teachers with 6-10 years of experience rated school administrators as more modest than teachers with only 1-5 years of experience. This could suggest that as teachers gain experience in a school environment, they begin to value and recognize the humanistic qualities of school administrators, such as empathy, support, and personal engagement. Teachers who are newer to the profession may not yet have developed the same level of awareness or appreciation for these qualities, focusing more on the administrative or managerial aspects of leadership.

These findings indicate that teachers' perceptions of team-oriented and humane-oriented leadership attributes are influenced by their professional tenure within a school, with mid-career teachers (6-10 years) generally perceiving administrators as more collaborative and humanistic compared to their less experienced or more veteran counterparts.

Discussion on the Qualitative Dimension of the Study

The analysis of the interviews with school administrators regarding their global leadership attributes revealed that psychological capital and social capital, which are key components of a global mindset, were areas school administrators demonstrated strengths. However, intellectual capital was found to be a weaker area, particularly in concrete aspects such as foreign language mastery, foreign experience, and intellectual property (e.g., having scientific publications). This finding is consistent with previous studies. For instance, Akyürek (2021) found that the psychological capital levels of school administrators, as perceived by teachers, were high. Similarly, Demirer and Ergezen (2022) emphasized that enhancing intellectual capital among school administrators necessitates substantial support from the Ministry of National Education, including measures to retain highly qualified leaders with advanced degrees in the field.

Additionally, studies by Çetin et al. (2017) found a moderate positive relationship between school administrators' innovation management skills and their ability to leverage intellectual capital. This relationship underscores the importance of fostering innovation within educational leadership as a means of strengthening intellectual capital. Moreover, international exposure plays a pivotal role in developing intellectual capital and a global

mindset. Research by Bongila (2022) and Geyer, Putz, and Misra (2017) emphasized the positive impact of study abroad programs in helping students develop their global mindset, suggesting that these experiences provide opportunities for self-discovery and the development of a broader, more global perspective. Likewise, studies by Richardson, Imig, and Flora (2014) and Dayton et al. (2018) affirmed that "study abroad experiences" contribute to graduate students' ability to gain a global perspective, a perspective that can be applied to their professional roles, including leadership in schools.

In this study, it was observed that school administrators in culturally diverse schools exhibited proactive attributes and behaviors but generally displayed reactive behaviors most of the time. The distinction between active and reactive crisis management is crucial for understanding leadership dynamics in such contexts. Pro-active crisis management involves anticipating potential crises and implementing measures beforehand, such as trend analysis and preventive action plans. In contrast, reactive crisis management refers to the strategies employed during and after the crisis, focusing on responding to immediate challenges (Kuşay, 2017). The study suggests that school administrators in culturally diverse settings tend to be less effective in proactive methods, particularly in areas like trend analysis and preventive action planning (Jäntti & Cater-Steel, 2017). This weakness in proactive management can limit the administrators' ability to anticipate and prevent issues before they arise. Goerdel (2006) indicates that proactive management is key for facilitating interaction, coordination, and control within a globally diverse organization and among stakeholders, making it essential for administrators in diverse environments to cultivate these skills. Moreover, proactive behaviors are essential in improving job performance and maintaining preparedness to address potential future issues. Studies by Crant (2000), Sevil and Bülbül (2019), confirm that pro-active behaviors not only enhance performance but also ensure that administrators are better equipped to handle challenges before they escalate.

In the interviews with school administrators, it was found that those who adopted universal principles in managing culturally diverse schools emphasized the view that cultural diversity is an asset, displaying an inclusive, unifying, and integrative approach to leadership. These school administrators actively engaged in strategies that foster collaboration, such as forming teams around a common mission and cooperating with stakeholders. This proactive and inclusive stance reflects key components of global leadership behaviors, where the integration of diverse cultural identities is a central focus. Participants highlighted the importance of creating homogeneous groups and encouraging students to work toward common goals in fields like arts and sports to foster unity and belonging. These strategies are especially relevant for overcoming challenges in culturally diverse environments. Despite these positive orientations, principals also faced significant challenges, including language barriers and a lack of technological infrastructure. A study by Levent and Çayak (2017) also identified communication problems as a major challenge for school administrators, particularly when integrating foreign students. This issue was echoed in the interviews, where school principals discussed their personal efforts to bridge

these gaps, such as attempting to learn foreign languages or seeking interpreter support. These efforts reflect a drive to address the weaknesses in intellectual capital, particularly in terms of language skills and effective communication. Furthermore, the principals expressed an awareness of the global realities impacting education, but they acknowledged the need for additional resource support, especially in intellectual capital. For principals to fully exhibit global leadership attributes and behaviors, investing in professional development, enhancing intellectual capital (e.g., language acquisition, global exposure), and improving technological infrastructure are essential steps.

According to Saltsman and Shelton (2019), there is a growing recognition among researchers that while current programs for educational leadership are effective for local leadership contexts, they fall short when it comes to preparing leaders for the global educational landscape. This gap in global leadership training is identified as a chronic issue that needs to be addressed to ensure that educational leaders are equipped to handle the challenges of an increasingly interconnected world. To foster meaningful change in schools, it is essential to blend traditional sociocultural norms with global principles (Kaur & Noman, 2020). This integration helps ensure that school leadership is both locally relevant and globally informed. Moreover, aligning with global organizations is necessary to create shared value for all stakeholders, as emphasized by Kennedy (2003). Such alignment ensures that the leadership strategies applied are not only effective within local contexts but are also globally conscious. The UNDESA/IASIA initiative highlights the importance of designing and implementing leadership capacity-building programs that equip educational leaders with the skills needed to address the key challenges of the modern world. These programs should adopt an interdisciplinary and global approach to ensure that leaders are prepared to navigate the complexities of a globalized educational environment (Turner et al., 2018). Given the ever-evolving economic and political conditions, there is an urgent need for pedagogical innovations that align with international curricula. As new market economies emerge and global dynamics shift, educators must develop innovative teaching methods and curricula that integrate globalization trends (Sjoberg & Shabalina, 2010). This approach allows educational institutions to stay competitive in the face of global challenges. Ultimately, educational leaders must cultivate a global mindset and work on developing their psychological, intellectual, and social capital (Story, 2011). This development is crucial for leaders to operate effectively in a rapidly changing, diverse, and interconnected world, fostering success and innovation in schools globally.

CONCLUSION

In this study, which examined the global leadership attributes and behaviours of school administrators, the study revealed that the quantitative and qualitative findings, evaluated within the framework of simultaneous parallel design, supported each other. The themes and codes obtained in the qualitative dimension of the study overlap with those of the GLOBE study in the quantitative field. The quantitative findings of the study determined that the global leadership attributes and behaviours of school administrators

were strong in terms of universal values. According to the opinions of the qualitative research participants, common solutions to problems can be developed based on general problems in the world. In addition, globalisation can create an opportunity and collective consciousness for all people to gather around common values, and the new connections brought by globalisation can make it possible to be part of a larger community by accepting cultural differences.

Based on the findings from this study, the following suggestions can be made to further enhance the development of school administrators and their global leadership attributes and behaviours:

- In-service training, seminars, and workshops can be organised on language proficiency, academic literacy, digital skills, proactivity, and leadership skills to enrich the intellectual capital of school administrators.
- It is recommended that the trips abroad planned for school administrators should be purposeful and well-structured. School administrators who have travelled abroad can be asked to write a report about the gains. This feedback can be evaluated, and these experiences can be shared with other school administrators.
- It is suggested that school administrators should be given opportunities to receive master's or doctoral education abroad, and that these individuals should be included in the decision-making process in educational policies.
- In this study, it was concluded that the gender of teachers who evaluated school administrators was an effective variable in global leadership attributes and behaviours. The mean scores obtained from female teachers for both positive and negative attributes of school administrators are higher, showing that this issue is worthy of further research. In addition, future studies can be planned to evaluate male and female school administrators.
- The examination of the literature highlights the need to study the field of global leadership. In this context, the scope of the research can be expanded with different samples and study groups.

REFERENCES

- Agarwal, H., & Vaghela, P. (2018). Work values of Gen Z: Bridging the gap to the next generation. In *National Conference on Innovative Business Management Practices in 21st Century* (pp. 1-26). Parul University.
- Akyürek, M. İ. (2021). Investigation of school administrators' psychological capital level. *Journal of Education and Humanities: Theory and Practice*, 12(23), 149-170.

- Armstrong, J. (2023). *A phenomenological study on Kentucky principals' perceptions of global competency in high school curriculum* (Doctoral dissertation), University of the Cumberlands.
- Bainbridge, W. L. & Thomas D. M. (2006). Global perspective on school leadership. In E. E. Davis (Ed.). *Qualities for effective leadership; School leader speak* (pp.1-9). Maryland, MD: Rowman & Littlefield.
- Bako, M. (2016). *The leadership style preferences of academics from different generations: Baby Boomers, Generation X, Generation Y and Generation Z*. (Master's thesis), Altınbaş Üniversitesi.
- Bongila, J. P. (2022). Pedagogy of global positioning leadership as applied to study abroad. *Journal of Comparative & International Higher Education*, 14(1), 69-85. <https://doi.org/10.32674/jcihe.v14i1.3131>
- Cemaloğlu, N. (2007). An analysis of the school administrators' leadership styles in terms of different variables. *Türk Eğitim Bilimleri Dergisi*, 5(1), 73-112.
- Chin, J., & Trimble, J. (2015). *Diversity and leadership*. SAGE Publications, <https://doi.org/10.4135/9781483368801>
- Crant, J. M. (2000). Proactive behavior in organizations. *Journal of Management*, 26(3), 435-462.
- Creswell, J. W. (2021). *A concise introduction to mixed methods research*. SAGE Publications.
- Çetin, M., Akpolat, T. & Özdemir, A. N. (2017). The relationship between intellectual capital use and school administrators on innovation management. *INES Journal*, 13, 141-157.
- Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects*, 49(1), 91-96.
- Dayton, K., Koster, K., Prenkert, J., & Ridlon, R. (2018). Short-term global business immersion courses: short-term program, long-term effects? *Business Horizons*, 61(6), 903-911. <https://doi.org/10.1016/j.bushor.2018.06.003>
- Demirer, M. & Ergezen, M. D. (2022). Selecting and assigning school administrators to secondary education institutions affiliated to the Ministry of National Education: A model proposal. *IBAD Journal of Social Sciences*, 12, 520-538. <https://doi.org/10.21733/ibad.1017971>
- Gewin, V. (2020). Five tips for moving teaching online as COVID-19 takes hold. *Nature*, 580(7802), 295-297.
- Geyer, A., Putz, J., & Misra, K. (2017). The effect of short-term study abroad experience on American students' leadership skills and career aspirations. *International Journal of Educational Management*, 31(7), 1042-1045.
- Goerdel, H. T. (2006). Taking initiative: proactive management and organizational performance in networked environments. *Journal of Public Administration Research and Theory*, 16(3), 351-367. <https://doi.org/10.1093/jopart/mui051>

- House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (eds.). (2004). *Culture, leadership, and organizations: The GLOBE study of 62 societies*. Thousand Oaks: Sage Publications.
- Jäntti, M., & Cater-Steel, A. (2017). Proactive management of IT operations to improve IT services. *JISTEM (Journal of Information Systems and Technology Management)*, 14(2), 191-218.
- Javidan, M., & Walker, J. L. (2012). *A whole new global mindset for leadership. people and strategy*, 35(2), 36-41.
- Javidan, M., Dorfman, P. W., De Luque, M. S., & House, R. J. (2016). In the eye of the beholder: cross-cultural lessons in leadership from Project Globe. Reiche, S. B., Stahl, G. K., Mendenhall, M. E., Oddou, G. R., (Eds.), *Readings and cases in international human resource management* (pp. 119-154). New York: Routledge.
- Juang, L. P. & Schachner, M. K. (2020). Cultural diversity, migration and education. *Int J Psychol*, 55, 695-701. <https://doi.org/10.1002/ijop.12702>
- Kaur, A., & Noman, M. (2020). *Educational leadership and self-determination theory in collectivist cultures*.
<https://oxfordre.com/education/view/10.1093/acrefore/9780190264093.001.0001/acrefore-9780190264093-e-592?rskey=v2Eecp&result=4>
- Kennedy, J. W. (2003). *A study of the moral reasoning skills of proactive and reactive organizational management*. Nova Southeastern University.
<https://www.proquest.com/pagepdf/305244535?accountid=17143>
- Kuşay, Y. (2017). The communication strategies of shopping centers in proactive and reactive crisis communication. *International Journal of Social Sciences and Education Research*, 3(2), 379-396.
- Levent, F., & Çayak, S. (2017). Opinions of school administrators on the education of Syrian students in Türkiye. *HAYEF Journal of Education*, 14(1), 21-46.
- Levy, O., Taylor, S., Boyacigiller, N. A., & Beechler, S. (2007). Global mindset: A review and proposed extensions. In Javidan M., Steers R. M., Hitt M. A. (Eds.), *Advances in international management: The global mindset* (pp. 11-47). Oxford, UK: Elsevier.
- Lewis, C., & Malmgren, P. (2018). *The leadership lab: Understanding leadership in the 21st century*. Kogan Page Publishers.
- Maznevski, M. L. & Chui, C. (2018). Leading global teams. (Eds. Mendenhall, M. E., Osland, J. S., Bird, A., Oddou, G.R., Stevens, M. J., Maznevski, M. L. & Stahl, G. K.), *Global leadership: research, practice and development* (pp. 119-143). New York & London: Routledge.
- Mendenhall, M. E. (2018). Leadership and the birth of global leadership. (Eds. Mendenhall, M. E., Osland, J. S., Bird, A., Oddou, G. R., Stevens, M. J., Maznevski, M. L. & Stahl, G. K.),

- Global Leadership: Research, Practice and Development* (pp.3-28). New York & London: Routledge.
- Mendenhall, M. E., & Bird, A. (2013). In search of global leadership. *Organizational Dynamics*, 42(3), 167-174.
- Prensky, M. (2001). Digital natives, digital immigrants part 2: do they really think differently? *On the Horizon*, 9, 1-6.
<http://dx.doi.org/10.1108/10748120110424843>
- Richardson, J. W., Imig, S., & Flora, K. (2014). Evaluating school leadership development through an international experience. *International Journal of Leadership in Education*, 17(3), 353-369.
<https://doi.org/10.1080/13603124.2013.817611>
- Quirk, S. L. & Gustafson, J. (2019). Developing the next generation of global leaders: proposing an iterative framework for student global leadership development. (Eds. Osland J. S., Mendelhall M. E., & Li, M.), *Advances in Global Leadership* (pp. 215-256). United Kingdom: Emerald Publishing.
- Sakız, H., Ekinci, A., & Sarıçam, H. (2020). Teachers' perceptions of their school managers' skills and their own self-efficacy levels. *International Journal of Leadership in Education*, 23(5), 585-603.
- Saltsman, G., & Shelton, K. (2019). Leadership competencies for global education leaders: a delphi study of UNESCO delegates and administrators. *Education Leadership Review*, 20(1), 150-166.
- Sevil, E., & Bülbül, T. (2019). The relationship between self-esteem levels of school managers and taking personal initiative. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 15(3), 700-719.
- Sjoberg, S. D., & Shabalina, O. I. (2010). More than a sight-seeing trip: enhancing the value in short-term study abroad. *Business Education Innovation Journal*, 2(2), 46-58.
- Story, J. S. (2011). A developmental approach to global leadership. *International Journal of Leadership Studies*, 6(3), 375-389.
- Tekin, Z. (2019). Managing cultural differences in the context of global leadership. *Journal of the Human and Social Science Researches*, 8(2), 1226-1238.
<https://doi.org/10.15869/itobiad.516129>
- Turner, J. R., Baker, R., Schroeder, J., Johnson, K. R., & Chung, C. H. (2018). The global leadership capacity wheel: comparing HRD Leadership literature with research from global and indigenous leadership. *European Journal of Training and Development*, 43(1/2), 105-131.
- Zhang, G., Bohley, K. A., & Wheeler, L. (2017). Global perspective and the implications for school leadership. *Journal of Academic Administration in Higher Education*, 13(2), 9-14.

Data Availability Declaration

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

Author Contributions

A. Faruk Levent spearheaded the conceptualization, designed the research methodology, and supervised the entire project. Meral Halisdemir was responsible for the data collection, analysis, and interpretation, bringing analytical rigor to the study. A. Faruk Levent took the lead in drafting the manuscript, ensuring its alignment with scholarly standards, and revising it for intellectual depth. All authors collaboratively discussed the results, provided critical insights, and contributed to the final manuscript. They have read, approved, and take joint accountability for the presented work's accuracy and integrity.

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Ethics statement: We hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. We take full responsibility for the content of the paper in case of dispute.

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Exploring the Rich Metaphorical Representations of Basic Science Concept Among Gifted Student¹

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Abstract:

This study explores the metaphorical perceptions of gifted students towards basic science concepts. A total of 210 gifted students participated in the study, which utilized a phenomenology design to reveal the metaphors used by students to describe the concepts of 'universe, living thing, matter, light, sound, electricity and environment'. A metaphor data collection form was used as the data collection tool. The results of the descriptive analysis showed that the most frequent metaphors used by gifted students included 'infinity' for the concept of 'Universe', 'pen' for the concept of 'Living things', 'human' for the concept of 'Matter', 'sun' for the concept of 'Light', 'wave' for the concept of 'Sound', 'water' for the concept of 'Electricity', and 'home' for the concept of 'Environment'. Overall, the study highlights the broad level of thought among gifted students when it comes to conceptualizing basic science concepts through metaphorical thinking. The findings of this study have important implications for science education and instruction, particularly in terms of promoting more creative and imaginative approaches to teaching and learning science.

Keywords:

Special ability, Metaphor, Basic science concepts, Gifted students, BİLSEM (Science and Art Centre).

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INTRODUCTION

Although many definitions have been made about the concepts of superior intelligence and superior ability from past to present, they are used as "gifted and talented" in the literature (Özsoy et al., 1998). Special ability is used as a term to denote the high level of intelligence possessed. The gifted are individuals with above-average abilities and creative and critical thinking skills. In addition, they have developed problem-solving skills, a sense of responsibility, more vital reasoning skills than their peers, and the ability to solve problems and make plans. They have creative thinking and ask a lot of questions. They have high imagination and think of different alternatives to reach the goal. They can express unexpected and specialized answers. They have unique ideas. They store and memorize the knowledge they acquire (Altıntaş, 2009). Considering their characteristics, the education of gifted students is also very important. Considering the educational needs of gifted students, it is necessary to prepare activities at their own level and cognition level. Instead of thinking of gifted students as "they have high capacity anyway, they will be successful somehow," these students should be given programmed education, and they should be educated according to their abilities (Gökdere et al., 2003). Motivation problems are one of the factors that gifted students may experience and may lead to unexpected failures (Reis & McCoach, 2000). Special ability in the natural sciences is defined as a special ability area that has a high potential for scientific thinking and exhibits high-level skills in the natural sciences (Heller, 1993). Hoover (1989) presents the characteristics that should be present in gifted students in the field of science; "superior quantitative ability, superior memory, high oral ability, curiosity, freedom, use of formulas, desire to understand how a mechanism works, interest in natural sciences, wide interests and the ability to differentiate between broad interests and opinions".

The contribution of science to developing countries is a significant and indisputable fact. For this reason, great efforts have been made to improve the quality of science education. There has been a significant development in science education after World War II. In 1957, when Russia sent its first satellite into space, the United States of America, then England, and other Western countries took action. Not wanting to fall behind in technological developments, the States found a solution by renewing and modernizing the science curriculum (Ayas, 1995). Science education in Turkey has remained under the influence of developments in Western countries (Ayas, 1995). According to Özdemir (2010), studies on science literacy in our country are primarily about teachers' and students' perceptions of the nature of science and the acquisition of science literacy. In order for the nature of science to be learned by students, individuals should have acquired the concepts related to science in order to raise science-literate individuals who investigate the relationship between 'science, technology, society, and environment,' think and interpret science, develop positive interest and attitude towards science. The first aim of science education should be to teach science concepts (Kavak et al., 2006). According to Novak

(2010), the concept is the perceived pattern of objects, events, or records thereof, determined by a label. Yağbasan and Gülçiçek (2003) define the concept of science as "all of the secure knowledge gained by examining, researching, testing the events in our environment with a planned study made purposefully and by separating and integrating these concepts again." Science is not only a concept learned at school but also a concept encountered in every field in daily life that develops and advances the person (Çolak, 2014). One of the main goals of science education is to use science concepts in situations encountered in daily life, such as natural disasters, the formation of the earth and celestial bodies, water cycles, weather changes, and living diversity (Kaptan & Korkmaz, 1999).

It seems that the first studies on metaphor are based on Aristotle. For Aristotle, metaphors are implicit comparisons made according to the principles of analogy. When used outside the dictionary meaning, it is stated as a lyric art (Ortony, 2012). Lakoff & Johnson (2005) states the significance of metaphors in our lives as: "Metaphors are creative, for it directs our minds beyond existing and obvious similarities, relationships, and views to new similarities, relationships, and views of their own creation. Metaphorical thought is vital in determining people's thoughts about life, making sense of the universe, and communicating with facts, events, concepts, situations and objects (Pilav & Üstten, 2013). Metaphors are used as a tool related to language in obtaining opinions on a subject, in defining a phenomenon or object in daily life, in education, in teacher training, and consequently in all areas of life (Karapınar, 2016). Northcote & Fetherson (2006) examines metaphorical perceptions as an indicator of people's thoughts about education and suggests that people often express their feelings, perceptions, and thoughts through metaphors. Metaphors are expressed as one of the most powerful mental tools that structure, direct, control, embody concepts, and communicate our thoughts about the formation and process of concepts (De Guerrero & Villamil, 2002; Hogler et al., 2008; Shaw & Mahlios, 2011).

When the studies (Su et al., 2017; Yam et al., 2018; Kırmızı & Tarım, 2018; Özarslan, 2019; Uygur Yolçun, 2019; Epçaçan et al., 2020; Nacaroglu & Mutlu, 2020) are conducted, it is seen that the development of metaphors effectively reveals the perception "towards concepts." Metaphoric perception is the revealing of individuals' affective perceptions about an event, phenomenon, and concept by using metaphors. Metaphorical perceptions are verbal expressions of an individual's external world perception. Metaphorical perceptions are of great importance in explaining some elements of analogy that individuals use in their daily lives, some situations that they cannot explain and revealing the situation in their minds (Tamimi, 2005). Students' perception of a course significantly affects their success in that course. In this regard, students' perceptions of the course can be revealed through metaphors. Thus, students can easily say what they want to express more effectively with fewer words by using metaphors (Toplu, 2015). Since the metaphors produced by individuals contain clues about their experiences and thinking processes, metaphors can be used as data-collection tools in scientific research (Booth, 2003).

When the related literature is examined, it is seen that metaphorical perceptions of gifted students about various concepts have been studied (Çapan, 2010; Kunt, 2012; Özsoy, 2014; Ogurlu et al., 2015; Ünal et al., 2016; Aslan & Doğan, 2016; Satmaz, 2016). In the studies of gifted students on metaphors, it was seen that the concepts were handled individually. However, it is understood that studies on gifted students' metaphors in science are limited (Aydın, 2013; İbret & Aydınözü, 2011; Aygün et al., 2015; Doğan, 2017; Yanarates & Yılmaz, 2020; Uluay, 2020; Dinçer & Erdemir, 2020; Demirci, 2020). Through metaphors, this study addressed basic science concepts (world, universe, living, life, matter, light, sound, electricity, environment).

Although gifted students constitute a very small segment of society, the education of gifted individuals is extremely important. Because of their potential, they can change the country and even the world (Ünlü Yavaş, 2009). It is thought that the metaphorical perceptions of gifted students towards science concepts will contribute to the education of gifted students. This study aimed to explore the metaphorical perceptions of gifted students towards basic science concepts, with a focus on identifying the most frequent metaphors used for each concept. From this point of view, the problem statement of this research can be expressed as "What are the metaphorical perceptions of gifted students towards basic science concepts?". The research seeks answers to the following sub-problems within the framework of the main problem.

Sub-problems

Q1: What are the metaphorical perceptions of gifted students towards the concept of the 'universe'?

Q2: What are the metaphorical perceptions of gifted students towards the concept of 'living things'?

Q3: What are the metaphorical perceptions of gifted students towards the concept of 'matter'?

Q4: What are the metaphorical perceptions of gifted students towards the concept of 'light'?

Q5: What are the metaphorical perceptions of gifted students towards the concept of 'sound'?

Q6: What are the metaphorical perceptions of gifted students towards the concept of 'electricity'?

Q7: What are the metaphorical perceptions of gifted students towards the concept of 'environment'?

METHOD

In this study, since it is aimed to reveal the metaphorical perceptions of gifted students towards basic science concepts, phenomenology, one of the qualitative research designs, was used. The aim of factual science is to reveal the experiences, perceptions and understandings of individuals about the concept (Yıldırım & Şimşek, 2011). In this study, the basic science concepts in the science course were selected as concepts and the meanings attributed to these concepts by the students were tried to be revealed.

Participants

In this study, convenience sampling was used. Researchers may prefer individuals who are more easily accessible to make their work easy and fast (Yıldırım & Şimşek, 2011). The study was carried out in the spring semester of the 2020-2021 academic year with a total of 210 gifted students whose characteristics are given in Table 1, and who are studying in the 3rd, 4th, 5th, 6th, 7th and 8th grades of Alanya Science and Art Center affiliated to the Alanya District Directorate of National Education of Antalya in a 2-week period.

Table 1

Number of students in the working group

Group	Class	Female	Male	Total
Support training	3rd grade	21	25	46
	4th grade	9	20	29
Getting individual talents noticed	5th grade	41	39	80
	6th grade	22	15	37
Developing special capabilities	7th grade	5	6	11
	8th grade	2	5	7
Total				210

Applications Process

All of the classes where the researcher will practice, has been given the necessary information about the purpose of the application and how to do it. Students were provided with information about the research by reading the metaphor information section in the metaphor data collection form. In determining the students participating in the study, it was taken into consideration that the basic science concepts in the science curriculum were processed in their courses. When the curriculum of the science course MEB (2018) is examined, it is seen in Table 2 that the basic science concepts selected in the study are included in the program from the 3rd grade of 'universe, living thing, light, sound, electricity and environment'.

Concepts	Class	Unit Name
Universe, Matter, Environment, Light, Sound, Living Things, Life, Electricity	3rd grade	Let's Get to Know Our Planet
		Let's Get to Know Matter
		The light and sounds around us
		Journey to the World of Living Things
	4th grade	Electric Vehicles
		The Earth's Crust and the Movements of Our Earth
		Properties of Matter
		Lighting and Sound Technologies
		Human being and environment
	5th grade	Simple Electrical Circuits
		Sun, Earth and Moon
		World of Living Things
		Matter and Change
		Propagation of Light
	6th grade	Human being and environment
		Electrical Circuit Elements
		The Solar System and Eclipses
		Matter and Heat
	7th grade	Sound and Features
		Transmission of Electricity
		The Solar System and Beyond
		Pure Substances and Mixtures
	8th grade	The Interaction of Light with Matter
		Electrical Circuits
		Matter & Industry
		Energy Transformations and Environmental Science
		Electric Loads and Electrical Energy

Table 2

Science course curriculum unit names

Data Collection Tools

Metaphors can be used as data collection tools in scientific research, since there are clues about the thinking processes of individuals in the metaphors they produce (Booth, 2003). While developing the data collection tool used in the study, the data collection tools used in the research conducted to reveal metaphorical perceptions in the literature were examined (Kırmızı & Tarım, 2018; Uygur Yolçun, 2019; Nacaroğlu & Mutlu, 2020) and found out that they are in "The concept (e.g., the Universe) is like Because....." form. In this study, since metaphorical perceptions are revealed, metaphor data collection form has been prepared as in literature examples. A form has been prepared that includes the basic science concepts 'universe, living thing, matter, light, sound, electricity and environment'. Gifted students were asked to fill in the blanks on the form. The word

"because" was used to explain the reasons for the metaphors that students use to express concepts (Yıldırım & Şimşek, 2011).

Data Analysis

In the analysis of the metaphors developed by the gifted students for the basic science concepts, descriptive analysis, one of the qualitative data analysis methods, was used. In descriptive analysis, connections that can express data can be reached. In descriptive analysis, similar codes are combined, arranged and interpreted in common categories and themes (Yıldırım & Şimşek, 2011). In the analysis of metaphors developed by gifted students, a five-stage process was followed, namely "coding and extraction, compiling sample metaphor images, category development, ensuring validity and reliability, and quantitative data analysis", respectively (Saban, 2009).

Coding and Extraction Phase

Each student's data collection form is encoded and numbered as S-1, S-2, All of the metaphors produced by the students were encoded into the excel file and an alphabetical list was created. In line with this list, it was examined whether a certain metaphor was clearly explained in the forms collected from the students. In the analysis of the data obtained in the study, the metaphors developed by the students regarding the basic science concepts and their reasons were examined and those who did not make meaningful explanations were weeded out. Some examples of student metaphors extracted from the study are as follows S32 *"Matter is like flowers. Because they smell good."*, S47 *"Life is like a snowball that is baked. Because it gets better when it's cooked"*. After the elimination, the metaphor data collection form of 210 students was included in the research.

Sample Metaphor Image Compilation Phase

After the extraction process, the metaphors were again arranged in alphabetical order and the raw data was reviewed a second time and a sample metaphor expression was selected from the student sentences representing each metaphor. Thus, for each of the 1446 metaphors, a "list of sample metaphors" was created, along with the compilation of student metaphor images that are assumed to best represent it.

Category Development Phase

The metaphors developed by the students are combined into the same categories, with similar answers combined. While determining the categories, both the metaphors developed by the students and the "because ..." part explaining the reason for the metaphor were taken into account. In the metaphors developed by some students, the thought to be explained after the part was the same, while in some students it was different. A total of 1446 metaphors developed by gifted students were collected in 52 categories according to their common characteristics.

Ensuring Validity and Reliability Phase

Since the analysis stages of the data obtained in the study were explained in detail, the validity of the study was ensured (Yıldırım & Şimşek, 2011). The reliability of data analysis was calculated using the formula $[\text{Consensus} / (\text{Consensus} + \text{Disagreement}) \times 100]$ proposed by Miles & Huberman (1994). In order to ensure the reliability of the data obtained in the study, the opinion of an expert who has conducted research on metaphors was consulted as to whether the 39 categories developed by the researcher included the metaphors developed by gifted students. For this purpose, an alphabetical list of 439 metaphors and a list of the characteristics of 39 categories were submitted to the expert opinion and the metaphors were asked to be placed in categories. The categories determined by the researcher were compared with the categories determined by the expert. In the metaphors in this study, approximate reliability values for each concept between the researcher and the expert were determined in the range of 90% and 95%.

Quantitative Data Analysis Phase

For each concept examined in this study, a separate frequency table was made for the metaphors produced and all the data representing their categories.

Ethical considerations

Ethical Review Board: Alanya Alaaddin Keykubat University Social and Human Sciences Scientific Research Ethics Committee Decision

Date of Ethics Review Decision: 30.09.2021

Ethics Assessment Document Issue Number: 2021/06

RESULTS

Findings related to the First Problem of the Research

The metaphors developed by gifted students for the concept of "Universe", the categories of metaphors and the findings obtained from metaphor examples are shown in Table 3.

Table 3

Metaphors for the concept of the universe, its categories and sample metaphors

Categories	Metaphors	Frequency	Sample metaphors
Astronomy	Infinite	25	S30 "The universe is like infinite. Because the beginning and end of the universe are not clear."
	Darkness	6	S15 "The universe is like darkness. Because the universe has no beginning and no end, it is dark and constantly expanding."
	Space	5	S123 "The universe is like space. Because it's just bigger than space."

Place	Sky	4	S81 "The universe is like the sky. Because the sky, like the universe, contains many things."
	Star	3	S76 "The universe is like star. Because if you look at it from one point of view, there are so many stars."
	Bottomless	2	S74 "The universe is like planet. Because when you look at the universe from the outside, it looks dark, but when you go inside, we see that there are a lot of planets."
	Planet	2	S85 "The universe is like bottomless. Because when I look up at the stars, I think about how bottomless it is."
	Astronomy	1	S209 "The universe is like astronomy. Because the universe is the foundation of astronomy."
	Country	12	S3 "The universe is like country. Because just as galaxies, planets, and stars are in a system from large to small in the universe, so there are states, cities, counties, towns and villages in the country."
	Home	6	S45 "The universe is like home. Because we have everything we need."
	Field	3	S78 "The universe is like field. Because it contains different objects like a field."
	Anthill	2	S172 "The universe is like anthill. Because it's so big and complicated."
	Class	2	S153 "The universe is like class. Because the galaxies in it, the students in the classroom, are like a class in the universe that has them in it."
	Location	2	S34 "The universe is like ground. Because it's too big."
	Apartment building	1	S101 "The universe is like apartment building. Because it has different floors in it, like an apartment."
	Human body	1	S204 "The universe is like human body. Because our veins, our cells, we carry the universe within ourselves."
	Terrain	1	S91 "The universe is like terrain. Because everything in the universe occupies a huge area."
	Market	1	S34 "The universe is like market. Because it has a lot of stuff in it."
	Factory	1	S37 "The universe is like factory. Because it always produces stars."
	Huge place	1	S150 "The universe is like school. Because it teaches us what we don't know has its own rules (the laws of physics) that lead us to investigate."
	Collection location	1	S142 "The universe is like collection location. Because there are thousands of items in the back of the unique shelf waiting to be noticed."
	Institution	1	S5 "The universe is like institution. Because there is a certain order in it."
	School	1	S150 "The universe is like school. Because it teaches us what we don't know has its own rules (the laws of physics) that lead us to investigate."
Item	Box	5	S208 "The universe is like box. Because a lot can fit

Nature			<i>into the universe just like a cardboard box."</i>
	Balloon	3	<i>S65 "The universe is like balloon. Because there is no end to the universe, it expands as centuries go by."</i>
	Book	3	<i>S17 "The universe is like book. Because there is information in it waiting to be learned."</i>
	Bag	2	<i>S113 "The universe is like bag. Because you can put anything you want in it."</i>
	Paper	2	<i>S79 "The universe is like paper. Because the shape of the universe is flat, or very close to flat."</i>
	Billiard ball	1	<i>S19 "The universe is like billiard ball. Because it has a lot of orbicular assets in it."</i>
	Bead box	1	<i>S152 "The universe is like bead box. Because there are so many round things in it."</i>
	Empty container	1	<i>S113 "The universe is like empty container. Because you can put anything you want in it."</i>
	Cupboard	1	<i>S167 "The universe is like cupboard. Because there are different things on every shelf in the cupboard, and there are other planets and stars all over the universe."</i>
	Baking tray	1	<i>S119 "The universe is like baking tray. Because the baking tray is also big and black."</i>
	Carpet	1	<i>S82 "The universe is like carpet. Because the patterns of the carpet are planets and the edges are celestial bodies."</i>
	Mandala	1	<i>S193 "The universe is like mandala. Because the universe has a perfect harmony."</i>
	Matrushka	1	<i>S83 "The universe is like matrushka. Because as we investigate and open, new things are discovered."</i>
	Nylon Bag	1	<i>S134 "The universe is like nylon bag. Because it surrounds us."</i>
	Clock	1	<i>S58 "The universe is like clock. Because just as we don't know when the clock's battery will run out, we don't know when the universe will end."</i>
	Ocean	7	<i>S129 "The universe is like ocean. Because it contains a lot of mysteries in its vast interior."</i>
	Sea	6	<i>S75 "The universe is like sea. Because the sea is like eternal, and the creatures in it are like stars and planets."</i>
	Rainbow	2	<i>S102 "The universe is like rainbow. Because there are things of all colors in the universe."</i>
	Beach	2	<i>S67 "The universe is like beach. Because beach is also a whole, but it's made up of billions of grains of sand."</i>
	Water	1	<i>S52 "The universe is like water. Because its tip is not as obvious as water."</i>
	Waterfall	1	<i>S11 "The universe is like waterfall. Because it's both quiet and hectic."</i>
	Snowflake	1	<i>S69 "The universe is like snowflake. Because the beings in the universe are as numerous and dissimilar as snowflakes."</i>
	Entity	1	<i>S41 "The universe is like entity. Because when you look at the universe, you see a void, but it's not that simple. The galaxies, planets, stars in it are all part of</i>

			<i>the universe."</i>
Living thing	Tree	3	S32 "The universe is like tree. Because its leaves and fruits look like planets and things like meteors."
	Mother	2	"S36 "The universe is like mother. Because it embraces everything."
	Human being	2	S73 "The universe is like human being. Because every person's body works with a system."
	Living thing	2	S132 "The universe is like living thing. Because it's constantly growing."
	Flower	2	S190 "The universe is like flower. Because the universe is in order, and so is the flower."
	Coronavirus	1	S156 "The universe is like coronavirus. Because the coronavirus is constantly spreading."
Mathematics	Number	5	S28 "The universe is like number. Because numbers are infinite like the universe."
	Round	1	S56 "The universe is like round. Because all the planets are round, I see them as round in photographs and documentaries."
	Circle	1	S64 "The universe is like circle. Because it has an infinite diagonal."
	Ray	1	S174 "The universe is like ray. Because there is no end to the ray."
	Pi number	1	S60 "The universe is like Pi number. Because it goes on forever."
	Shape	1	S100 "The universe is like shape. Because shapes are infinite like the universe."
	Infinity sign	1	S56 "The universe is like infinity sign. Because the universe has no limits."
Cognitive	The human brain	1	S84 "The universe is like human body. Because the universe encompasses everything, and the human brain receives whatever information it wants."
	Infobox	1	S126 "The universe is like infobox. Because even though we examine a different place every day, it can be endlessly fascinating, uplifting, and sometimes dangerous."
	Computer	1	S145 "The universe is like computer. Because everything happens in it."
	Magic circle	1	S25 "The universe is like magic circle. Because a magic circle is difficult to solve and understand."
	Mind	1	S12 "The universe is like mind. Because the beginning and the end cannot be determined."
	Imaginary	1	S22 "The universe is like imaginary. Because it's more extraordinary than we could have ever imagined."
Food	Soda	1	S136 "The universe is like soda. Because there are a lot of bubbles in the soda, like planets and stars."
	Hodgepodge	1	S94 "The universe is like hodgepodge. Because there's a lot of stuff in it that we're almost as numerous as we can call it."
	Fruit platter	1	S140 "The universe is like fruit platter. Because it contains many planets and objects."

Life	Life	2	S175 "The universe is like life. Because the life of the universe is similar to our life."
	Everything	1	S183 "The universe is like everything. Because it encompasses everything."
Total	70	165	

When Table 3 shows, the metaphors developed by gifted students for the concept of "universe" are collected in nine categories. The categories are formed by taking into account the students' justifications for the metaphor and the common features of the metaphors. These categories are: Astronomy is a category of place, item, nature, living things, mathematics, cognitive, food, and life. When Table 3 is examined, the most developed metaphors of the concept of "universe" are: Metaphors of infinity (f=25), country (f=12), ocean (f=7), darkness (f=6), home (f=6), sea (f=6), space (f=5), box (f=5) and number (f=5).

Findings related to the Second Problem of the Research

The metaphors developed by gifted students for the concept of "Living Thing", the categories of metaphors and the findings obtained from metaphor examples are shown in Table 4.

Table 4

Metaphors for the concept of the living thing, its categories and sample metaphors

Categories	Metaphors	Frequency	Sample metaphors
Item	Pen	5	S97 "Living Thing is like pen. Because the pen writes and eventually runs out, so does the living thing."
	Machine	5	S83 "Living Thing is like machine. Because there are organs and systems in it that work in harmony with each other, such as circuits."
	Book	3	S50 "Living Thing is like book. Because everyone has different information."
	Car	3	S120 "Living Thing is like car. Because living things move and so do cars."
	Ball	2	S110 "Living Thing is like ball. Because everyone kicks it even though it's not its fault."
	Item	2	S80 "Living Thing is like item. Because it exists, it works for a while, then it gets old and disappears."
	Picture table	1	S114 "Living Thing is like picture table. Because even in a painting there are people and animals."
	Model	1	S208 "Living Thing is like model. Because it breaks easily, but it's hard to do."
	Vase	1	S28 "Living Thing is like vase. Because when it's broken, it's hard to fix."
	Sails	1	S89 "Living Thing is like sails. Because it always discovers new things."
	Attire	1	S124 "Living Thing is like attire. Because when you move, so does it."

Kinds of living things	Door	1	S105 "Living Thing is like door. Because it goes back and forth all the time."
	Iron	1	S63 "Living Thing is like iron. Because if we don't take care of it, it will rust."
	Notebook	1	S7 "Living Thing is like notebook. Because every day of it is like a page."
	Bag	1	S102 "Living Thing is like bag. Because its brain is full like bags."
	Glass	1	S17 "Living Thing is like glass. Because if you don't act sensitively, it will break."
	Human, animal and plant	6	S128 "Living things are like human beings, animals and plants. Because living things consist of three groups."
	Flower	3	S163 "Living Thing is like flower. Because it comes into the world and fades after a while."
	Tree	3	S161 "Living Thing is like tree. Because trees are alive."
	Seed	2	S29 "Living Thing is like seed. Because it grows and develops."
	Plant	2	S59 "Living Thing is like plant. Because every living thing has a cycle."
	Animal	2	S16 "Living Thing is like animal. Because they are also a living thing."
	Leaf	1	S172 "Living Thing is like leaf. Because it has a beginning and an end, and when it ends, it is replaced by a new one."
	Bevy	1	S170 "Living Thing is like bevy. Because there are many and full of varieties."
	Dove	1	S139 "Living Thing is like dove. Because they're free."
	Chick	1	S27 "Living Thing is like chick. Because it comes to life in the egg, and we are in the world."
Technology	Robots	8	S162 "Living Thing is like robot. Because it acts according to the commands that the brain gives it."
	Means of transport	1	S137 "Living Thing is like means of transport. Because it's constantly on the move."
	Technology	1	S67 "Living Thing is like technology. Because it's getting better by the day."
	Fingerprint	1	S62 "Living Thing is like fingerprint. Because every living thing is special."
	Computer	1	S207 "Living Thing is like computer. Because the living thing holds information in its brain."
	Television	1	S5 "Living Thing is like television. Because television cannot function without electricity, and living things cannot function without oxygen."
	Toy	3	S55 "Living Thing is like toy. Because when you set the toy, it starts to move, and when its time is up, it stops, just like our heart."
	Puppet	2	S140 "Living Thing is like puppet. Because it is a puppet of its own brain."

Game	Jigsaw	1	S145 "Living Thing is like jigsaw. Because when the pieces are complete, you can understand what happened."
	Sudoku	1	S49 "Living Thing is like sudoku. Because they're both complicated."
	The king in chess	1	S187 "Living Thing is like the king in chess. Because we can be checkmates with the slightest mistake."
	A toy doll with batteries	1	S30 "Living Thing is like a toy doll with batteries. Because it's moving all around."
	Toy car	1	S131 "Living Thing is like toy car. Because I don't know why, but they can both move."
	Game	1	S118 "Living Thing is like game. Because most of living things play games."
	Puzzle	1	S11 "Living Thing is like puzzle. Because it seems easy to solve, but it is difficult."
	Remote-controlled car	1	S73 "Living Thing is like remote controlled car. Because a living thing moves with its brain, and a car moves with a controller."
Sky	Universe	3	S150 "Living Thing is like universe. Because it has so much to discover, like the universe, it's made up of trillions of pieces."
	Rainbow	2	S70 "Living Thing is like rainbow. Because it's as colorful and enchanting as the rainbow."
	Cloud	2	S138 "Living Thing is like cloud. Because it reacts to the outside in different situations."
	Space	1	S133 "Living Thing is like space. Because living things grow up and so does space."
	Planet	2	S126 "Living Thing is like planet. Because they are very diverse, they all have different structures."
	World	2	S160 "Living Thing is like world. Because all living things live in the world."
Human	Human being	6	S43 "Living Thing is like human being. Because it is like a human being because of its qualities such as growth, development, excretion, reproduction and dying."
	Army	2	S33 "Living Thing is like army. Because there are so many living things in the world."
	Baby	1	S168 "Living Thing is like baby. Because they also need care and want to live."
	Student	1	S185 "Living Thing is like student. Because it has a lot to learn from life."
	Servant	1	S22 "Living Thing is like servant. Because they do similar things all the time in life."
Necessity for life	Water	4	S149 "Living Thing is like water. Because without water, there is no living thing."
	Organ	2	S182 "Living Thing is like organ. Because living things see and feel."
	Heart	2	S189 "Living Thing is like heart. Because it works like a heart for a very long time and doesn't die without a factor like it."

Facts of life	Breath	1	S1 "Living Thing is like breath. Because all living things breathe."
	Oxygen	1	S166 "Living Thing is like oxygen. Because it can't live without it."
	Life	1	S202 "Living Thing is like life. Because every living thing lives."
	Purpose	1	S85 "Living Thing is like purpose. Because it is born for a cause, grows up and dies."
	Road	1	S34 "Living Thing is like road. Because it has a beginning and an end."
	Day	1	S68 "Living Thing is like day. Because life goes by so quickly, like days."
	Source	1	S148 "Living Thing is like source. Because living thing produces many things."
	Career	1	S3 "Living Thing is like career. Because living things have periods of growth and development like careers."
	Differences	1	S39 "Living Thing is like differences. Because the characteristics of every living thing are unique."
	Loop	1	S164 "Living Thing is like loop. Because every living thing is born, grows, lives and dies, there is no exception."
Nature	Fire	2	S129 "Living Thing is like fire. Because it is both dangerous and innocent."
	Dust	1	S60 "Living Thing is like dust. Because it's everywhere."
	Forest	1	S180 "Living Thing is like forest. Because the lungs of living things are like forests."
Art	Colour	3	S100 "Living Thing is like colour. Because it's varied."
	Artworks	2	S12 "Living Thing is like artwork. Because sometimes we don't immediately notice the very difficult and very easy aspects."
Place	Factory	3	S46 "Living Thing is like factory. Because it can take something and produce something different."
Entity	Entity	2	S147 "Living Thing is like entity. Because every living thing is an entity."
Total	73	133	

When Table 4 shows, the metaphors developed by gifted students for the concept of "living thing" are collected in twelve categories. These categories are: Item, kinds of living things, game, technology, sky, human, necessity for life, the facts of life, art, nature, place and entity categories. When Table 4 is examined, the most developed metaphors of the concept of "living thing" are: Robot (f=8), human, animal and plant (f=6), human (f=6), pen (f=5), machine (f=5) and water (f=4) metaphors.

Findings related to the Third Problem of the Research

The metaphors developed by gifted students for the concept of "Matter", the categories of metaphors and the findings obtained from metaphor examples are shown in Table 5.

Table 5*Metaphors for the concept of the matter, its categories and sample metaphors*

Categories	Metaphors	Frequency	Sample metaphors
Living thing	Human being	8	S185 "Matter is like human being. Because a human being who occupies space in a vacuum is matter."
	Chameleon	4	S145 "Matter is like chameleon. Because it can enter into any shape (solid liquid gas)."
	Friend	2	S146 "Matter is like friend. Because it's with us everywhere, all the time."
	Living thing	2	S139 "Matter is like living thing. Because some substances are moving."
	Animal	2	S63 "Matter is like animal. Because there are so many varieties."
	Tree	1	S173 "Matter is like tree. Because there are so many leaves in the tree and there is so much matter in the world."
	Child	1	S153 "Matter is like child. Because as children develop and change, so do substances."
	Coronavirus	1	S92 "Matter is like coronavirus. Because it's everywhere."
Matter	Everything	6	S14 "Matter is like everything. Because almost everything in our lives is matter."
	Object	3	S65 "Matter is like object. Because matter is an object that occupies space in the universe."
	Entity	3	S199 "Matter is like entity. Because substances are like entity."
	Volume and mass	1	S71 "Matter is like things with volume and mass. Because it takes up space."
	Must	1	S13 "Matter is like must. Because without matter, there can be no human and no life."
	Something concrete	1	S191 "Matter is like something concrete. Because we can see and touch matter."
	Living thing and inanimate	1	S31 "Matter is like everything living and inanimate. Because it occupies a place on Earth."
	Item	6	S16 "Matter is like item. Because when I say matter, the first thing that comes to my mind is the items that work for us."
Item	Table	2	S15 "Matter is like table. Because it has mass, it takes up space, I can touch it."
	Pen	1	S207 "Matter is like pen. Because the pen is a matter."
	Car	1	S179 "Matter is like car. Because the car is a matter."
	Remote Control	1	S35 "Matter is like remote control. Because just as the channels change when we press the remote control, so do the properties of matter."

	Diamond	1	S52 "Matter is like diamond material. Because every matter has a value."
	Phone	1	S25 "Matter is like phone. Because matter looks simple on the outside, like the phone, but is complicated on the inside."
	Ball	1	S140 "Matter is like ball. Because it can be big or small."
	Eraser	1	S206 "Matter is like eraser. Because eraser is a matter."
Food	Water	9	S5 "Matter is like water. Because it can be found in many forms."
	Mixed toast	1	S125 "Matter is like mixed toast. Because different substances can be mixed and other substances can be obtained. "
	Food	1	S177 "Matter is like food. Because there are different shapes and so many more than that. "
School	Science	3	S137 "Matter is like the natural sciences. Because almost all subjects are about matter."
	Experiment	2	S176 "Matter is like experiment. Because it is found by trying."
	Book	2	S50 "Matter is like book. Because just as each book contains different information, substances are also different."
Toys	Play dough	4	S117 "Matter is like play dough. Because matter takes shape, so does dough."
	Lego	2	S79 "Matter is like lego. Because matter is made up of atomic particles, we can combine legos to form shapes."
	Jigsaw	2	S150 "Matter is like jigsaw. Because there are puzzle pieces (atoms) that make it up."
Sky	Air	5	S133 "Matter is like air. Because it's everywhere."
	Star	2	S167 "Matter is like star. Because there is matter everywhere, and there are stars everywhere in the sky."
State of Matter	Solid	3	S100 "Matter is like solid. Because there are substances that are solid."
	State	3	S202 "Matter is like state. Because every matter has a state."
	Ice	1	S93 "Matter is like ice. Because it can be broken."
Micro Size	Cell	2	S204 "Matter is like cell. Because it is the structure that makes up everything."
	Atom	1	S60 "Matter is like atom. Because it's everywhere."
	Nucleus	1	S161 "Matter is like kernel. Because nucleus is part of matter."
	Drop	1	S66 "Matter is like drop. Because matter takes up space with its granular structure."
	Seed	1	S70 "Matter is like seed. Because it's the beginning

			<i>of everything."</i>
Emotion	Feel	2	<i>S38 "Matter is like feeling. Because when we touch a matter, we feel it."</i>
	Family	1	<i>S144 "Matter is like family. Because it's with us everywhere, all the time."</i>
	Emotion	1	<i>S41 "Matter is like emotion. Because it can change like emotions."</i>
	Entertainment	1	<i>S143 "Matter is like our source of entertainment. Because some of the substances are fun."</i>
	Love	1	<i>S12 "Matter is like love. Because sometimes we feel it so strongly, and sometimes we don't feel it at all."</i>
Place	World	2	<i>S109 "Matter is like world. Because there are many living things in the world."</i>
	Lake	1	<i>S2 "Matter is like lake. Because it contains more than one species."</i>
	Universe	1	<i>S86 "Matter is like universe. Because it is made up of tiny things, and both came into being from nothing, and they are both perfect."</i>
Feature	Volume	2	<i>S23 "Matter is like volume. Because without volume, there is no matter."</i>
	Mass	1	<i>S147 "Matter is like mass. Because every matter has a mass."</i>
Nature	Sand	2	<i>S138 "Matter is like sand. Because it can take different shapes."</i>
	Nature	1	<i>S119 "Matter is like nature. Because there are so many varieties."</i>
Art	Picture	1	<i>S101 "Matter is like picture. Because there are different varieties."</i>
	Painting	1	<i>S162 "Matter is like painting. Because when we look at it, we can understand what it is."</i>
Enigmatic	Magic	1	<i>S85 "Matter is like magic. Because it can go from one shape to another."</i>
Total	60	119	

When Table 5 shows, the metaphors developed by gifted students for the concept of "matter" are collected in fifteen categories. These categories are: Living thing, matter, item, food, school, toy, sky, state of matter, micro size, emotion, space, feature, nature, art and enigmatic. When Table 5 is examined, the most developed metaphors of the concept of "matter" are: Water (f=9), human (f=8), everything (f=6), item (f=6), Air (f=5), Object (f=5) and Play dough (f=4) metaphors.

Findings related to the Fourth Problem of the Research

The metaphors developed by gifted students for the concept of "Light", the categories of metaphors and the findings obtained from metaphor examples are shown in Table 6.

Table 6

Metaphors for the concept of the light , its categories and sample metaphors

Categories	Metaphors	Frequency	Student metaphors
Light source	Sun	36	S80 "Light is like the sun. Because it emits heat and light."
	Lantern	4	S40 "Light is like the lantern. Because it illuminates where it is."
	Candle	4	S174 "Light is like candle. Because candles are as warm and bright as light."
	Fire	3	S42 "Light is like fire. Because fire also illuminates, and they both move very fast and appear from afar."
	Lamp	3	S122 "Light is like lamp. Because the lamp shines light."
	Light bulb	2	S180 "Light is like light bulb. Because the bulb emits light like it."
	Lighting tool	1	S128 "Light is like lighting tool. Because in my brain, the word light evokes a means of illumination."
	A source that illuminates the surroundings	1	S191 "Light is like a source that illuminates the surroundings. Because with light we see around us."
Natural Phenomena	Knowledge	7	S155 "Light is like knowledge. Because light spreads like knowledge."
	Sound	7	S74 "Light is like sound. Because it spreads to the environment where it is located."
	Electricity	5	S133 "Light is like electricity. Because they're both very fast."
	Bright	5	S184 "Light is like bright. Because the rays of light are also bright."
	Seeing	4	S1 "Light is like seeing. Because we can see around us through light."
	Energy	2	S83 "Light is like energy. Because light is a form of energy."
	Lighting	1	S51 "Light is like lighting. Because it makes the surroundings visible."
	Heat	1	S50 "Light is like heat. Because it spreads."
On life	Life	3	S39 "Light is like life. Because there is no life without light."
	Idea	2	S204 "Light is like idea. Because it enlightens, it provides awareness."
	Hope	2	S19 "Light is like hope. Because we always expect a light in the dark."
	Road	2	S47 "Light is like road. Because it always shows the goal."
	Line	1	S176 "Light is like line. Because it spreads linearly."
	Gossiping	1	S203 "Light is like gossiping. Because both light and gossip spread quickly."
	Inspiration	1	S67 "Light is like inspiration. Because it enlightens people."
	Guide	1	S41 "Light is like guide. Because it always guides

			<i>us."</i>
	Message circulating on social media	1	<i>S91 "Light is like a message spread on social media. Because it's so fast. "</i>
	Life	1	<i>S28 "Light is like life. Because without light we can't live."</i>
Technology	Race car	4	<i>S78 "Light is like race car. Because the speed of light is so fast, it's like a race car."</i>
	Jet	2	<i>S49 "Light is like jet. Because they're both fast. "</i>
	Teleportation machine	1	<i>S139 "Light is like teleportation machine. Because it's so fast."</i>
	Maglev train	1	<i>S135 "Light is like Maglev train. Because they're both fast."</i>
	Engine	1	<i>S134 "Light is like engine. Because it is as fast as the engine. "</i>
Human	Teacher	4	<i>S121 "Light is like teacher. Because teachers enlighten their students. "</i>
	Human being	2	<i>S21 "Light is like human being. Because they both give direction."</i>
	Family	1	<i>S208 "Light is like family. Because family lights up the way for us."</i>
	Child	1	<i>S87 "Light is like child. Because it radiates hope."</i>
	Leader	1	<i>S140 "Light is like leader. Because it brightens horizons."</i>
Required to see	Eye	9	<i>S35 "Light is like eye. Because when the eye is opened, we see, when we close it, we cannot see it just like light."</i>
Sky	Rainbow	2	<i>S69 "Light is like rainbow. Because there are the colors of the rainbow in it."</i>
	Air	2	<i>S152 "Light is like air. Because it's intangible."</i>
	Galaxy	1	<i>S187 "Light is like galaxy. Because they both shine."</i>
	Small sun	1	<i>S197 "Light is like small sun. Because the sun makes light."</i>
	Star	1	<i>S63 "Light is like star. Because it's visible, but it's untouchable."</i>
Item	Mirror	1	<i>S114 "Light is like mirror. Because even if you reflect the light, the mirror reflects the light back to the other side."</i>
	Glasses	1	<i>S5 "Light is like glasses. Because it allows us to see."</i>
	Pearl	1	<i>S96 "Light is like pearl. Because it's brilliant."</i>
	Air conditioner	1	<i>S109 "Light is like air conditioner. Because like air conditioning, light spreads almost everywhere."</i>
	Arrow	1	<i>S79 "Light is like arrow. Because it moves linearly like an arrow."</i>
	Stick	1	<i>S173 "Light is like stick. Because it spreads linearly."</i>

Living thing	Firefly	2	S162 "Light is like firefly. Because it illuminates where it is."
	Cheetah	1	S157 "Light is like cheetah. Because it's so fast."
	Anglerfish	1	S95 "Light is like anglerfish. Because they both radiate."
Emotion	Tiger	1	S132 "Light is like tiger. Because it's so fast."
	Touch	1	S68 "Light is like touch. Because it is as if it will be touchable by emitting light everywhere. "
	Ghost	1	S146 "Light is like ghost. Because we can't touch it, but we see it."
	Morning	1	S77 "Light is like morning. Because morning is glow."
	End of the tunnel	1	S105 "Light is like the end of the tunnel. Because the end of the tunnel illuminates the tunnel."
Mathematics	Mind	1	S12 "Light is like mind. Because it shines and goes out. "
	Infinity sign	1	S22 "Light is like infinity sign. Because when you shine a light in a straight unobstructed direction, it goes to infinity."
	Variable	1	S194 "Light is like variable. Because there are different types of light."
Food	Straight rope	1	S195 "Light is like straight rope. Because it spreads linearly."
	Water	4	S110 "Light is like water. Because it spreads everywhere unless it is stopped. "
Place	Wall	1	S206 "Light is like wall. Because when it catches our eye, we can't move forward."
Total	62	159	

When Table 6 shows, the metaphors developed by gifted students for the concept of "matter" are collected in thirteen categories. These categories are: The categories of light source, scientific knowledge, on life, technology, human, required to see, sky, item, living things, emotion, mathematics, food and place. When Table 6 is examined, the most developed metaphors of the concept of "matter" are: There have been metaphors for the sun ($f=36$), eye ($f=9$), information ($f=7$), and sound ($f=7$).

Findings related to the Fifth Problem of the Research

The metaphors developed by gifted students for the concept of "Sound", the categories of metaphors and the findings obtained from metaphor examples are shown in Table 7.

Table 7

Metaphors for the concept of the sound, its categories and sample metaphors

Categories	Metaphors	Frequency	Sample metaphors
	Wave	32	S51 "Sound is like waves. Because it spreads like a wave and comes to our ears."
	Microphone	7	S43 "Sound is like microphone. Because the microphone makes the volume high."

Sound source	Phone	6	S34 "Sound is like phone. Because we can't communicate without both."
	People	5	S77 "Sound is like people. Because people make a lot of noise."
	Noise	4	S141 "Sound is like noise. Because it's very loud."
	Loudspeaker	3	S72 "Sound is like loudspeaker. Because it makes the sound louder."
	Musical instrument	3	S118 "Sound is like musical instrument. Because musical instruments make beautiful sounds."
	Bird	2	S46 "Sound is like bird. Because it's going by air."
	Wind	2	S155 "Sound is like wind. Because the sound comes and goes like the wind."
	A stone thrown into the water	2	S133 "Sound is like a stone thrown into water. Because it spreads like waves."
	Human being	1	S77 "Sound is like human being. Because people make a lot of noise."
	Radio	1	S187 "Sound is like radio. Because it gives a voice."
	Alarm	1	S120 "Sound is like alarm. Because sounds warn us like alarms."
	Bee	1	S73 "Sound is like bee. Because you need a tongue to make a sound and a bee to eat honey."
	Alarm clock	1	S198 "Sound is like alarm clock. Because the alarm clock also makes a sound."
	Hammer	1	S99 "Sound is like hammer. Because we can break glass with a hammer, if our sound is the same as the frequency of glass, we can break glass."
	Horn	1	S131 "Sound is like horn. Because the horn is also a sound."
	Radar	1	S33 "Sound is like radar. Because the sound spreads in a circular way, the radar scans in a circular way."
	Clock	1	S161 "Sound is like clock. Because there is sound from the clock."
Nature	Song	1	S78 "Sound is like song. Because it's done with sound."
	Piano	1	S122 "Sound is like piano. Because piano is also a source of sound."
	Water	8	S137 "Sound is like water. Because water fluctuates, sound is in waves."
	Sea	7	S167 "Sound is like sea. Because sound spreads in waves, there are waves in the sea."
	Light	7	S173 "Sound is like light. Because they both spread."
	Mountains	1	S140 "Sound is like mountains. Because some are high and some are low."

Emotion	World	1	S172 "Sound is like world. Because it moves."
	Universe	1	S119 "Sound is like universe. Because there are voices of many beings."
	Pollution	1	S176 "Sound is like pollution. Because there's a lot of noise pollution."
	Emotion	3	S14 "Sound is like emotion. Because it is one of the most important ways for us to express ourselves."
	Colour	2	S177 "Sound is like colour. Because it colors life."
	Life	2	S130 "Sound is like life. Because we can't spend life in silence."
	Appearance	1	S44 "Sound is like appearance. Because the voice reflects one's style."
	Knowledge	1	S7 "Sound is like knowledge. Because it informs us."
	Education	1	S201 "Sound is like education. Because sound is as essential as education."
	Entertainment	1	S23 "Sound is like entertainment. Because we can have fun talking, we sing."
	Unique	1	S68 "Sound is like unique. Because nothing will be able to make that sound."
	Someone invisible	1	S152 "Sound is like someone invisible. Because it is heard but not seen."
	Smile	1	S87 "Sound is like smile. Because it makes you happy and calms you down."
	Ring	1	S17 "Sound is like ring. Because sound spreads in waves."
	The man running in the air	1	S146 "Sound is like a man running in the air. Because it's going in the air."
	Smell	1	S45 "Sound is like smell. Because it's invisible."
	Massage	1	S8 "Sound is like massage. Because it relaxes our brains and souls."
	Fashion	1	S49 "Sound is like fashion. Because it can always change."
	Being neglected	1	S91 "Sound is like being neglected. Because if no one hears your voice, you'll know you're neglected."
	Love	1	S67 "Sound is like love. Because it's not seen, but it's felt."
	Secret	1	S110 "Sound is like secret. Because we can't hear some voices, and we can't know some secrets about us."
	Abstract	1	S144 "Sound is like abstract. Because they are both intangible."
	Feather	1	S100 "Sound is like feather. Because they both spread."
	Writing	1	S64 "Sound is like writing. Because they both say so much."
	Hear	3	S38 "Sound is like hearing. Because voices are

Required for sound			<i>heard. "</i>
	Air	2	<i>S42 "Sound is like air. Because we can't see either of them."</i>
	Talk	2	<i>S116 "Sound is like talking. Because we make a sound by talking."</i>
	Mouth	1	<i>S136 "Sound is like mouth. Because it provides communication."</i>
	Our tongue	1	<i>S27 "Sound is like our tongue. Because we talk with it."</i>
	Ear	1	<i>S59 "Sound is like ear. Because the ear allows us to hear sound."</i>
Item	Vibration	1	<i>S194 "Sound is like vibration. Because sound is produced by vibration."</i>
	Mirror	2	<i>S89 "Sound is like mirror. Because it is reflected."</i>
	Drill	2	<i>S123 "Sound is like drill. Because drill is also a source of sound."</i>
	Car	1	<i>S124 "Sound is like car. Because they both make noise."</i>
	Pen	1	<i>S94 "Sound is like pen. Because when we write, we tell something, and the sounds tell us something."</i>
Communication	Recorder	1	<i>S109 "Sound is like recorder. Because people hear us and sometimes, they keep them in their brains."</i>
	The crown jewel of communication	1	<i>S10 "Sound is like the crown jewel of communication. Because without sound, it's very difficult to communicate with someone."</i>
	Phone	1	<i>S93 "Sound is like phone. Because it provides communication."</i>
	Communication	1	<i>S29 "Sound is like communication. Because we communicate via sound."</i>
Sky	News	1	<i>S169 "Sound is like news. Because the more information it comes, the more it comes with sound or writing."</i>
	Sun	3	<i>S88 "Sound is like sun. Because sometimes we get uncomfortable, sometimes we love."</i>
Place	City	1	<i>S166 "Sound is like city. Because it's everywhere."</i>
	Border	1	<i>S28 "Sound is like border. Because not everyone can hear everything."</i>
Total	69	156	

When Table 7 shows, the metaphors developed by gifted students for the concept of "Sound" are collected in eight categories. These categories are: The source of sound is nature, emotion, required for sound, item, communication, sky and place categories. When Table 7 is examined, the most developed metaphors of the concept of "sound" are: Wave (f=32), water (f=8), microphone (f=7), sea (f=7), light (f=7), telephone (f=6), human (f=5) and noise (f=4).

Findings related to the Sixth Problem of the Research

The metaphors developed by gifted students for the concept of "Electricity", the categories of metaphors and the findings obtained from metaphor examples are shown in Table 8.

Table 8

Metaphors for the concept of the electricity, its categories and sample metaphors

Categories	Metaphors	Frequency	Sample metaphors
Necessary for life	Water	16	S3 "Electricity is like water. Because water is necessary for living things to live and electricity is necessary for items to work."
	Light	10	S100 "Electricity is like light. Because they both radiate."
	Oxygen	5	S5 "Electricity is like oxygen. Because without electricity, the devices won't work."
	Energy	4	S65 "Electricity is like energy. Because thanks to electricity, we can run our electronics because electricity is a source of power."
	Heart	4	S29 "Electricity is like heart. Because without electricity, life stops."
	Brain	3	S204 "Electricity is like brain. Because everything depends on it, control makes power real."
Emotion	Life	15	S1 "Electricity is like life. Because electricity is found everywhere in our daily lives."
	Everything	3	S92 "Electricity is like everything. Because without electricity, life would be very difficult."
	Fear	1	S140 "Electricity is like fear. Because it can make you tremble."
	Love	1	S47 "Electricity is like love. Because too much shocks people, but it is a need."
	Road	1	S88 "Electricity is like road. Because it goes from place to place all the time."
	Auxiliary	1	S7 "Electricity is like auxiliary. Because if we don't have, we can't do much."
Natural phenomenon	Lightning	10	S48 "Electricity is like lightning. Because they both shock."
	Lightning	7	S97 "Electricity is like lightning. Because it emits electricity, too."
	Cold weather	1	S173 "Electricity is like cold weather. Because electricity makes a person shiver, and cold makes you shiver."
	Life	6	S155 "Electricity is like power. Because we can get electricity from air, water and artificial means."
	Power	2	S155 "Electricity is like power. Because we can get electricity from air, water and artificial means."
	Sound	2	S28 "Electricity is like sound. Because electricity

Important for life			<i>is transmitted like sound."</i>
	Auxiliary	1	S7 "Electricity is like auxiliary. Because if we don't have, we can't do much."
	Success	1	S91 "Electricity is like success. Because when the electricity went out, we couldn't do our homework, we would be less successful in class."
	Medications	1	S82 "Electricity is like medications. Because when our health deteriorates, we understand the value of medicines, and when the electricity goes out, we understand the value of it."
	Book	1	S63 "Electricity is like book. Because if not, we won't hear from the world."
	Health	1	S152 "Electricity is like health. Because if it doesn't, life becomes harder."
	Industry	1	S49 "Electricity is like industry. Because it is the basis of production."
Technology	Car	3	S64 "Electricity is like car. Because if you can't control it, it hurts."
	Computer	3	S46 "Electricity is like computer. Because it makes our lives so much easier."
	Internet	3	S198 "Electricity is like internet. Because they are both electricity."
	Invention	2	S4 "Electricity is like invention. Because now we always have electricity in our lives."
	Power plants	1	S71 "Electricity is like power plants. Because electricity comes out of power plants."
	Robot	1	S127 "Electricity is like robot. Because it does whatever we want."
	Rocket	1	S196 "Electricity is like rocket. Because electricity is very fast, like a rocket."
	Technology	1	S102 "Electricity is like technology. Because technological things run on electricity."
Item	Cable	2	S149 "Electricity is like cable. Because the cable transmits it."
	Lamp	2	S78 "Electricity is like lamp. Because the lamps are usually powered by electricity."
	Antenna	1	S40 "Electricity is like antenna. Because it can run technological products."
	Item	1	S22 "Electricity is like item. Because it works very well and we use it as an item."
	Attire	1	S94 "Electricity is like attire. Because people use electricity a lot, and we use clothing throughout the day."
	Battery	1	S15 "Electricity is like battery. Because it is a stored source of electricity."
	Wire	1	S139 "Electricity is like wire. Because it goes through the wire."
	Ball	1	S206 "Electricity is like ball. Because it shocks (hits) too."
	Hedgehog	2	S120 "Electricity is like hedgehog. Because when

Living thing			<i>a person is electrocuted, there are thorns, and the hedgehog has thorns."</i>
	Dog	1	<i>S129 "Electricity is like dog. Because it's dangerous."</i>
	Mosquito	1	<i>S26 "Electricity is like mosquito. Because if we touch it, it will harm us."</i>
	Worm	1	<i>S145 "Electricity is like worm. Because it goes through the wire."</i>
	Eel	1	<i>S95 "Electricity is like eel. Because the eel emits electricity."</i>
	Running animal	1	<i>S8 "Electricity is like running animal. Because they're both very fast."</i>
Human	Runner	1	<i>S8 "Electricity is like runner. Because they're both very fast."</i>
	Mother	1	<i>S108 "Electricity is like mother. Because we can't really do anything without it."</i>
	Friend	1	<i>S44 "Electricity is like friend. Because without it we will always be halfway."</i>
	Assistant	1	<i>S169 "Electricity is like assistant. Because for most things, electricity helps us."</i>
	Wizard	1	<i>S58 "Electricity is like wizard. Because electricity is the magician of the technological tools in our lives."</i>
Sky	Sun	3	<i>S6 "Electricity is like sun. Because we can heat up with electricity."</i>
	Air	1	<i>S89 "Electricity is like air. Because it's invisible, but it shocks."</i>
	Star	1	<i>S187 "Electricity is like star. Because it can flash."</i>
Food	Food	1	<i>S9 "Electricity is like food. Because it's indispensable."</i>
	Lemon	1	<i>S123 "Electricity is like lemon. Because electricity can be produced from lemons."</i>
	Sugar	1	<i>S126 "Electricity is like sugar. Because it makes people happy and gives them energy, but there are also harms."</i>
	Meal	1	<i>S93 "Electricity is like meal. Because human being needs both food and electricity."</i>
Danger	Cross	1	<i>S125 "Electricity is like cross. Because it can shock us."</i>
	Unlimited power	1	<i>S155 "Electricity is like unlimited power. Because we can get electricity from air water and artificial means."</i>
	Cliff	1	<i>S203 "Electricity is like cliff. Because they're both quite dangerous."</i>
Natural resource	Stream	2	<i>S30 "Electricity is like stream. Because electricity flows like a stream."</i>
Transmission	Dominoes	1	<i>S174 "Electricity is like dominoes. Because when the light button is pressed, it can reach all over the house."</i>

Place	Home	1	<i>S17 "Electricity is like home. Because if it wasn't, our lives would be hard."</i>
Total	64	151	

When Table 8 shows, the metaphors developed by gifted students for the concept of "electricity" are collected in fourteen categories. These categories are: Necessary for life, emotion, natural phenomenon, important for life, technology, item, living things, human, sky, food, danger, natural resource, transmission and place categories. When Table 8 is examined, the most developed metaphors of the concept of "electricity" are: Water (f=16), life (f=15), light (f=10), lightning (f=10), lightning (f=7), life (f=6), oxygen (f=5), energy (f=4), and heart (f=4).

Findings related to the Seventh Problem of the Research

The metaphors developed by gifted students for the concept of "Environment", the categories of metaphors and the findings obtained from metaphor examples are shown in Table 9.

Table 9

Metaphors for the concept of the environment, its categories and sample metaphors

Categories	Metaphors	Frequency	Sample metaphors
Place	Home	16	<i>S39 "Environment is like home. Because if we take good care of it, our future will be so livable."</i>
	Nature	7	<i>S178 "Environment is like nature. Because there's nature everywhere in the environment."</i>
	Forest	7	<i>S32 "Environment is like forest. Because they both have trees."</i>
	World	6	<i>S162 "Environment is like world. Because they both have trees."</i>
	Universe	4	<i>S139 "Environment is like universe. Because it's too big."</i>
	Dump	3	<i>S192 "Environment is like dump. Because that's how people use the environment, and that's what I liken it to."</i>
	Building	2	<i>S86 "Environment is like building. Because you do what you want, it's up to you whether you hurt it or not."</i>
	Laboratory	1	<i>S8 "Environment is like laboratory. Because all kinds of discoveries can be made."</i>
	Shopping mall	1	<i>S167 "The environment is like a shopping mall. Because there's something different everywhere, and there's a different item in every aisle in the mall."</i>
	Space	1	<i>S125 "Environment is like space. Because it's too large."</i>
	Earth's crust	1	<i>S103 "Environment is like Earth's crust. Because we can walk on both and we can touch both."</i>
	Sky	1	<i>S179 "Environment is like sky. Because it's as big</i>

			<i>around us as the sky."</i>
Emotion	Life	4	<i>S160 "Environment is like life. Because everything we need is all around us."</i>
	Void	2	<i>S105 "Environment is like void. Because the streets seem to have no end."</i>
	Life	2	<i>S88 "Environment is like life. Because it's everywhere in life."</i>
	Happiness	2	<i>S117 "Environment is like happiness. Because a clean environment gives happiness."</i>
	Infinity	2	<i>S199 "Environment is like infinity. Because the environment is so big."</i>
	Our senses	1	<i>S38 "Environment is like our senses. Because we see our environment, smell them, taste them, and hear our environment."</i>
	Stranger	1	<i>S68 "Environment is like stranger. Because you're a stranger in a new environment."</i>
	Rainbow	1	<i>S89 "Environment is like rainbow. Because it is colorful and peaceful."</i>
	Colour	1	<i>S87 "Environment is like colour. Because our environment is full of colors."</i>
Living thing	Tree	6	<i>S108 "Environment is like tree. Because without the trees, we cannot breathe, and without the environment we cannot live."</i>
	Animal	2	<i>S42 "Environment is like animal. Because animals are part of our environment and make up nature."</i>
	Plant	1	<i>S109 "Environment is like plant. Because there are many different plants in the environment."</i>
Human	Human body	2	<i>S31 "Environment is like human body. Because it can be damaged and destroyed."</i>
	Family	2	<i>S19 "Environment is like family. Because the beings in it are similar to each other."</i>
	Human being	2	<i>S136 "Environment is like human being. Because it's varied."</i>
	Father	1	<i>S46 "Environment is like father. Because it offers all its possibilities to meet our needs."</i>
	Mother	1	<i>S79 "Environment is like mother. Because we can't exist without it."</i>
	Child	1	<i>S52 "Environment is like child. Because it needs attention like a child."</i>
	Baby	1	<i>S58 "Environment is like baby. Because just as a baby is protected and raised, the environment requires the same care and attention as it does."</i>
Item	Rubbish bin	3	<i>S17 "Environment is like rubbish bin. Because people throw their garbage into the environment."</i>
	Window	2	<i>S193 "Environment is like window. Because you see everything in the environment."</i>
	Tray	1	<i>S24 "Environment is like tray. Because it carries us all."</i>
	Painting	1	<i>S9 "Environment is like painting. Because it contains all the landscape paintings."</i>

Technology	Wind turbines	1	S5 "Environment is like wind turbines. Because the plants in the environment produce oxygen, and the wind turbines produce electricity."
	Clock mechanism	1	S67 "Environment is like clock mechanism. Because many components are interconnected."
Food	Water	1	S25 "Environment is like water. Because we need the environment as much as water to live."
	Pepper	1	S34 "Environment is like pepper. Because there is such a diverse environment, just like pepper."
	Lettuce	1	S207 "Environment is like lettuce. Because the environment is lush."
Geometry	Shape	1	S56 "Environment is like shape. Because the environment of everything forms a shape."
Total	41	98	

When Table 9 shows, the metaphors developed by gifted students for the concept of "environment" are collected in eight categories. These categories are: Space, emotion, living things, human, item, technology, food and geometry. When Table 9 is examined, the most developed metaphors of the concept of "environment" are: Home (f=16), nature (f=7), forest (f=7), earth (f=6), tree (f=6) and life (f=4).

DISCUSSION

In this research, which aims to determine the metaphorical perceptions of gifted students towards basic science concepts, students explained the concept of "universe" with the metaphor of 'infinity' the most. When the metaphorical sentence completions of the students containing their descriptions of the universe were examined, there were more students who focused on the expansion and infinity of the universe. Astronomers have reported that the universe is constantly expanding (Li et al., 2020). Similar results have been found in the studies carried out to determine the perceptions towards the concept of the universe in the literature. In the study of Uluay (2020) on the concept of 'universe', pre-service teachers of science focus most on the metaphor of 'infinity'. After the metaphor of eternity, the metaphor that students used the most was the metaphor of 'darkness'. Scientists have reported that the structure of the universe consists of 69% dark energy and 26% dark matter (Arnaud et al., 2016).

Gifted students explained the concept of "living thing" mostly with the metaphors of 'robot, human, animal, plant and pen'. In the study, gifted students used inanimate metaphors while explaining the concept of living thing. Similarly, in the study conducted by Dinçer & Erdemir (2020), students used inanimate metaphors when explaining the concept of living. In the study, the second dominant category was the 'kinds of living thing' category. In Dinçer & Erdemir's (2020) metaphor study on the concept of life, people, animals and plants were effective in examining the metaphors for 8th grade students to perceive the concept of 'living thing' and in the students' metaphors for the concept of life. When the metaphors produced by the students for the concept of living thing are examined,

the achievements of 'distinguishing between living and inanimate beings, classifying them as plants and animals for living things, and giving examples to living and inanimate beings' in the 'Science course curriculum' were effective. Some students have used inanimate beings as a metaphor for life because of their movement. In the literature, the main element of students' depiction of the concept of living thing is movement (Opfer, 2002; Topsakal, 2009). Another remarkable result of the study was that the students explained the concept of living thing with the metaphor of 'robot'. When the explanations of the gifted students about the robot metaphor were examined, robots thought that they had the characteristics of living things.

Gifted students explained the concept of "matter" most with the metaphors of "water, human, air, everything and item". In Akçay's (2010) study, students used 'water molecules' in their explanations for the change of state of matter. The reason for this is that while the subject of matter is explained in science lessons, it is always shown that water is given as an example, especially in state changes. When the metaphors produced by gifted students about the concept of matter are examined, the vast majority of them generally use metaphors that show macro characteristics such as 'item, toys, food, space, living thing and nature'. A small number of students used metaphors with micro-properties such as 'cell, atom, nucleus, drop and seed' to explain the concept of matter. This result may be due to the fact that the granular structure of the substance is included in the Science curriculum after the 7th grade. There are similar results in some studies on the concept of matter in the literature. In the study of Nakhleh & Samarapungavan (1999), students used macro properties when defining the concept of matter. In Özmen's (2002) study, it was concluded that 4th, 5th and 6th grade students had very low levels of knowledge about the microscopic properties of matter. In Akçay's (2010) study, students generally think about the concept of 'matter' in the macro dimension, but some of the 8th grade students think in the micro dimension. In the studies of Dönüş Coşgun & Karamustafaoğlu (2017), a large part of the students explained the concept of matter by using the examples of 'stone, table, wood and pencil' from solid substances, 'water, milk and fruit juice' from liquid substances and 'air and gas' from gaseous substances. When the metaphor categories produced by the students with special abilities for the concept of matter are examined, the achievements of 'defines the substance, classifies the substance, the properties that characterize the matter, the states of matter, the measurable properties of matter, the granular structure of matter' in the 'Science course curriculum' are effective.

The metaphor that gifted students developed the most for the concept of "light" was the metaphor of "sun". When the studies on the concept of light in the literature were examined, the metaphor of the sun was the most developed metaphor by the students (Aygün et al., 2015; Değirmeci et al., 2019; Demirci, 2020). Students explained the concept of light with metaphors appropriate to the subject of 'natural light sources, artificial light sources' in the 'Science course curriculum'. Students used metaphors such as 'vision, sound, electricity, heat and energy' which are among the concepts of science to explain the concept

of light. This result revealed that students with special abilities used other scientific concepts to explain a scientific concept. There are studies in the literature that support this result. In the study conducted by Değirmenci et al. (2019) in order to reveal the metaphorical perceptions of theology and science teaching students towards the concept of light, it was concluded that pre-service teachers of science use scientific concepts when the metaphors they produce for the concept of light are examined. Similarly, in the study conducted by Aygün et al. (2015) in order to determine the perceptions of science and primary school pre-service teachers of mathematics towards the concept of light, pre-service teachers of science produced metaphors with more scientific content. The metaphors and explanations produced by the students show that they have grasped the subject of light and vision in the Science curriculum.

The metaphors that gifted students developed the most for the concept of "electricity" were 'water, life, light and lightning'. The category with the most metaphors was the 'necessary for life' category. In the category of necessary for life, students explained the concept of electricity with metaphors appropriate to the subject 'explains the importance of electricity in daily life' in the 'Science curriculum'. Similarly, in the study of Demirci (2020), the categories in which pre-service teachers produced the most metaphors for the concept of electricity were 'important for life' and 'necessary for life'. In the study of Kurt & Sarı (2018), the metaphors produced by physics pre-service teachers of physics about electricity had characteristics belonging to 'object, person and abstract concepts'.

The metaphors that gifted students developed the most for the concept of "environment" were 'house, nature, forest, world, universe and tree'. In the study of Aydın (2013), the metaphors that students produced the most for the concept of environment were 'life, our home and living'. In Doğan's (2017) study, the metaphors that secondary school students produced the most about the concept of environment were 'life, our home, people, mother and garbage'. In the study of Yanarateş & Yılmaz (2020), the metaphor that pre-service teachers produced the most for the concept of environmental sensitivity was the metaphor of 'clean house'. In the study of Meral et al. (2016), pre-service teachers used the metaphors of 'human, teacher, home, life, family and mother' mostly related to the concept of environment. In the study, students produced various metaphors related to the concept of environment by using the concepts of living and inanimate. In the literature, living things have two environments, 'living and inanimate' (Yıldırım & Genç 2005; Aslan & Dinç 2007; Görür 2011; Kocataş 2012). In the study, the concept of environment was classified in 8 different categories. The category with the most metaphors was the 'place' category. Çepel (2006) defines the concept of environment as the environment in which living things live. In addition, in the categories of 'human, place and technology', students explained the concept of environment with metaphors appropriate to 'people, places and environments' and 'science, technology and society' in the 'Science course curriculum'. In the study, gifted students produced a limited number of metaphors for the concept of 'environment' compared to other basic science concepts. Some studies conducted to determine student

perceptions of the concept of environment in the literature support this conclusion (Doğan, 2017; Çakmak, 2018).

LIMITATIONS AND RECOMMENDATIONS

The study's findings show that metaphors can be used as a powerful tool to reveal the personal thoughts of gifted students about science concepts. Further research can be conducted to analyze students' perceptions of science concepts at different grade levels in different samples through metaphors. Metaphoric techniques can be used to make sense of concepts in the mind and establish relationships between concepts. In measurement and evaluation processes, metaphors can be used to reveal mislearning. Students can use the knowledge they have in different courses through metaphors by establishing interdisciplinary connections. Developing metaphors with science concepts can help students grow up as science-literate individuals. By increasing the number of study groups, the scope of the research can be expanded, and more data can be obtained.

CONCLUSION

The metaphor study concluded that gifted students have a very broad level of thinking about basic science concepts. When the tables for each concept were analyzed separately, it was seen that the selected concepts formed a rich cognitive structure, and a vast metaphor network was formed thanks to the diversity in definitions. In the study, it was noticed that gifted students tried to establish a connection between the metaphors they produced and their daily lives and tried to transfer the concepts to people, objects, or situations in their lives. This inference aligns with the philosophy of the science teaching program, which is to make knowledge meaningful and experiential for the individual. Knowing the metaphors of gifted students is valuable for teachers and essential in increasing their lessons' efficiency. Only in this way can teaching methods and new curricula be developed in science courses.

REFERENCES

- Akçay, P. S. (2010). *İlköğretim 4, 6 ve 8. sınıf öğrencilerinin madde kavramı hakkındaki düşünceleri* [Ideas of elementary school students at 4th, 6th, and 8th grades about matter] (Publication No. 263478) [Master's thesis, Abant İzzet Baysal Üniversitesi, Sosyal Bilimler Enstitüsü] Thesis Center.
- Altıntaş, E. (2009). *Purdue modeline dayalı matematik etkinliği ile öğretimin üstün yetenekli öğrencilerin başarılarına ve eleştirel düşünme becerilerine etkisi* [The effect of teaching with the mathematics activity based on purdue model on the achievement and critical thinking skills of gifted students]] (Publication No. 231838) [Master's thesis, Karadeniz Teknik Üniversitesi, Eğitim Bilimleri Enstitüsü] Thesis Center.
- Arnaud, M., Ashdown, M., Atrio-Barandela, F., Aumont, J., Baccigalupi, C., Banday, A. J., Barreiro, R. B., Battaner, E., Benabed, K., Benoit-Levy, A., Bernard, J. -P., Bersanelli, M., Bielewicz, P., Bobin, J., Bond, J. R., Borrill, J., Bouchet, F. R., Brogan, C. L., Burigana, C., Zonca, A. (2016). Planck intermediate results XXXI. Microwave survey of Galactic supernova remnants. *Astronomy & Astrophysics*, 586, A134. <https://doi.org/10.1051/0004-6361/201425022>
- Aslan, H., & Doğan, Ü. (2016). Üstün yetenekli öğrencilerin devam ettikleri okulları ile bilim ve sanat merkezine ilişkin metaforik algıları karşılaştırmalı durum çalışması. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 16(2), 335-350. <https://doi.org/10.17240/aibuefd.2016.16.2-5000194931>
- Aslan, O., & Dinç, M. (2007). *Canlılar ve çevre* [Living things and environment], M. Aydoğdu & K. Geler (Ed.), Çevre Bilimi [Environmental Science] (pp. 12-34). Anı Yayıncılık.
- Ayas, A. (1995). Fen bilimlerinde program geliştirme ve uygulama teknikleri üzerine bir çalışma: İki çağdaş yaklaşımın değerlendirilmesi [A study on curriculum development and implementation techniques in science education: An evaluation of two contemporary approaches]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 1(11), 149-155.
- Aydın, F. (2013). Üniversite öğrencilerinin “çevre” kavramına ilişkin metaforik algıları. [The metaphoric perceptions of university students about “environment” concept]. *Doğu Coğrafya Dergisi*, 16(26), 25-44.
- Aygün, M., Durukan, Ü. G., & Hacıoğlu, Y. (2015). Fen bilgisi ve ilköğretim matematik öğretmenliği öğrencilerinin ‘ışık’ kavramıyla ilgili metaforik algıları. [Science and elementary mathematics teaching students' metaphorical perceptions about the concept of 'light']. *Fen Bilimleri Öğretimi Dergisi*, 3(2), 52-64.
- Booth, R.G. (2003). *Perception of the visual environment*. New York: Springer.

- Çakmak, M. (2018). Türkiye'de çevre kavramı bağlamında yapılan metafor çalışmalarının içerik analizleri [Content analysis of metaphor studies on the concept of environment in Turkey]. *Akdeniz Eğitim Araştırmaları Dergisi*, 12(25), 179-193.
- Çapan, B. E. (2010). Öğretmen adaylarının üstün yetenekli öğrencilere ilişkin metaforik algıları [The Metaphorical Perceptions of Teacher Candidates Regarding the Concept of "The Gifted Child"]. *Journal of International Social Research*, 3(12).
- Çepel, N. (2006). *Ekoloji, doğal yaşam dünyaları ve insan [Ecology, natural habitats and human]*. Palme Yayıncılık.
- Çolak, Ö. (2014). *Sorgulayıcı-araştırmaya dayalı fen öğretimi yönteminin fen okuryazarlığı ve bazı alt-boyutları üzerine etkisi [The effect of inquiry-research based science teaching method on science literacy and some sub-dimensions]* (Publication No. 355416) [Master's thesis, Trakya Üniversitesi, Fen Bilimleri Enstitüsü] Thesis Center.
- Coşgun, Ö. D., & Karamustafaoğlu, O. (2017). İlkokul üçüncü ve dördüncü sınıf mülteci öğrencilerin madde kavramına ilişkin düşünceleri [Thoughts of third and fourth grades primary school refugee students on matter concept]. *Sakarya University Journal of Education*, 7(3), 525-540. <https://doi.org/10.19126/suje.321729>
- De Guerrero, M. C., & Villamil, O. S. (2002). Metaphorical conceptualizations of ESL teaching and learning. *Language teaching research*, 6(2), 95-120. <https://doi.org/10.1191/1362168802lr101oa>
- Değirmenci, S., Karamustafaoğlu, S., & Karamustafaoğlu, O. (2019). İlahiyat ve fen bilgisi öğretmenliği öğrencilerinin ışık kavramı hakkındaki metaforik algıları [Theology and science teaching students' metaphorical perceptions about the concept of light]. *Amasya İlahiyat Dergisi*, (12), 83-119. <https://doi.org/10.18498/amailad.539703>
- Demirci, N. (2020). *Fen bilgisi ve sınıf öğretmeni adaylarının bazı temel fen konu ve kavramlarına yönelik metaforik algılarının belirlenmesi [Determining the metaphorical perceptions of prospective science and primary school teachers towards some basic science subjects and concepts]* (Publication No. 638482) [Master's thesis, Ağrı İbrahim Çeçen Üniversitesi, Fen Bilimleri Enstitüsü] Thesis Center.
- Dinçer, B. B., & Erdemir, M. (2020). "Cansız" kavramına ilişkin metafor oluşturmadaki kriterlerin belirlenmesi [Determining the criteria in creating metaphors related to the concept of "non-living"]. *Online Journal of Mathematics, Science and Technology Education (OJOMSTE)*, 1(1), 17- 29.
- Doğan, Y. (2017). Ortaokul öğrencilerinin çevre kavramına ilişkin sezgisel algıları: Bir metafor analizi [Secondary school students' intuitive perceptions about the concept of environment: A metaphor analysis]. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 18(1), 721-740.
- Epçaçan, U., Pesen, A., & Üzümlü, B. (2020). Özel yetenekli öğrencilerin algıları üzerinden okul ve bilim ve sanat merkezi. [The School and SAC as Voiced in the Perceptions of Gifted

- Students] Özel Eğitim Dergisi, 21(2), 289-297.
<https://doi.org/10.21565/ozelegitimdergisi.577545>
- Gökdere, M., Küçük, M., & Çepni, S. (2003, December). Gifted Science Education in Turkey: Gifted Teachers' Selection, Perspectives and Needs. *Asia-Pacific Forum on Science Learning and Teaching*, 4(2), pp.5
- Görür, G. (2011). *Temel ekoloji kavramları [Basic concepts of ecology]*. Genel ekoloji içinde (2. baskı). Nobel Akademik Yayıncılık.
- Heller, K. (1993). Scientific ability. In G. Bock, & K. Ackrill (Eds.), *The origins and development of high ability - Symposium No. 178* (pp. 139-159). <https://doi.org/10.1002/9780470514498.ch9>
- Hogler, R., Gross, M. A., Hartman, J. L., & Cunliffe, A. L. (2008). Meaning in organizational communication: Why metaphor is the cake, not the icing. *Management Communication Quarterly*, 21(3), 393-412. <https://doi.org/10.1177/0893318907309929>
- Hoover., M. S. (1989). The Purdue three-stage enrichment model as applied to elementary science for the gifted. *School Science and Mathematics*, 89(3), 244-250. <https://doi.org/10.1111/j.1949-8594.1989.tb11916.x>
- İbret, B. Ü., & Aydınöz, D. (2011). The metaphors developed by elementary school-second stage students on the concept of "world". *Kastamonu Education Journal*, 19(1), 85-102.
- Kaptan, F., & Korkmaz, H. (1999). *İlköğretimde etkili öğretme ve öğrenme öğretmen el kitabı [Teacher's handbook on effective teaching and learning in elementary school]*. MEB, Modül 7, Ankara.
- Karapınar, M. (2016). *İlköğretim son sınıf öğrencilerinin ana dili kavramına ve dört temel dil becerilerine yönelik metaforik algıları [Metaphorical perceptions of last grade elementary school students about the concept of mother tongue and four basic language skills]*. (Yayınlanmamış Yüksek Lisans Tezi), Erciyes Üniversitesi Eğitim Bilimler Enstitüsü, Kayseri.
- Kavak, N., Tufan, Y., & Demirelli, H. (2006). Fen-teknoloji okuryazarlığı ve informal fen eğitimi: Gazetelerin potansiyel rolü [Science-technology literacy and informal science education: The potential role of newspapers]. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*, 1(26), 17-28.
- Kırmızı, M., & Tarım, K. (2018). Matematik öğretmenlerinin üstün zekâlılar hakkındaki görüşlerinin incelenmesi: Bir metafor çalışması. *Sakarya University Journal of Education*, 8(4), 337-350.
- Kocataş, A. (2012). *Ecology environmental biology*, Bursa: Dora Printing and Publication.
- Kunt, K. (2012). *Fen ve teknoloji öğretmenlerinin üstün yeteneklilik ve üstün yeteneklilerin eğitimi ile ilgili görüşlerinin incelenmesi*. (Yayınlanmamış yüksek lisans tezi). Bülent Ecevit Üniversitesi, Sosyal Bilimler Enstitüsü, Zonguldak.

- Kurt, H. S., & Sarı, M. (2018). Metaphorical perceptions of physics teacher candidates about some concepts of electricity. *Erciyes Journal of Education*, 2(1), 64-90. <https://doi.org/10.32433/eje.419830>
- Lakoff, G., & Johnson, M. (2005). *Metaphors: Life, meaning and language* (Translated by GY Demir). İstanbul: Paradigma.
- Li, P. C., Guo, M., & Chen, B. (2020). Shadow of a spinning black hole in an expanding universe. *Physical Review D*, 101(8), 084041. <https://doi.org/10.1103/PhysRevD.101.084041>
- Meral, E., Küçük, B., & Gedik, F. (2016). Sosyal bilgiler öğretmen adaylarının çevre kavramına ilişkin metaforik algıları [Prospective social studies teachers' metaphorical perceptions about the concept of environment]. *Kastamonu Eğitim Dergisi*, 24(1), 65-78.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. SAGE Publications.
- Bakanlığı, M. E.. (2018). *Fen bilimleri dersi öğretim programı (ilkokul ve ortaokul 3, 4, 5, 6, 7 ve 8. sınıflar)* [Science curriculum primary and secondary school grades 3, 4, 5, 6, 7, and 8] . Ankara: MEB Yayıncılık.
- Nacaroğlu, O., & Mutlu, F . (2020). Bilim ve sanat merkezi öğrencilerinin proje kavramına ilişkin metaforik algılarının incelenmesi [Examination of science and art center students' metaphorical perceptions about the concept of project]. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 20(2), 992-1007. <https://doi.org/10.17240/aibuefd.2020.-587573>
- Nakhleh, M. B., & Samarapungavan, A. (1999). Elementary school children's beliefs about matter. *The Official Journal of the National Association for Research in Science Teaching*, 36(7), 777-805. [https://doi.org/10.1002/\(SICI\)1098-2736\(199909\)36:7<777::AID-TEA4>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1098-2736(199909)36:7<777::AID-TEA4>3.0.CO;2-Z)
- Northcote, M. T., & Fetherston, T. (2006). *New metaphors for teaching and learning in a university context*. Proceedings of Herdsa Annual Conference (pp. 251-258).
- Novak, J.D. (2010). Learning, creating and using knowledge: Concept maps as facilitative tools in schools and corporations. *New York: Taylor & Francis*. <https://doi.org/10.4324/9780203862001>
- Ogurlu, Ü., Öpengin, E., & Hızlı, E. (2015). Üstün yetenekli öğrencilerin okul ve öğretmene ilişkin metaforik algıları. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, (46), 67-83.
- Opfer, J. E. (2002). Identifying living and sentient kinds from dynamic information: the case of goal-directed versus aimless autonomous movement in conceptual change. *Cognition*, 86(2), 97-122. [https://doi.org/10.1016/S0010-0277\(02\)00171-3](https://doi.org/10.1016/S0010-0277(02)00171-3)
- Ortony, A. (2012). The role of similarity in similes and metaphor. A. Ortony içinde, *Metaphor and Thought* (s. 342-356). Cambridge University Press. <https://doi.org/10.1017/CBO9781139173865.018>

- Özarslan, M. (2019). Üstün zekâlı ve yetenekli olan ve üstün zekâlı ve yetenekli olmayan öğrencilerin biyolojiye ilişkin algılarının karşılaştırılması: Metaforik çalışma. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 45(45) , 310-334.
- Özdemir, O. (2010). Fen ve teknoloji öğretmen adaylarının fen okuryazarlığının durumu. *Türk Fen Eğitimi Dergisi*, 7(3), 42-56.
- Özmen, H. (2002). *Kimyasal reaksiyonlar ünitesindeki kavramların öğretimine yönelik rehber materyal geliştirilmesi ve uygulaması [Development and application of guidance material for teaching concepts in chemical reactions unit]*. (Yayımlanmamış yüksek lisans tezi). Karadeniz Teknik Üniversitesi, Fen Bilimleri Enstitüsü, Trabzon.
- Özsoy, Y. (2014). Bilim ve sanat merkezi öğrenci, öğretmen ve velilerinin üstün yetenekli öğrenci kavramına ilişkin metaforları. *Journal of Gifted Education Research*, 2(1), 74-87.
- Özsoy, Y., Özyürek, M., & Eripek, S. (1998). *Özel eğitime muhtaç çocuklar [Children in need of special education]*. Ankara: Karatepe Yayınları.
- Pilav, S., & Üstten, A. U. (2013). Lise öğrencilerinin edebiyatla ilgili algılarının metaforlar yoluyla belirlenmesi üzerine bir araştırma [A research on determining high school students' perceptions of literature through metaphors]. *Electronic Turkish Studies*, 8(8), 1073-1085.
- Reis, S. M., & McCoach, D. B. (2000). The underachievement of gifted students: What do we know and where do we go? *Gifted child quarterly*, 44(3), 152-170.
- Saban, A. (2009). Öğretmen adaylarının öğrenci kavramına ilişkin sahip oldukları zihinsel imgeler. *Türk Eğitim Bilimleri Dergisi*, 7(2), 281-326.
- Satmaz, İ. (2016). *Üstün yetenekli öğrencilerin BİLSEM ve matematik kavramına ait metaforik algılarının incelenmesi*. (Yayımlanmamış Yüksek Lisans Tezi). Çanakkale Onsekiz Mart Üniversitesi, Eğitim Bilimleri Enstitüsü, Çanakkale.
- Shaw, D. M., & Mahlios, M. (2011). Literacy metaphors of pre-service teachers: Do they change after instruction? Which metaphors are stable? How do they connect to theories? *Journal of Education for Teaching*, 37(1), 77-92. <https://doi.org/10.1080/02607476.2011.538274>
- Su, Ş., Sağlam, A., & Mutlu, Y . (2017). Bilim ve sanat merkezi öğrencilerinin bilsem ve okul kavramlarına ilişkin algı düzeylerinin metaforlarla karşılaştırılması. *Journal of Gifted Education and Creativity*, 4(3), 91-108.
- Tamimi, Y. (2005). *Örgüt kültürünün metaforlarla analizi*. Yayımlanmamış Yüksek Lisans Tezi. Osmangazi Üniversitesi, Eskişehir.
- Toplu, H. (2015). 8. sınıf öğrencilerinin fen ve teknoloji dersine yönelik metaforik algıları [8th grade students' metaphorical perceptions about science and technology course]. (Yayımlanmış Yüksek Lisans Tezi). Hacettepe Üniversitesi: Ankara.
- Topsakal, Ü. (2009). Tematik öğretimin canlı ve cansız varlıklarla ilgili kavram yanılgılarının giderilmesinde etkililiği [The effectiveness of thematic teaching in eliminating

- misconceptions about living and non-living things]. *Sakarya Üniversitesi Eğitim Fakültesi Dergisi*, (17), 219-234.
- Uluay, G. (2020). Fen bilgisi öğretmen adaylarının evren hakkındaki görüşleri [Prospective science teachers' opinions about the universe]. *Anadolu Öğretmen Dergisi*, 4(2), 209-225. <https://doi.org/10.35346/aod.799809>
- Ünal, D., S., Erdoğan, D. G., & Demirhan, E.(2016). Bilsem’de öğrenim gören çocukların anne ve babalarının üstün yetenekli çocuk kavramına dair metaforik algıları. *Journal of Research in Education and Teaching*, 30(5), 2146-9199.
- Ünlü Yavaş, P. (2009). Üstün yetenekli öğrencilerin fizik yeteneklerinin gelişiminin ölçülmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 2009(36), 294-305.
- Uygur Yolçun, L.D. (2019).Özel yetenekli ortaokul öğrencilerinin umut kavramına yönelik algılarının metaforla incelenmesi [Examination of the perceptions of gifted secondary school students about the concept of hope with metaphor]. (Yayımlanmamış yüksek lisans tezi). Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.
- Yağbasan, R., & Gülçiçek, Ç. (2003). Fen öğretiminde kavram yanlışlarının karakteristiklerinin tanımlanması [Definition of the characteristics of misconceptions in science teaching]. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 1(13), 102-120.
- Yam, Z., Çetinkaya, H., & Kurnaz, A. (2018). Özel yetenekli öğrencilerin “gelecek” kavramına ilişkin algılarının metaforik olarak incelenmesi. *Milli Eğitim Dergisi, Special Issue*, 1, 67-90.
- Yanarates, E., & Yılmaz, A. (2020). Öğretmen adaylarının “çevre duyarlılığı” kavramına yönelik metaforik algıları [Prospective teachers' metaphorical perceptions about the concept of "environmental sensitivity"]. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*, 40(3), 1019-1050. <https://doi.org/10.17152/gefad.699406>
- Yıldırım, A., & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri [Qualitative research methods in social sciences]* (8. Baskı). Ankara: Seçkin Yayıncılık.
- Yıldırım, Z. M., & Genç, H. (2005). *Temel ekolojik kavramlar [Basic ecological concepts]*. Şimşekli (Ed.), *Çevre Bilimi* (27-55), İstanbul: Lisans Yayıncılık.

Data Availability Declaration

The data can be shared upon request.

Author Contributions

Multiple Authors with Equal Contribution:

Author Contributions:

All authors, Tuba DEMİRCİ and Gamze KOCABAŞ contributed equally to this work. They collaboratively handled the conceptualization, methodology design, data acquisition, and analysis. Each author played a significant role in drafting and revising the manuscript, ensuring its intellectual depth and coherence. All authors have thoroughly reviewed, provided critical feedback, and approved the final version of the manuscript. They jointly take responsibility for the accuracy and integrity of the research.

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The Effect of Child-Centered Play Therapy on Self-Compassion and Emotion Regulation Skills in Children with Cancer¹

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Abstract:

This study examined the effects of Child-Centered Play Therapy (CCPT) on self-compassion and emotion regulation skills in 8- to 12-year-old children diagnosed with cancer. The study was conducted using a pretest-posttest design with a control group. The participants were children undergoing long-term cancer treatment at Necmettin Erbakan University Faculty of Medicine, Department of Pediatrics. In the experimental group, a child-centered curriculum was applied for 12 weeks. The control group did not receive any therapy. For this purpose, 17 participants were randomly assigned to the experimental group and 17 participants to the control group. The Emotion Regulation Scale for Children and the Self-Compassion Scale for Children were used as data collection instruments in the study. These scales were administered simultaneously to the experimental and control groups to obtain pre-test and post-test measures. As a result of the experimental applications, it was observed that the children in the child-centered play therapy group achieved higher scores in self-compassion and emotion regulation skills compared to their peers in the control group.

Keywords:

Children with cancer, Child-Centered Play Therapy, Emotion regulation, Self-compassion

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INTRODUCTION

Children diagnosed with cancer may face a number of psychological problems during the disease process and treatment phase, including psychological symptoms, lack of self-compassion, and impaired emotion regulation (Hedström et al., 2015). Such negative processes, especially during childhood, can have serious negative developmental consequences. In this context, the impact of treatment modalities that provide psychological support on protecting and improving children's psychosocial health has become an important area of research (Katz et al., 2018).

Play-based therapy programs are used as a functional intervention method to address children's social, emotional, and behavioral problems. This therapy typically works with children between the ages of 2 and 10 years and is effective in treating problems such as anxiety, depression, obsessions and compulsions, and mental health issues (Vanfleet, Sywulak, & Sniscak, 2018). Child-centered play therapy is preferred in addition to or as an alternative to drug treatment, especially in dealing with psychological symptoms, which are among the most common problems (Orhan, 2022). In the field of play therapy, child-centered play therapy is the most researched therapy method. Related studies confirm the positive effects of this therapy method in solving children's problems (Bratton et al., 2015).

Child-Centered Play Therapy (CCGT) is a method based on the client-centered approach to therapy first introduced by Carl Rogers. This approach was developed and adapted to play therapy by Virginia Axline. Later, this approach developed by Virginia Axline was further developed and conceptualized by Garry Landreth, thus introducing the child-centered play therapy approach (Ryan & Wilson, 2016). The effects of CCOT on children diagnosed with cancer may play an important role, especially in reducing psychological symptoms (Anderson & Gedo, 2013). In addition, self-compassion and emotion regulation are recognized as important internal resources that increase psychological resilience, especially in children who have experienced stressful and traumatic experiences (González et al., 2019; Neff, 2003a). Play therapy can be effective in improving the quality of life for these children by reducing their stress levels, improving their self-compassion skills, and helping them achieve emotional balance (Stallard et al., 2016).

CCET and Emotion Regulation in Children with Cancer

Child-centered play therapy is recognized as an effective way to improve the emotional and psychological state of children with serious illnesses such as cancer. Play provides a way for children to express themselves, their fears, anxieties, and other emotional states. Children undergoing cancer treatment may experience emotional difficulties due to the stress, uncertainty, and time spent in the hospital. At this time, play therapy can help children improve their emotion regulation skills (Shamabadi et al., 2022; Wempe et al., 2023). Play therapy is based on children's play as a natural form of expression. In this process, children learn to manage their emotions through play. For example, expert-led play sessions

allow children to explore their feelings of anxiety, fear, or loneliness and develop coping strategies (Goodyear-Brown, 2009; Kottman & Ashby, 2024).

Emotion regulation includes not only the downward regulation of negative emotions such as sadness and anxiety, but also attempts to reduce, increase, maintain, or change any emotion (e.g., positively valenced emotions such as happiness and excitement) (McRae & Gross, 2020). An important feature of emotion regulation is that it can occur outside of explicit/conscious awareness, such as the desire to change an upsetting problem (Gross & John, 2003), or implicit/conscious awareness, such as hiding one's love from another person due to fear of rejection (Gross, 2014).

Emotion regulation is a general term that refers to the regulation of not only negative but also positive emotions and includes the ability to keep the intensity of emotions felt by individuals at a stable level and to maintain it for the desired period of time (Garnefski, Kraaij & Spinhoven, 2001; Leahy et al., 2011). In cases where emotion regulation is not possible, individual and social functionality is compromised and this situation leads to various problems (Leahy et al., 2011; Niedenthal & Brauer, 2012).

Especially in studies conducted with chronic cancer patients, it is known that in addition to positive health behavior change, the provision of social support, self-efficacy, refocusing on the plan and positive reappraisal, which are emotion regulation strategies, increase disease resilience in chronic patients (Helgeson & Zajdel, 2017). People who are able to remain optimistic about their chronic illness are found to frequently use acceptance, positive reappraisal, and plan refocusing as coping mechanisms, while maladaptive strategies are rarely used (Carver et al., 2010). In a comprehensive study of chronic illness conducted by Mihalca et al. (2017) with participants aged 11 to 17 years with chronic illness, it was found that young people's social functioning was impaired and the use of maladaptive cognitive emotion regulation strategies was higher.

Thompson argued that emotional regulation can be defined as external and internal. That is, emotions are not only self-regulated but also managed by others. Biologically, emotions organize and coordinate responses to important environmental events. Therefore, emotional regulatory processes are necessary both to provide flexibility to the behavioral processes that help motivate and direct emotions and to enable organisms to respond quickly and efficiently to change (Thompson, 2008).

Middle childhood is a period of significant change for both attachment and emotion regulation. As in younger years, parents remain children's primary attachment figures. As in younger years, caregivers serve as both safe spaces and secure bases, although their role as secure bases becomes more important in middle childhood. In terms of emotion regulation, the change seen in middle childhood is that children become increasingly self-aware, which increases the regulation of their emotions. Norms for emotional expression also change, such that children are increasingly expected to modify and regulate their

emotions in middle childhood, and failure to do so is associated with difficulties such as peer rejection (Movahed Abtahi & Kerns, 2017).

There are studies showing that emotion regulation difficulties and processes are associated with many psychopathologies such as somatic symptoms and related disorders, depression and posttraumatic stress disorder due to childhood trauma (Alpay et al., 2017; Hopfinger et al., 2016), internalizing and externalizing disorders in children (Braet et al., 2014). Research has supported that emotion regulation processes are also associated with illness anxiety. Görgen et al. (2014) found that dysfunctional emotion regulation strategies such as suppression, rumination, blaming others, and catastrophizing were associated with illness anxiety.

Child-centered play therapy is a therapeutic approach that creates a safe space for children to express their emotional and psychological concerns through play. The therapist tries to understand the child's feelings and experiences and shows unconditional acceptance. The playroom is organized in such a way that the child feels safe and free to express themselves and experience emotional release through play. In addition, self-compassion is an important concept that encourages individuals to be kind, understanding, and supportive of themselves (Germer & Neff, 2013). Self-compassion is the ability to approach one's own shortcomings, pain, and challenging experiences from a wise perspective and to be compassionate toward oneself (Neff et al., 2007). This is not just an individual trait; on the contrary, people can only behave in the same way with others if they are compassionate, loving and kind to themselves. Play therapy gives children the opportunity to express their feelings and make sense of them. This process increases emotional awareness and helps children accept their own emotional experiences, which is a key component of self-compassion. The empathic relationship with the therapist allows children to develop empathy for themselves. The therapist's unconditional acceptance and gentle approach encourages children to be kinder to themselves. In addition, CCPT increases children's self-confidence and self-esteem (Daniel et al., 2023).

CCPT and Self-Compassion in Children with Cancer

Being diagnosed with cancer can be considered a traumatic event in and of itself and can be described as a painful experience. Patients experience psychosocial, spiritual, and existential distress (Garcia et al., 2021). Changing one's perspective on this challenging experience, developing empathy, and strengthening emotional coping skills are critical for these patients (Ewert, Vater, & Schröder-Abe, 2021). Self-compassion can enhance the psychosocial well-being of cancer patients, alleviate their suffering, and help them maintain self-care, suggesting that it is an important resource (Garcia et al., 2021). Childhood cancer is a major health problem that leaves deep physical, emotional, and social impacts. In this process, children's sense of self-compassion is of great importance, as it plays a critical role in overcoming difficulties and psychological adjustment. Self-compassion can help children to accept their bodies and show love to themselves (Serçe, 2022).

According to Neff (2003b), the sub-dimensions of self-compassion are defined as self-kindness, a sense of common humanity, and mindfulness, which in turn are related to the opposite dimensions of self-judgment, isolation, and over-identification. Cancer reduces people's self-compassion, decreases self-kindness, weakens self-care, and increases self-judgment. It also triggers feelings of alienation and isolation, weakens the sense of shared experience with humanity by thinking "Why is this happening to me?" and leads to integration with trauma by reducing self-awareness. According to Neff (2003b), practices that support self-compassion can be effective in reducing the stress and anxiety experienced by children with cancer. Self-compassion promoted in play therapy settings can help children be less critical and more supportive of themselves when coping with difficult situations, which can increase overall well-being by reducing emotional distress. Additionally, self-compassionate approaches in play therapy settings allow children to accept and cope with their feelings of fear, sadness, and anxiety (Bluth & Blanton, 2014).

Play therapy can have a positive impact on self-compassion and its sub-dimensions through the process of building a relationship with the child to address issues such as self-judgment, isolation, and illness identification that may occur in children with cancer. This method of therapy helps the child gain a sense of control and mastery over their experiences, helps make the unmanageable manageable, and supports the child in feeling understood and unconditionally accepted (Neff & Dahm, 2015). According to ESMOT, children have innate problem-solving and self-efficacy skills. In this context, it is accepted that the child is the guide and the potential for intrinsic well-being is given great importance. The therapist provides an environment for the child to discover and manage themselves through empathy, reassurance, and unconditional acceptance (Meany-Walen & Teeling, 2016). The focus is on the individual, living in the present rather than the past, accepting rather than directing, and understanding rather than explaining. The fundamental power for healing and change is found in the inner resources and wisdom of the individual (Vanfleet, Sywulak, & Sniscak, 2018).

Purpose of the Study

Child-centered play therapy is a school that has been recently addressed and increasing research on this subject contributes to the field. There is more research on this topic in foreign literature than in our country (Ghasemzadeh, 2022; Parker et al., 2021; Ray et al., 2015). Weis (2020) stated that play is a powerful tool, and play can be used to help children cope better with difficulties. Lin and Bratton (2015), in a study conducted using the meta-analysis method, stated that child-centered play therapy is effective for children and that positive outcomes were recorded for internalizing and externalizing behaviors in children who received child-centered play therapy. Looking at national studies, it can be seen that child-centered play therapy has only recently been addressed. Therefore, there are few studies on child-centered play therapy in Turkey. Sancak (2023) stated that although there is a significant increase in research on play therapy as of 2019, play therapy should be

addressed more in domestic research compared to foreign literature. It has been observed that the research in the domestic literature on child-centered play therapy is mostly related to behavioral problems of children. On the other hand, there are few studies that examine the effects of child-centered play therapy on emotion regulation and self-compassion in children with cancer. The purpose of this study is to examine the effects of Child-Centered Play Therapy (CCPT) applied to 8-12-year-old children diagnosed with cancer on their emotional regulation and self-compassion levels. The following research questions were addressed:

- Is there a statistically significant difference between the posttest scores on the Emotion Regulation Scale in Children of 8-12-year-old children in the experimental group who received play therapy and those who did not?
- Is there a statistically significant difference between the posttest scores on the Self-Compassion in Children Scale for 8-12-year-old children in the experimental group who received play therapy and those who did not?

METHOD

This study was conducted using the experimental method with a study group consisting of experimental and control groups determined by randomization (pretest-posttest control and experimental group design). According to Karunaratna et al. (2024), random assignment in research is an experimental technique used to randomly assign participants to different groups (e.g., a treatment group and a control group) in an experiment. This ensures that each participant or group of subjects has an equal chance of being placed in any group. Random assignment of participants helps ensure that any differences between and within groups in the experimental study are not initially systematic. Thus, any differences between groups at the end of the experiment can be said to be due to the experimental procedures or treatment process (Mattila et al., 2021).

This study used the **experimental method** to examine the effects of Child-Centered Play Therapy (CCPT) on self-compassion and emotion regulation skills in 8-12 year old children diagnosed with cancer. The experimental procedure included 12 sessions of child-centered play therapy in the experimental group. In the placebo control group, instead of play therapy, free time was spent and no application was performed. At the beginning of the experimental procedures, the scales of the study were applied to both groups as a pre-test.

The researcher manipulated the independent variable (therapy) by administering the CCPT to the children in the experimental group and measuring the results using the study's scales. This was the most reliable method of determining cause and effect. Random assignment of subjects allowed the researcher to maintain control over the variables and helped to understand whether the effect of the experimental treatment was truly due to the

play therapy or to other external factors. Random assignment minimized sample bias and provided similar baseline conditions in both groups.

Research Group

Participants were children undergoing long-term cancer treatment at Necmettin Erbakan University Faculty of Medicine, Department of Pediatrics. Eligibility criteria were determined based on previous studies on this topic. According to the order of hospitalization of children undergoing cancer treatment, participants were included in the study according to the following inclusion criteria:

- (1) Meet cancer criteria and be undergoing cancer treatment;
- (2) Be between the ages of 8 and 12;
- (3) Have no acute or chronic medical conditions other than cancer;
- (4) Report regularly to the hospital for treatment;
- (5) Have no known disorders, disabilities, or cognitive-mental impairments;
- (6) Children should speak Turkish and have the literacy level to complete the questionnaires;
- (7) Voluntary participation of the children in the study and parental consent.

The exclusion criteria were as follows:

- (1) Children do not communicate well with researchers;
- (2) Children's illness is at a critical stage (negatively affecting the research process);
- (3) Refusal to participate in the study.
- (4) Death of the child, irregular attendance at therapy sessions (not attending two or more consecutive sessions), unwillingness to continue the study.

In this study, which examined the effect of Child-Centered Play Therapy on participants' self-compassion and emotion regulation skills, research participants were identified based on the procedures of a two-group randomized controlled trial. At this stage, experimental and control groups were formed according to expert opinion and research in the literature. According to Zareapour et al. (2009), the recommended sample size for an experimental study is at least 20 (total experimental and control groups) using a significance level of .05, $\beta = 0.1$, and 90% power. However, due to the nature of childhood cancer, a total of 40 participants were enrolled in the experimental and control groups to account for a dropout or exclusion rate. Thus, 20 participants who received child-centered play therapy were randomly assigned to the experimental group and 20 participants who received no therapy were randomly assigned to the control group. Group assignments was completely randomized according to the hospital patient lists, with 20 children in each group (experimental and control). In the experimental group, 2 patients were excluded due to

absenteeism during the experimental interventions and 1 participant was excluded due to exacerbation of his illness. In the control group, 2 patients were excluded because they did not complete the post-tests and 1 participant died. Thus, the study was carried out with the participation of 34 children (17 experimental + 17 control group) who completed the pre- and post-tests. In the experimental group, 8 of the participants were boys and 9 were girls; in the control group, 9 were boys and 8 were girls. Twelve of the children in the experimental group were in elementary school and 5 were in middle school. In the control group, 13 participants attended primary school and 4 attended secondary school. We can say that the experimental and control groups are equivalent in terms of gender and educational status. Ethical approval to conduct this research was obtained from Hasan Kalyoncu University Ethics Committee. The necessary application permissions were obtained from the Dean's Office of Necmettin Erbakan University, Faculty of Medicine, where the research application will be carried out.

Practice

The study used a two-group randomized controlled trial to evaluate the effectiveness of "child-centered play therapy" in children with chronic illness between June and October 2024. The entire therapeutic procedure consisted of 12 sessions of child-centered play therapy lasting approximately 20 minutes, 1-2 times per week, and the entire therapy practice lasted approximately 5 months. Eligible children and their families in both groups were administered the research scales and the therapy method individually in a private room after obtaining their consent. Prior to the study, the Child Self-Compassion and Emotion Regulation Skills Scales were administered simultaneously and individually to children with cancer in the experimental and control groups.

- In this study, participants in the experimental group received child-centered play therapy for 12 sessions. The control group received regular health care without any therapy. Regular health care consisted of routine medical care and daily expressions of comfort and encouragement by medical staff.

- The interventions in the experimental group were conducted at Necmettin Erbakan University, Faculty of Medicine Hospital in Konya. The child-centered play therapy room was set up in the pediatric ward and the room was relatively independent, quiet, and sufficiently bright.

- In the child-centered play therapy practices of the experimental group, toys were used in each session. The toys used in the sessions were: Dramatic/role-playing tools, creative expression tools, tablet and digital tools, classic play therapy toys, dramatic/role-playing tools, expressive art tools, cards, gift cards, mandala, balls (large, small), counseling balls, sandboxes, sand, art tools, sensory tables, craft materials, magic wand, costumes, musical instruments, animal mascots, blackboard chalk, easel, newspaper, brushes, pencils, paper, children's furniture, story and fairy tale books, medical books.

-The main themes and topics of the child-centered play therapy sessions were determined according to the child-centered play therapy models proposed by Bratton et al. (2015), Landreth (2012), Post et al. (2019), Ray (2011), Sweeney & Landreth (2009), VanFleet et al. (2010), and Wilson, Kendrick & Ryan (2005). According to these models, child-centered play therapy follows a child-centered procedure and can be adapted to the therapy situation. In this study, only one child was allowed in the playroom at a time to ensure that the sessions were effective. Before the session began, the therapist took the child through a strict hand hygiene procedure and introduced the play therapy room and the procedure to be followed in a soft and gentle voice. Once the child was familiarized with the environment, the therapist guided the child to get used to the play activity and to relax. The therapist emphasized that the play creation could be anything and that the child would not be judged. As the child played the game, the therapist recorded the child's behavior and the miniatures used. The therapist adopted a "silent witness" approach, accepting, appreciating, and accompanying the child, creating a safe, tolerant, and supportive atmosphere so that the child could fully engage in the process of creating the play creations. After the therapy session, according to the child's psychological state, the therapist asked the child to present the play and his/her creations, communicated with the child, and guided them to appreciate and explore their inner world. After the play therapy session, the therapist took pictures with the child's permission and saved the pictures in files.

-At the end of the study, self-compassion and emotion regulation skills scales for children were applied as post-tests to children with cancer in the experimental and control groups.

Data Collection Tools

The Emotion Regulation Scale for Children and the Self-Compassion Scale for Children were used as data collection instruments in the study. In the experimental group, all scales were administered before and after the child-centered play therapy procedure. In the control group, the research scales were administered simultaneously as a pretest-posttest.

The Emotion Regulation Scale for Children (ERS)

The Emotion Regulation Scale for Children (ERS): It was developed by Rydell, Berlin-Thorell, and Bohlin (2007) based on the idea that it would be efficient for children to self-assess their emotion regulation skills. The items associated with this scale were developed by Rydell, Berlin, and Bohlin (2003) for caregivers to assess children's emotion regulation skills using the items from the Emotion Regulation Scale for Children: Adult Form" by Rydell, Berlin, and Bohlin (2003) for caregivers to assess children's emotion regulation skills. It consists of 29 items related to four sub-dimensions: Anger (9 items), Excitement (5 items), Fear (8 items), and Sadness (7 items). The scale is a 4-point Likert-type scale that is scored from 1 to 4 as "Not at all appropriate for me," "Not appropriate for me," "Appropriate for me," "Appropriate for me," and "Totally appropriate for me," and comments are made on

the total score. An increase in the total score indicates an increase in the level of emotion regulation. Some of the items (Anger Dimension items: 2, 9; arousal dimension items: 4, 5; Fear dimension items: 3, 6, 7) are reverse scored. In the original study, Cronbach alpha values for the dimensions were calculated as .77 for the anger subscale, .57 for the excitement subscale, .61 for the fear subscale, and .71 for the sadness subscale. The original Cronbach alpha value obtained for the total scale was .85.

The Self-Compassion Scale for Children (SCSC)

The Self-Compassion Scale for Children (SCSC) was developed to assess the level of self-compassion in primary and secondary school students, aged 8-12 years. The Turkish adaptation of the scale developed by Sutton et al. (2017) was conducted by Çakmak et al. The scale is a 12-item measurement tool that assesses children's positive and negative thoughts and feelings about themselves.

As a result of the factor analysis conducted during scale development, items were grouped into two factors: positive self-compassion (items 2, 3, 5, 6, 7, 10) and negative self-compassion (items 1, 4, 8, 9, 11, 12). Factor loadings ranged from .53 to .71 for the positive self-compassion items and from .60 to .72 for the negative self-compassion items. This construct aims to assess both positive and negative aspects of self-compassion. Negative items are reversed and an overall self-compassion score is obtained from the scale. High scores indicate high levels of self-compassion. The scale is administered as a five-point Likert-type scale ranging from "never" (1) to "always" (5). The fit indices were χ^2 (53) = 183.32, $p < .001$; CFI = .91; RMSEA = .08 (90% CI .06-.09), which supports the construct validity of the scale (Sutton et al., 2017).

Çakmak et al. (2018) showed that the Turkish adaptation was consistent with the original form. The overall Cronbach's alpha internal consistency coefficient was .81, .83 for positive self-compassion, and .71 for negative self-compassion. Exploratory and confirmatory factor analyses confirmed the distribution of positive and negative items in the original scale. These results suggest that the SCSC is a reliable measure of children's self-compassion.

Data Analysis

The analysis of the research data was conducted using SPSS 25.0 statistical software. According to the central limit theorem, the sample size should be at least 30 in order to apply parametric analysis (Kul, 2014). However, in this study, the number of participants in the experimental and control groups was less than 30. In addition, according to the normality test results, each of the pretest-posttest scores did not have a normal distribution. Given these results, the data were analyzed using nonparametric tests. The Mann-Whitney U test was used to compare the pretest and posttest scores of emotion regulation and self-compassion among the groups.

Ethical Considerations

Before starting the research, ethical principles were applied to the Hasan Kalyoncu University Scientific Research and Publication Ethics Committee, and an ethics committee approval certificate numbered was obtained.

Ethical Review Board: [Hasan Kalyoncu University Scientific Research and Publication Ethics Committee]

Date of Ethics Review Decision: [05.12.2023]

Ethics Assessment Document Issue Number: [E-97105791-050.01.01-47349]

FINDINGS

Table 1

Descriptive Values of Emotion Regulation Pretest Scores of Experimental and Control Groups

Pre-test	Experimental		Control	
	Mean	Std. Deviation	Mean	Std. Deviation
Anger	2,49	0,12	2,53	0,20
Excitement	2,51	0,37	2,52	0,38
Fear	2,46	0,31	2,51	0,37
Sadness	2,16	0,54	2,12	0,49
Total	2,40	0,26	2,38	0,30

Examining Table 1, the descriptive values of the pretest scores for emotion regulation of the experimental and control groups are presented. The mean score of the experimental group was 2.40 with a standard deviation of 0.26, while the mean score of the control group was 2.36 with a standard deviation of 0.30. These results show that there are small differences between the emotion regulation levels of the two groups.

Table 2

Pretest Rank Means and Mann-Whitney U Test Results of Emotion Regulation Scale of Experimental and Control Groups

PreTest	Group	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	p
Anger	Experimental	17	19,13	363,50	173,50	-0,21	0,83
	Control	17	19,87	377,50			
Excitement	Experimental	17	19,37	368,00	178,00	-0,08	0,94
	Control	17	19,63	373,00			
Fear	Experimental	17	18,92	359,50	169,50	-0,34	0,73
	Control	17	20,08	381,50			
Sadness	Experimental	17	19,71	374,50	176,50	-0,13	0,90
	Control	17	19,29	366,50			
Total	Experimental	17	19,87	377,50	173,50	-0,21	0,84
	Control	17	19,13	363,50			

Table 2 shows the comparison of the pretest emotion regulation scores of the experimental and control groups using the Mann-Whitney U test. The mean rank of the experimental group was calculated as 19.87 and the mean rank of the control group was calculated as 19.13. The Mann-Whitney U value was 173.5, $z=-0.21$ and $p=0.84$. This result showed that there was no significant difference between the experimental and control groups in terms of emotion regulation in the pretest and that the groups' emotion regulation was similar before the experimental procedure.

Table 3

Descriptive Values of Self-Compassion Pre-Test Scores of Experimental and Control Groups

Variables	Test	Group			
		Control		Control	
		Mean	Sd	Mean	Sd
Self-compassion	Pre-test	32,53	5,87	33,94	4,48

Examining Table 3, the descriptive values of the pre-test self-compassion scores of the experimental and control groups are presented. The mean self-compassion score of the experimental group was 32.53 with a standard deviation of 5.87, while the mean score of the

control group was 33.94 with a standard deviation of 4.48. These results show that there are small differences between the self-compassion scores of the two groups.

Table 4

Self-compassion Pretest Rank Means of Experimental and Control Groups and Mann-Whitney U Test Results

Variables	Group	N	SO	ST	U	z	p
Self-compassion pretest	Experimental	17	15,79	268,5	115,5	-1,01	0,31
	Control	17	19,21	326,5			

Table 4 shows the comparison of the pre-test self-compassion scores of the experimental and control groups using the Mann-Whitney U test. The mean score of the experimental group was 15.79 and the mean score of the control group was 19.21. The Mann-Whitney U value is 115.5, $z=-1.01$ and $p=0.31$. This result showed that there was no significant difference between the experimental and control groups in terms of self-compassion levels and that the groups had similar self-compassion perceptions before the experimental procedure.

Table 5

Descriptive Values of Emotion Regulation Scale Posttest Scores of Experimental and Control Groups

	Experimental		Control	
	Mean	Std. Deviation	Mean	Std. Deviation
Post-test				
Anger	2,70	0,58	2,25	0,18
Excitement	2,96	0,44	2,65	0,41
Fear	2,89	0,47	2,54	0,37
Sadness	3,18	0,53	2,97	0,52
Total	2,93	0,42	2,60	0,26

Examining Table 5, the descriptive values of the emotion regulation posttest scores of the experimental and control groups are presented. In total, the mean emotion regulation score of the experimental group was 2.93 with a standard deviation of 0.42, while the mean score of the control group was 2.60 with a standard deviation of 0.26. Results showed a significant increase in the level of emotion regulation in the experimental group compared to the control group.

Table 6

Post-test Rank Means and Mann-Whitney U Test Results of Emotion Regulation Scale of Experimental and Control Groups

		N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	p
Anger	Experimental	17	24,45	464,50	86,50	-2,78	0,01
	Control	17	14,55	276,50			
Excitement	Experimental	17	22,50	427,50	123,50	-1,71	0,09
	Control	17	16,50	313,50			
Fear	Experimental	17	23,53	447,00	104,00	-2,27	0,02
	Control	17	15,47	294,00			
Sadness	Experimental	17	21,97	417,50	133,50	-1,42	0,15
	Control	17	17,03	323,50			
Total	Experimental	17	24,66	468,50	82,50	-2,86	0,00
	Control	17	14,34	272,50			

When Table 6 is examined, the descriptive values of the post-test scores of emotion regulation of the experimental and control groups are presented. According to the analysis, a significant difference was found in the scores of anger, fear and emotion regulation in the whole scale ($p < 0.05$). These results show that there was a significant increase in the emotion regulation skills of the experimental group compared to the control group.

Table 7

Descriptive Values of Self-Compassion Posttest Scores of Experimental and Control Groups

Variables	Test	Group			
		Experimental		Control	
		Mean	Sd	Mean	Sd
Self-compassion	Post-test	40,88	3,59	33,94	4,13

Examining Table 7, the descriptive values of the self-compassion post-test scores of the experimental and control groups are presented. The mean self-compassion score of the experimental group was 40.88 with a standard deviation of 3.59, while the mean score of the control group was 33.94 with a standard deviation of 4.13. These results show that there was a significant increase in the self-compassion level of the experimental group compared to the control group.

Table 8*Self-compassion Posttest Rank Means of Experimental and Control Groups and Mann-Whitney U Test Results*

Variables	Group	N	SO	ST	U	z	p
Self-compassion post-test	Experimental	17	24,44	415,5	26,50	-4,08	0,00*
	Control	17	10,56	179,5			

*p<0,05

Table 8 shows the Mann-Whitney U test results for the self-compassion posttest scores of the experimental and control groups. The mean rank of the experimental group was 24.44 and the mean rank of the control group was 10.56, and there was a significant difference between the groups with $U=26.50$, $z=-4.08$, and $p=0.00$ ($p<0.05$). These results show that the self-compassion level of the children in the experimental group was significantly higher than that of the control group. The finding that there was a significant increase in self-compassion levels of children who received Child-Centered Play Therapy suggests that this therapy is effective in developing children's positive perceptions of themselves.

DISCUSSION

CCPT is an effective therapy method that addresses the psychosocial needs of children, allowing them to express themselves and explore their emotional world. This study examined the effect of the CCPT approach applied to 8-12 year old children diagnosed with cancer on their levels of emotion regulation and self-compassion.

According to the results of the study, the children participating in the experimental group who received child-centered play therapy achieved higher emotion regulation scores compared to their peers in the control group. Consistent with the findings of this study, the effect of child-centered play therapy on the emotion regulation levels of children with cancer was found to be positive and at a very high level. The emotion regulation skills of children who participated in the family involvement training program, which was prepared by Uğur-Ulusoy and Gözün-Kahraman (2019) to increase the emotion regulation skills of preschool children, increased. As Weikart (1998) stated, emotional skills programs that are prepared to involve children and families are more effective and lasting. Similarly, Aktürk (2016) investigated the effectiveness of a play-based psychotherapy program on the emotion regulation skills of 5-6-year-old children whose parents were divorced. The experimental group received 7 sessions of play-based psychoeducation, which lasted approximately twenty minutes each week. As a result of the study, it was observed that the emotional regulation skills of the experimental group increased significantly compared to the placebo control group, and this effect was maintained in the follow-up test conducted one month later.

Many studies show the positive effects of play therapy on children with cancer. For example, Landreth (2002) states that play therapy increases children's emotional expression and improves their ability to cope with stress. In addition, Akin (2016) has shown that children's self-expression through play has a significant impact on their emotional regulation skills. In conclusion, play therapy is an important tool for children with cancer to improve their emotional state and develop their emotional regulation skills. This therapy method allows children to express themselves while also helping them increase their psychological resilience due to their development in emotional regulation skills.

When the findings regarding the effect of CCPT application on children's self-compassion levels are examined, the fact that the mean self-compassion post-test scores of the children in the experimental group were higher than those in the control group shows that the therapy contributed to the development of a positive perspective towards themselves. While self-compassion facilitates the acceptance of one's own emotional experiences on the one hand, it also enables the development of defense mechanisms against negative emotions (Germer & Neff, 2013; Neff, 2003). In this context, it can be said that CCPT supports the development of self-compassion in children and provides a healthier emotional structure. Play therapy provides a safe space where children can express themselves. In this therapy, children express their emotional conflicts and negative feelings towards themselves through play. This process helps children understand and accept themselves better (Gil & Drewes, 2004; Landreth, 2012). CCPT provides a safe environment where the child can develop a sense of self-compassion through emotional support and acceptance. Allowing children to express their feelings and respecting these feelings during the therapy process is an important factor that supports the increase in self-compassion (Coatsworth, 2021). Such intervention programs can have a protective effect, especially for children who have experienced challenging life events (Brown et al., 2020; Bluth & Blanton, 2014). The increase in the self-compassion levels of the children in the experimental group supports their ability to keep themselves away from criticism and develop an internal support mechanism. Another reason why CCPT is effective on self-compassion may be that the therapy supports the child's personal awareness and increases self-esteem (Landreth, 2012). Especially during the play therapy process, allowing the child to think about their experiences and emotional reactions improves their internal evaluation skills, which contributes to the increase in self-compassion (Van Vliet & Kalnins, 2016). Considering that children with high self-compassion have stronger emotional resilience and an increased ability to cope with challenging situations, the importance of the role of CCPT on emotional development becomes even more evident (Germer & Neff, 2013). According to Van Vliet and Kalnins (2011); children's self-confidence improves during the play therapy process. The increase in self-compassion ensures that children's self-evaluations change in a more positive direction and increases their self-confidence, and children have the opportunity to know and accept themselves better during this process. The positive self-compassion development provided by CCPT can also have positive effects on children's social

relationships. Children with high self-compassion can establish healthier relationships in social environments. This contributes to the strengthening of emotional support networks during the treatment process (Barnard & Curry, 2011). Another reason for this significant increase in the experimental group is the potential of children to transfer the behaviors they adopt in the therapy environment to their daily lives. CCPT helps children acquire skills such as accepting themselves without judgment and managing their emotions (Siu, 2020). Increasing children's self-compassion levels is of critical importance for the development of their psychological resilience and self-efficacy. In this context, including children with low self-compassion in emotional support programs can improve their quality of life and contribute to them becoming psychologically healthy individuals in their future lives (Gouveia et al., 2019; Neff & McGehee, 2010).

CONCLUSIONS AND RECOMONDATIONS

According to the results of the study, it was observed that the 12-week CCPT application positively affected the emotion regulation and self-compassion levels of children diagnosed with cancer in the 8-12 age group. However, the program applied in this study was limited to 12 weeks. It is thought that longer periods of child-centered therapy programs will have more positive effects. It is thought that increasing the duration of the program applied to children with cancer and providing psycho-education to those who provide care and support in hospitals while the program is applied to children will increase the awareness of health workers and positively affect the social and emotional development of children. In addition to the fact that children with cancer in the intensive treatment process are more sensitive and disadvantaged, positive skill development is a process that requires time. In this context, it is important for health institutions to conduct studies on the development of self-compassion and emotion regulation skills in children with cancer, such as child-centered play therapy.

REFERENCES

- Akin, A. (2016). The effectiveness of play therapy in children with cancer. *Journal of Cancer Education*, 31(2), 222-229.
- Aktürk, B. (2016). *Oyun tabanlı psikoeğitim programının boşanmış aileye sahip okul öncesi çocukların duygu düzenleme beceri düzeylerine etkisi*. [Master Thesis, Melikşah University]
- Alpay, E. H., Aydın, A., & Bellur, Z. (2017). Çocukluk çağı travmalarının depresyon ve travma sonrası stres belirtileri ile ilişkisinde duygu düzenleme güçlüklerinin aracı rolü [The Mediating Role of The Emotion Regulation Difficulties On The Relationship Between Childhood Traumas, Post Traumatic Stress Symptoms and Depression]. *Klinik Psikiyatri Dergisi*, 20(3), 218-226. <https://doi.org/10.5505/kpd.2017.98852>.
- Anderson, M., & Gedo, J. (2013). Play therapy with pediatric cancer patients. *Journal of Clinical Child Psychology*, 42(3), 257-270.
- Bluth, K., & Blanton, P. W. (2014). Mindfulness and self-compassion: Exploring pathways to adolescent emotional well-being. *Journal of Child and Family Studies*, 23(7), 1298-1309. <https://doi.org/10.1007/s10826-013-9830-2>
- Braet, C., Theuwis, L., van Durme, K., Vandewalle, J., Vandevivere, E., Wante, L., Moens, E., Verbeken, S., & Goossens, L. (2014). Emotion regulation in children with emotional problems. *Cognitive Therapy and Research*, 38(5), 493-504. <https://doi.org/10.1007/s10608-014-9616-x>
- Bratton, S., Purswell, K., & Jayne, K. (2015). Play therapy: A child-centered approach. In H. T. Prout & A. L. Fedewa (Eds.), *Counseling and psychotherapy with children and adolescents: Theory and practice for school and clinical settings* (5th ed., pp. 91-113). John Wiley & Sons Inc.
- Brown, S. L., Hughes, M., Campbell, S., & Cherry, M. G. (2020). Could worry and rumination mediate relationships between self-compassion and psychological distress in breast cancer survivors? *Clinical Psychology & Psychotherapy*, 27(1), 1-10. <https://doi.org/10.1002/cpp.2399>
- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, 30(7), 879-889. <https://doi.org/10.1016/j.cpr.2010.01.006>
- Coatsworth, J. D. (2021). Promoting self-compassion in children. *Journal of Child and Family Studies*, 30(1), 15-29.
- Çakmak, A., Kanak, M., & Özkubat, S. (2018). Çocuklar için öz şefkat ölçeği: türkçeye uyarlama çalışması [Self-Compassion Scale For Children: The Study Of Turkish Adaptation]. *Turkish Studies*, 13(26), 295-305. <http://dx.doi.org/10.7827/TurkishStudies.14405>

- Daniel, S., Berkovits, L., Eisenhower, A., & Blacher, J. (2023). Child-centred play therapy and rhythmic relating improves emotion regulation in autism: A single-n pilot intervention study. *Counselling & Psychotherapy Research*.25., <https://doi.org/10.1002/capr.12671>.
- Ewert, C., Vater, A., & Schröder-Abé, M. (2021). Self-compassion and coping: A meta-analysis. *Mindfulness*, 12(5), 1063–1077. <https://doi.org/10.1007/s12671-020-01563-8>
- Garcia, A. C. M., Camargos Junior, J. B., Sarto, K. K., Silva Marcelo, C. A. D., Paiva, E. M. D. C., Nogueira, D. A., & Mills, J. (2021). Quality of life, self-compassion and mindfulness in cancer patients undergoing chemotherapy: A cross-sectional study. *European journal of oncology nursing : the official journal of European Oncology Nursing Society*, 51, 101924. <https://doi.org/10.1016/j.ejon.2021.101924>
- Garnefski, N., Kraaij, V., & Spinhoven, P. (2001). Negative life events, cognitive emotion regulation and emotional problems. *Personality and Individual Differences*, 30(8): 1311–1327. [https://doi.org/10.1016/S0191-8869\(00\)00113-6](https://doi.org/10.1016/S0191-8869(00)00113-6)
- Germer, C. K., & Neff, K. D. (2013). Self-compassion in clinical practice. *Journal of Clinical Psychology*, 69(8), 856-867.
- Ghasemzadeh, S. (2022). Effectiveness of child-centered play therapy on resiliency of Children with leukemia cancer. *Journal of Pediatric Nursing*, 8(3), 47-55.
- Gil, E., & Drewes, A. A. (2004). *Cultural issues in play therapy*. Guilford Press.
- González, S. G., Román, G., & Noguera, C. (2019). Self-compassion as a resilience factor in pediatric oncology. *Journal of Pediatric Psychology*, 44(5), 543-553.
- Goodyear-Brown, P. (2009). *Play therapy with traumatized children*. John Wiley & Sons.
- Gouveia, M. J., et al. (2019). The impact of child-centered play therapy on children's self-compassion. *Clinical Child Psychology and Psychiatry*, 24(1), 66-78.
- Görge, S. M., Hiller, W., & Witthöft, M. (2014). Health anxiety, cognitive coping, and emotion regulation: A latent variable approach. *International Journal of Behavioral Medicine*, 21, 364-374. <https://doi.org/10.1007/s12529-013-9297-y>
- Gross, J. J. (2014). Emotion regulation: Conceptual and empirical foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (2nd ed., pp. 3–20). The Guilford Press.
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. *Journal of personality and social psychology*, 85(2), 348. <https://doi.org/10.1037/0022-3514.85.2.348>
- Hedström, M., Ljungman, G., & Von Essen, L. (2015). Perceptions of distress among childhood cancer patients and their families. *Pediatric Hematology and Oncology*, 32(7), 541-550.
- Helgeson, V. S., & Zajdel, M. (2017). Adjusting to chronic health conditions. *Annual Review of Psychology*, 68, 545-571. <https://doi.org/10.1146/annurev-psych-010416-044014>

- Hopfinger, L., Berking, M., Bockting, C. L., & Ebert, D. D. (2016). Emotion regulation mediates the effect of childhood trauma on depression. *Journal of affective disorders*, 198, 189-197. <https://doi.org/10.1016/j.jad.2016.03.050>
- Karunaratna, I., De Alvis, K., Gunasena, P., & Jayawardana, A. (2024). Designing and conducting clinical research: Methodological approaches. *Journal of Clinical Research*, 1-13. <https://doi.org/10.13140/RG.2.2.23657.30569>
- Katz, E. R., Varni, J. W., & Seid, M. (2018). Quality of life in pediatric cancer patients. *Cancer Nursing*, 41(2), 120-126.
- Kottman, T., & Ashby, J. S. (2024). *Play therapy: Basics and beyond*. John Wiley & Sons.
- Landreth, G. (2002). *Play Therapy: The Art of the Relationship*. New York: Brunner-Routledge.
- Landreth, G. L. (2012). *Play therapy: The art of the relationship* (3rd ed.). New York: Brunner-Routledge.
- Leahy, R. L., Tirch, D., & Napolitano, L. A. (2011). *Emotion Regulation in Psychotherapy: A Practitioner's Guide*, (1st. ed.). Guilford press.
- Lin, Y-W. & Bratton, S. C. (2015). A meta-analytic review of child-centered play therapy approaches. *Journal of Counseling and Development*, 93(1), 45-58. <https://doi.org/10.1002/j.1556-6676.2015.00180.x>
- Mattila, A. S., Luo, A., Xue, X., & Ye, T. (2021). How to avoid common mistakes in experimental research?. *International Journal of Contemporary Hospitality Management*, 33(1), 367-374. <https://doi.org/10.1108/IJCHM-07-2020-0696>
- McRae, K., & Gross, J. J. (2020). Emotion regulation. *Emotion*, 20(1), 1-9. <https://doi.org/10.1037/emo0000703>
- Mihalca, A. M., Diaconu-Gherasim, L. R., & Butnariu, L. I. (2017). Social functioning and coping strategies in Romanian and Moldavian adolescents with chronic diseases. *Current Psychology*, 36(4): 791-800. <https://doi.org/10.1007/s12144-016-9468-5>
- Movahed Abtahi, M., and Kerns, K. A. (2017). Attachment and emotion regulation in middle childhood: changes in affect and vagal tone during a social stress task. *Attachment & human development*, 19(3), 221-242. <https://doi.org/10.1080/14616734.2017.1291696>
- Neff, K. D. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, 2(2), 85-101. <https://doi.org/10.1080/15298860309032>
- Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity*, 2(3), 223-250. <https://doi.org/10.1080/15298860309027>
- Neff, K. D., & McGehee, P. (2010). Self-compassion and psychological resilience. *Journal of Adolescence*, 33(1), 213-223.

- Neff, K. D., Rude, S. S., & Kirkpatrick, K. L. (2007). An examination of self-compassion in relation to positive psychological functioning and personality traits. *Journal of Research in Personality*, 41, 908-916. <https://doi.org/10.1016/j.jrp.2006.08.002>
- Niedenthal, P. M., & Brauer, M. (2012). Social functionality of human emotion. *Annual Review of Psychology*, 63, 259-285. <https://doi.org/10.1146/annurev.psych.121208.131605>
- Orhan, E. (2022). Çocuk Merkezli Oyun Terapisinin Dikkat Eksikliği Hiperaktivite Bozukluğu Tanılı Çocukların Duygu ve Davranışlarına Etkisi [The effect of child-centered play therapy on the emotions and behaviors of children with attention deficit hyperactivity disorder]. (Master's thesis, Trabzon University, Graduate School of Education).
- Parker, M. M., Hergenrather, K., Smelser, Q., & Kelly, C. T. (2021). Exploring child-centered play therapy and trauma: A systematic review of literature. *International Journal of Play Therapy*, 30(1), 2. <https://doi.org/10.1037/pla0000136>
- Post, P. B., Phipps, C. B., Camp, A. C., & Grybush, A. L. (2019). Effectiveness of child-centered play therapy among marginalized children. *International Journal of Play Therapy*, 28(2), 88. <https://doi.org/10.1037/pla0000096>
- Ray, D. (2011). *Advanced play therapy: Essential conditions, knowledge, and skills for child practice*. Routledge. <https://doi.org/10.4324/9780203837269>
- Ray, D. C., Armstrong, S. A., Balkin, R. S., & Jayne, K. M. (2015). Child-centered play therapy in the schools: Review and meta-analysis. *Psychology in the Schools*, 52(2), 107-123. <https://doi.org/10.1002/pits.21798>
- Ryan, V., & Wilson, K. (2016). Yönlendirmesiz oyun terapisinde vaka çalışmaları [Case studies in non-directive play therapy] (G. Erden & İ. A. Dikmeer, Çev.). Ankara: Nobel Akademik Yayıncılık.
- Rydell, A.-M., Berlin, L., & Bohlin, G. (2003). Emotionality, emotion regulation, and adaptation among 5- to 8-year-old children. *Emotion*, 3(1), 30-47. <https://doi.org/10.1037/1528-3542.3.1.30>
- Serçe Yüksel, Ö. (2022). *The effect of human caring theory and self-compassion based psychoeducation on self-compassion, anxiety, and depression levels of individuals diagnosed with hematological cancer* (Doctoral dissertation, Dokuz Eylül University, Health Sciences Institute). İzmir.
- Shamabadi, R., Nosratabadi, M., Asgharinekah, S. M., & Banihashem, A. (2022). Effectiveness of group play therapy based on choice theory on executive functions of children and adolescents with cancer. *Journal of Fundamentals of Mental Health*, 24(5).
- Siu, A. M. (2020). Self-compassion intervention programs in educational psychology. *Educational Psychology Review*, 32(3), 587-601.
- Stallard, P., Williams, L., & Velleman, S. (2016). The use of computerized cognitive behavioral therapy with children who have cancer. *Journal of Pediatric Psychology*, 41(5), 514-523.

- Sutton, E., Schonert-Reichl, K., Wu, A., D., Lawlor, M., S. (2017). Evaluating the Reliability and Validity of the Self-Compassion Scale Short Form Adapted for Children Ages 8–12. *Child Ind Res* 11, 1217–1236. <https://doi.org/10.1007/s12187-017-9470-y>
- Sweeney, D. S., & Landreth, G. L. (2009). Child-centered play therapy. In K. J. O'Connor & L. D. Braverman, *Play therapy theory and practice: Comparing theories and techniques* (2nd ed., pp. 123–162). John Wiley & Sons Inc.
- Thompson, R. A. (2008). Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development*, 59(2-3), 25–52. <https://doi.org/10.1111/j.1540-5834.1994.tb01276.x>
- Uğur Ulusoy, R., Gözün Kahraman, Ö. (2019). Okul Öncesi Dönem Çocukları için Duygu Düzenleme Becerilerine Yönelik Hazırlanan Aile Katılımlı Eğitim Programının Etkililiğinin İncelenmesi [Investigating efficiency of parental involvement training programme that is prepared for pre-school childrens' emotion regulation skills], *Uluslararası Aile Çocuk ve Eğitim Dergisi*, 17 (4).
- VanFleet, R., Sywulak, A. E., & Sniscak, C. C. (2011). *Child-centered play therapy*. Guilford Press.
- Van Vliet, K. J., & Kalnins, G. R. (2011). Self-compassion and emotional regulation in young adults with a history of childhood maltreatment. *Mindfulness*, 2(1), 10-19.
- Van Vliet, K. J., & Kalnins, G. R. (2016). Enhancing self-compassion in youth: A critical review. *Child and Adolescent Social Work Journal*, 33(4), 337-348.
- Weikart, D. P. (1998). Changing early childhood development through educational intervention. *Preventive Medicine*, 27(2), 233-237. <https://doi.org/10.1006/pmed.1998.0280>
- Weis, J. (2020). *Play therapy interventions promoting intrinsic characteristics of resilience: A systematic literature review*. Master Thesis, Jönköping Üniversitesi, Jönköping.
- Wempe, M. F., Hendricks-Ferguson, V. L., Thackray, J., & Raybin, J. (2023). Investigating the Effectiveness of Story Therapy and Art-Play Therapy on Children with Cancer. *Clinical Cancer Investigation Journal*, 12(6-2023), 28-32. <https://doi.org/10.51847/8TNZUrtjee>
- Wilson, K., Kendrick, P., & Ryan, V. (2005). *Play therapy: A nondirective approach for children and adolescents*. (2nd ed.). London, UK: Bailliere Tindall.
- Zareapour, A., Falahi Khoshknab, M., Kashaninia, Z., Biglarian, A., & Babashahabi, R. (2009). Effect of group play therapy on depression in children with cancer. *Scientific Journal of Kurdistan University of Medical Sciences*, 14(3), 64-72.

Data Availability Declaration

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

Author Contributions

All authors, Esra Coşkun and Prof. Dr. Şaziye Senem Başgöl, contributed equally to this work. They collaboratively handled the conceptualization, methodology design, data acquisition, and analysis. Each author played a significant role in drafting and revising the manuscript, ensuring its intellectual depth and coherence. Both authors have thoroughly reviewed, provided critical feedback, and approved the final version of the manuscript. They jointly take responsibility for the accuracy and integrity of the research.

Author(s)' statements on ethics and conflict of interest

Ethics statement: We hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. We take full responsibility for the content of the paper in case of dispute.

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Investigation of High School Students' Attitudes Towards Mind and Intelligence Games and the Relationship of Attitude Level with Some Demographic Characteristics

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Abstract:

The aim of this study is to examine the attitudes of high school students towards mind and intelligence games and how these attitudes differ based on various variables. The study population consists of 800 students studying in different departments at Konya Selçuklu Türk Telekom Vocational and Technical Anatolian High School during the 2023–2024 academic year. The sample includes 192 students selected through the convenience sampling method and who voluntarily participated. Both the descriptive and relational survey models were used in the research. Data were collected using a personal information form and the "Attitude Scale Towards Intelligence Games" developed by Karapınar and Aydoğan (2020), and analyzed with the SPSS program. According to the findings, students' overall attitude towards mind and intelligence games was at the level of agreement ($x=3.47$). In terms of sub-factors, students showed a disagreement-level attitude toward the negative attitude factor ($x=2.34$), an agreement-level attitude toward the positive attitude factor ($x=3.50$), and a neutral attitude toward the behavioral element factor ($x=2.81$). Additionally, no statistically significant differences were found in students' attitudes based on gender, grade level, parental education, family income, or prior training on mind and intelligence games.

Keywords: Mind and intelligence games, attitude, high school students, intelligence.

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INTRODUCTION

Today's cultures and societies are undergoing a rapid evolution, driven by significant advances in science, knowledge, and technology, as well as the development of the internet and enhanced accessibility (Kaleci, 2018; Sulak & Koklu, 2024). One of the most important features of this new era in which information is at the forefront is the integration of digital technologies and teaching supportive methods in education systems and methodologies. In this framework, traditional teaching techniques have been replaced by the integration of various tools into the lessons. Especially in recent years, the integration of various supportive teaching methods and the use of digital and technological tools in education have gained prominence, driven by technological advancements that have facilitated the development of devices compatible with evolving technology (Koklu & Sulak, 2021). In this context, one of the teaching supportive methods integrated into education systems is mind and intelligence games.

According to the Turkish Language Association Dictionary (2023), intelligence is defined as a term that includes the abilities of thinking, reasoning, learning, visualization, grasping objects, perceiving objective facts, judgment, inference, physical control, perception of emotion, evaluation and invention (Turkish Language Association TDK Dictionary, 2023). In other words, intelligence refers to the cognitive capacity to attribute mental states to oneself and others (Goldman, 2012, p. 1). Intelligence is the environment in which the sequence of internal events or activities including thoughts, perceptions, sensations, etc. in an individual's mind takes shape. (Ikhianosime & Akalue, 2021, p. 83).

Games are facilitators that structure player behavior and whose main purpose is enjoyment (Allen et al., 2024, p. 2). Games are learning machines designed to experience a story or test cognitive skills, where players learn how to interact through systems within the game (Altura & Curwood, 2015, p. 25). Games play a critical role in cognitive development and are a vital factor, especially for children (Türkoğlu & Uslu, 2016, p. 52). The uncritical use of games in education actually contains an argument that has the potential to reduce inequality in learning processes (Whitton, 2013). Games are one of the methods frequently used by teachers to keep students active and open to learning in learning processes.

Although games have various effects on children, especially mind and intelligence games have important effects on their development (Güneş & Yünkül, 2021, p. 807). Mind and intelligence games are educational activities designed to help individuals discover their own talents, produce creative solutions to problems and continuously improve themselves, and develop high-level thinking skills. (Bizer et al., 2006, p. 247). Brain teasers can be defined as an area where intelligence is directly practiced; this game activity offers an aesthetic experience where intelligence and play are intertwined. (Caliskan & Sahin, 2022, p. 2). Brain teasers are activities that involve real problems and present different gamified problems.

For this reason, they can be considered as the most appropriate tools that can contribute to the development of children's cognitive skills such as improving their thinking skills, gaining various perspectives, improving reasoning, increasing their problem-solving skills, creating different strategies, analyzing, focusing, and establishing relationships. (Marangoz & Demirtaş, 2017, p. 614). Beyond recreational purposes, games and interactive environments can offer valuable and important insights from individual learners to parents, teachers and entire education systems (Ketamo, 2013). Games offer a micro-world where you can observe social organization at work. Structure, status, identity, power, time, memory, norms and values are all found in the game world (Perinbanayagam, 2006). In chess, for example, players have to use logic to predict their opponents' next move and at the same time formulate their own strategy. This game is a typical turn-taking game where black and white take turns making moves. Chess is a type of game that requires both players to know the history and rules of the game and is completely focused on knowledge and strategy rather than visual cues. Chess represents a mental challenge with perfect and complete information for both players (Meijering et al., 2018).

Intelligence games aim to increase students' cognitive abilities by increasing their ability to perceive and evaluate problems, create various perspectives, make quick and accurate decisions, improve their focusing skills, and effectively develop their reasoning and logical thinking capacities. (Dokumacı Sütçü, 2021, p. 990). Contrary to common perception, brain teasers do not only aim to increase mathematical abilities, but also to improve students' visual, auditory and social skills, and to strengthen skills such as strategic thinking, understanding abstract concepts, three-dimensional thinking, critical and creative thinking. (Çalışkan, 2019, p. 16). Thanks to intelligence games, students will reveal their talents and potentials in individual and teamwork, strengthen and increase their self-confidence, acquire regular study habits, and develop different solutions and strategies by adopting a brave attitude in case of failure. (Yağlı, 2019, p. 3). Individuals have to keep up with these changes in a world in constant change. Individuals need to have the mental skills to produce and apply creative solutions to the problems they face in this change. The ability to produce creative solutions that enable individuals to overcome difficulties can only be the product of a unique intelligence. In this context, activities that develop mental skills that enable individuals to produce practical solutions gain importance.

According to Dempsey et al. (2002), through various course contents and tools to be used in education, individuals will develop at the point of reaching the targeted abilities. Games in general and brain teasers in particular are effective tools for achieving these goals (Saygı et al., 2016, p. 281). It confirms the idea that the careful use of carefully planned teacher- guided and specific mental games can contribute to the maintenance and development of students' reasoning and problem-solving abilities. These skills are likely to have a positive impact on students' overall academic achievement in the long run (Bottino et al., 2013b, p. 62). Information processing skills, as a problem-solving strategy that develops in interaction with complex problem situations, can be assessed through the

challenging situations presented by mind and intelligence games (Adalıyılmaz, 2022, p. 2). It is possible to accept the potential of using mind and intelligence games as an effective tool in the context of developing individuals' attention and concentration capacities, gaining skills such as creative thinking, problem solving skills, high-level cognitive awareness, and social skills development. (Ayar, 2022, p. 6).

Attitude is a global and relatively permanent evaluation of a person, object or issue (good or bad) based on emotional, cognitive or behavioral information, varying in severity (Bizer et al., 2006, p. 247). The role of attitude in individuals' learning processes is extremely important. In this context, the variables affecting attitudes towards mental and cognitive games should be examined in detail. With mind and intelligence games, individuals develop analytical and creative thinking skills in the face of problems including real life problems. In the face of changing and developing science and technology, it is of great importance to determine student attitudes towards mind and intelligence games that develop such mental skills of individuals.

In the literature, there are no studies that examine high school students' attitudes towards mind and intelligence games and the relationship between attitudes and some demographic variables. For this reason, this section includes the findings of various studies focusing on the effects of mind and intelligence games on students.

Marangoz & Demirtas (2017) found that mind and intelligence games increased the cognitive ability levels of 2nd grade students. Based on this finding, they emphasized the importance of mind and intelligence games for primary school students.

Researchers have generally found that the use of mind and intelligence games in lessons contributes to students' achievement of various gains. In general, these studies show that mind and intelligence games increase students' problem solving, decision-making skills, patient behavior and school satisfaction (Esen, 2019), analytical thinking, critical thinking, decision-making skills (Baş et al., 2020), verbal skills, observation skills (Ekiçi et al., 2017), aggressive behaviors (Gençay et al., 2019), development of higher order thinking and reasoning skills (Güneş & Yünkül, 2021), development of creative thinking skills, giving students a different perspective, making the lesson fun (Yılmaz & İkikardeş, 2020), support the student's active participation in the lesson (Kama Yılmaz, 2019), attitude towards mathematics course (Angin, 2022), higher order thinking skills, student achievement, mathematical skills (Kel & Kul, 2021), progression of creative thinking, higher-order cognitive awareness, focusing and social skills (Setting, 2022), access to information processing thinking skills (Adalıyılmaz, 2022), mental skill levels (Marangoz & Demirtas, 2017), reflective thinking skills (Şanlıdağ & Aykaç, 2021).

Mind and intelligence games are one of the important areas that have been tried to be integrated into the Turkish education system. The mind and intelligence games course has been added to the elective course pool for the Turkish education system, but it has not reached the compulsory course format. There are academic studies that reveal that this

elective course is effective on students' academic achievement (Bottino et al., 2013a; Çağan & Usta, 2023; Gabrito et al., 2023; Kumar et al., 2023; Kel & Kul, 2021). In addition to this basic finding, although the number of studies emphasizing the effects of mind and intelligence games on students' academic achievement is quite high, there are also a small number of research findings that do not find a statistically significant relationship between the concepts (Cabrillos et al., 2023).

There are also academic research findings that the integration of mind and intelligence games into the education system has an impact on many factors other than students' academic achievement (Esen, 2019; Ekiçi et al., 2017; Gençay et al., 2019). When these broad effects of mind and intelligence games on students are evaluated together, it is thought that including mind and intelligence games in education systems will make important contributions to the Turkish education system.

In addition to this effect, determining students' attitudes towards mind and intelligence games and some variables affecting these attitudes will be an important factor for educational policies to be developed in this direction. Because it is a generally accepted fact that the most important factor that directs the emergence of behaviors is attitude. For this reason, the researches to be conducted to determine the level of students' attitudes towards mind and intelligence games and some variables affecting these attitudes have the importance of being an important input element for the educational policies to be developed in this regard.

Although there are various studies in the academic literature on students' attitudes towards mind and intelligence games, the number of studies examining the level of differentiation of these attitudes according to some demographic characteristics is quite low. In particular, the number of studies on this subject in the domestic literature is quite limited. In addition, according to Budak & Saban (2023), among the studies on mind and intelligence games in the literature, no research was found that identified high school students as the study group (Budak & Saban, 2023, p. 895). Analyzing high school students' attitudes towards mind and intelligence games and determining how these attitudes change according to various demographic factors can provide important guidance for the development of educational policies and practices. Based on this idea, this study aimed to examine high school students' attitudes towards mind and intelligence games and the differentiation of attitudes in terms of various variables. In line with this main purpose, this study sought answers to the following research questions.

1. What is the level of high school students' attitudes towards mind and intelligence games?
2. Do high school students' attitudes towards mind and intelligence games differ according to some demographic characteristics?
 - a. Do high school students' attitudes towards mind and intelligence games differ significantly according to gender?

- b. Do high school students' attitudes towards mind and intelligence games differ significantly according to the grade of education?
- c. Do high school students' attitudes towards mind and intelligence games differ significantly according to their mother's education level?
- d. Do high school students' attitudes towards mind and intelligence games differ significantly according to their fathers' level of education?
- e. Do high school students' attitudes towards mind and intelligence games differ significantly according to the income status of the family?
- f. Do high school students' attitudes towards mind and intelligence games differ significantly according to their previous participation in a training on mind and intelligence games?

METHOD

Design of the Study

Scientific research approaches are generally classified into three different approaches: qualitative research, quantitative research and mixed research (Williams, 2007, p. 65). This study is based on a quantitative research approach.

Research Design

In this study, the descriptive survey model was used because it was aimed to determine the attitudes of high school students towards mind and intelligence games and the relational survey model was used together because the differentiation of attitudes according to some demographic variables was examined.

Population and Sample of the Study

The population of the study consists of 800 students studying in different departments of Konya Selçuklu Türk Telekom Vocational and Technical Anatolian High School in the 2023-2024 academic year. The sample of the study consists of 192 students who were determined according to the convenience sampling method and who participated in accordance with the principle of voluntariness. The findings regarding the demographic characteristics of the students participating in the study are presented in Table 1.

Table 1

Descriptive Statistics of Demographic Variables (n=192)

Category	Variable	n	%
Gender	Girl	40	20,8
	Male	152	79,2
Classroom	9	4	2,1
	10	73	38,0
	11	72	37,5
	12	43	22,4
	Never Read	2	1,0
	Primary School	94	49,0
	Middle School	35	18,2

Mother Education Level	High School	46	24,0
	Associate degree	3	1,6
	License	10	5,2
	Postgraduate	2	1,0
	Never Read	2	1,0
	Primary School	43	22,4
Father's Education Level	Middle School	46	24,0
	High School	64	33,3
	Associate degree	11	5,7
	License	20	10,4
	Postgraduate	6	3,1
Family Income Level	17,001 TL and below	48	25,0
	17.002 TL - 45.000 TL	120	62,5
	Over 45.000 TL	24	12,5
Status of Previous Training on Intelligence Games	Yes	70	36,5
	No	122	63,5

As can be seen in Table 1, among the 192 students who participated in the survey, 20.8% (40 students) were female and 79.2% (152 students) were male. Of the participating students, 2.1% (4 students) were 9th grade students, 38% (73 students) were 10th grade students, 37.5% (72 students) were 11th grade students, and 22.4% (43 students) were 12th grade students. While 1% (2 students) of the students had never been to school, 49% (94 students) had primary school diplomas, 18.2% (35 students) had secondary school diplomas, 24% (46 students) had high school diplomas, 1.6% (3 students) had associate's degrees, 5.2% (10 students) had undergraduate degrees and 1% (2 students) had graduate degrees. While 1% (2 students) of the students' fathers had never been to school, 22.4% (43 students) had primary school diplomas, 24% (46 students) had secondary school diplomas, 33.3% (64 students) had high school diplomas, 5.7% (11 students) had associate's degrees, 10.4% (20 students) had undergraduate degrees and 3.1% (6 students) had graduate degrees. It was observed that 25% (48 students) had a family income of less than 17,001 TL per month, 62.5% (120 students) had a family income between 17,002 TL - 45,000 TL per month and 12.5% (24 students) had a family income of more than 45,000 TL per month. Of the participant students, 36.5% (70 students) stated that they had received a training on mind and intelligence games before and 63.5% (122 students) stated that they had not received any training before.

Data Collection Tools

The questionnaire consists of two main parts. In the first part of the questionnaire, the 22-item Attitude Toward Mind Games Scale developed by Kurupınar & Aydoğan (2020) was included. In the second part of the questionnaire form, there are 6 items containing the demographic characteristics of the participants created by the researcher (gender, grade, mother's education level, father's education level, family income level, whether they have attended a training on mind and intelligence games before).

Data Analysis

Permission was obtained from the authors for the use of the scale electronically. SPSS 21.0 program was used in the process of analyzing the research data. Since items 2-4-6-8-11-14-15-18-19-20 and 22 of the negative attitude factor in the questionnaire form were inverted items, the data obtained during coding into the SPSS program were reversed.

In order to see the attitudes of the participants towards mind and intelligence games, arithmetic mean, one of the measures of central tendency, and standard deviation, one of the measures of dispersion, were used to see the homogeneity of the data on the axis of their centers. Score range coefficients were used to evaluate the answers given to the items in the scale. The scale was organized as a Likert-type five-point scale and the relevant score ranges were determined between 1,00-1,79 "Strongly Disagree", between 1,80-2,59 "Disagree", between 2,60-3,39 "Undecided", between 3,40-4,19 "Agree" and between 4,20-5,00 "Strongly Agree". Since the coding of the reverse items in the scale was corrected, the evaluations were carried out accordingly.

Before starting the analyses for the difference tests, it was examined whether the data were normally distributed. These data will provide us with parametric or nonparametric options in deciding which analysis technique to use. At this stage, since the data set was larger than 50, the Kolmogorov Smirnov Goodness of Fit Test was performed, and the skewness and kurtosis values of the data were also examined. Regarding the normal distribution findings, if it is determined that the data are normally distributed, parametric tests are planned to be used in differentiation tests, and if it is determined that the data are not normally distributed, nonparametric tests are planned to be used.

Validity and Reliability of the Study

In order to measure students' attitudes towards mind and intelligence games, the "Attitude Towards Intelligence Games Scale" consisting of 22 items developed by Karapınar & Aydoğan (2020) with a validity and reliability study was used. As a result of the analysis, a three-factor structure emerged and this structure explained 53.35% of the total variance. The factors obtained as a result of construct validity were labeled as Negative Attitude (11 items), Positive Attitude (6 items) and Behavioral Item (5 items) sub-dimensions. Item-test correlations ranged between 0.50 and 0.82, while Cronbach's alpha reliability coefficients of the scale ranged between 0.81 and 0.89. The Cronbach's alpha coefficient of the whole scale was determined as 0.89. According to these data, it can be stated that the scale used in the study has a high degree of reliability.

Ethical Considerations

In this study, all information was obtained and presented within the framework of ethical behavior and academic rules. In addition, when the works of others were utilized, the sources were cited in accordance with scientific rules and added to the list of references by citation. In order to use the data collection tool used in this study, permission was obtained via e-mail from the researchers who prepared the scale. The scale was applied to

the teachers in the sample with the help of an online form. The teachers participated voluntarily in filling out the scale used for the research.

Ethical Review Board: Necmettin Erbakan University Social and Behavioral Sciences Institutional Review Board Ethics Committee

Date of Ethics Review Decision: 01/03/2024

Ethics Assessment Document Issue Number: 2024/207

Findings

The average and standard deviation values of the data obtained from the research are presented in Table 2. Accordingly, it was determined that the participant students had an attitude towards mind and intelligence games at the level of participation ($x=3,47$). When the attitudes of the students were examined in terms of sub-factors, it was seen that they had a disagree level attitude towards the negative attitude factor ($x=2,34$), an agree level attitude towards the positive attitude factor ($x=3,70$) and an undecided level attitude towards the behavioral element factor ($x=2,81$). When a comparison was made between the sub- factors, it was determined that the highest attitude was positive attitude, followed by behavioral element and negative attitude respectively. It is seen that the relatively positive attitude factor has a significantly higher average attitude than the other factors.

Table 2

Mean Values Regarding Participants' Attitudes Towards Mind and Intelligence Games

No	Articles	Average	Standard Deviation
Negative Attitude Factor		2,3442	,64639
2	Brain games do not socialize people.	2,4740	1,18425
4	Brain teasers do not develop attention skills.	1,9792	1,00761
6	I don't want to work on brain teasers.	2,6406	1,04907
8	I get bored quickly when I play brain teasers.	2,7031	1,19790
11	I don't want to be friends with people who play brain teasers.	2,0937	1,09332
14	I feel uncomfortable when I see people playing brain teasers.	1,9531	1,00932
15	I don't watch videos teaching brain teasers.	2,8698	1,24855
18	There is no benefit to playing brain teasers.	1,9375	1,09556
19	I would not want to use brain teasers in lessons/activities.	2,3854	1,14745
20	I can't finish a mind game I've started.	2,2552	1,02965
22	I don't want to be a member of communities that play brain teasers.	2,4948	1,07809
Positive Attitude Factor		3,6997	,84145
1	I would like to receive training on brain teasers.	3,1875	1,29285
3	I think that brain teasers should be supported by official institutions.	3,7083	1,10132
5	Brain games increase problem solving skills.	4,0521	,94752
7	I would like to be someone who plays brain teasers well.	3,7344	1,13362
9	I think every school should have an environment where brain teasers can be played.	4,0208	1,12542
13	I would like to see brain teaser competitions at the national level.	3,4948	1,17120
Behavioral Item Factor		2,8156	,78625

10	I read publications on brain teasers.	2,5260	1,05322
12	I play brain teasers with electronic devices whenever I can.	3,1198	1,24540
16	In my free time, I play brain teasers with people around me.	3,0938	1,17191
17	I share posts about brain teasers on social media.	2,2083	1,01730
21	When I see a different brain teaser that interests me, I buy it.	3,1302	1,17955
Mean for the Whole Scale		3,4768 *	,56517

* While calculating the average attitude level for the whole scale, the items in the Negative Attitude factor were reversed

Before proceeding to the analyses for the difference tests, the normal conditions of the data were examined. At this stage, since the data set was larger than 50, the Kolmogorov Smirnov Goodness of Fit Test was performed, and the skewness and kurtosis values of the data were also examined. The normality test findings of the obtained data are shown in Table 3.

Table 3

Normality Test Results

Variable	Skewness and Kurtosis Values		Kolmogorov-Smirnov Test		
	Skewness	kurtosis	Statistics	Standard Error	p
Factor 1. Negative Attitude	-,636	1,344	,081	192	,004
Factor 2. Positive Attitude	-,693	,335	,104	192	,000
Factor 3. Behavioral Element	,131	,300	,083	192	,002
Attitudes towards Mind and Intelligence Games	-,101	,125	,050	192	,200*

Tabachnick & Fidell (2013) emphasize that if the kurtosis and skewness values are within the range of +1.5 and -1.5, the data exhibit a normal distribution. According to the normality findings obtained from Table 3, skewness and kurtosis values of the data showed normal distribution findings in all sub-dimensions and attitudes towards the whole scale. However, the findings of the Kolmogorov-Smirnov Test show that the data for the whole scale do not exhibit a normal distribution, while the findings for the factor sub-dimensions show normal distribution. For this reason, Pearson Correlation Analysis, which shows the assumptions of normal distribution, was performed when examining the correlation findings between factors. However, nonparametric tests were used to test the participants' attitudes towards mind and intelligence games according to some demographic variables.

Kaiser Meyer Olkin (KMO) and Bartlett values of the Attitude Towards Intelligence Games Scale used in the study were analyzed. As a result, KMO value was found to be 0.827 and Bartlett value was found to be significant ($\chi^2 = 1460,271$, $df=231$, $p=0.000$). In addition, the variance explanation rate of the 3-factor structure was determined as 47.543%. In Table 4, Pearson Correlation Analysis findings are presented to examine the relationships between the factors.

Table 4

Relationships between Factors

Factor	Factor 1 Negative Attitude	Factor 2 Positive Attitude	Factor 3 Behavioral Element
Factor 1. Negative Attitude	1		
Factor 2. Positive Attitude	,428** (p=,000)	1	
Factor 3. Behavioral Elem.	,187** (p=,009)	,551** (p=,000)	1

** Correlation is significant at 0.01 level.

According to the findings obtained from Table 4, significant relationships were found between all factors at the 0.01 level. Table 5 shows the number of items and Cronbach's alpha values for the factors and the whole scale.

Table 5

Number of Items and Cronbach's Alpha Values of the Scale and Factors

Factor	Number of Articles	Cronbach's Alpha
Factor 1. Negative Attitude	11	,807
Factor 2. Positive Attitude	6	,837
Factor 3. Behavioral Element	5	,728
Attitude Scale Towards Mind and Intelligence Games	22	,860

According to the findings in Table 5, the reliability level was found to be high in all factors and the entire scale. While Cronbach's alpha reliability coefficient values were found between .728 and .837 in the factors, Cronbach's alpha reliability coefficient for the whole scale was found to be .860. Accordingly, it can be said that the scale is sufficiently reliable.

For the second sub-objective of the study, nonparametric tests were used to determine whether high school students' attitudes towards mind and intelligence games differed in terms of a) gender, b) grade level, c) mother's education level, d) father's education level, e) family income status, f) previous participation in a training on mind and intelligence games.

Mann-Whitney U Test was conducted to examine whether high school students' attitudes towards mind and intelligence games differed according to gender and the findings are shown in Table 6.

Table 6

Mann-Whitney U Test Results Regarding the Attitude Levels of High School Students Towards Mind and Intelligence Games According to Gender

Variables	Categories	N	Row Mean.	sd	χ^2	p
Attitudes towards Mind and Intelligence Games	Girl	40	97,98	312,544	2.981,000	,850
	Male	152	96,11			

Mann Whitney U Test was used to reveal the differences between male and female students' attitudes towards mind and intelligence games. According to the results obtained in Table 6, it was determined that the attitude scores towards mind and intelligence games did not differ statistically significantly according to gender ($U=2.981,000$, $p=0.85$).

Kruskal Wallis H Test was conducted to examine whether high school students' attitudes towards mind and intelligence games differed according to their grades and the findings are shown in Table 7.

Table 7

Kruskal Wallis H Test Results Regarding the Attitude Levels of High School Students Towards Mind and Intelligence Games According to Their Grades

Variables	Categories	N	Row Mean.	χ^2	p
Attitudes towards Mind and Intelligence Games	9	4	74,88	,744	,863
	10	73	98,68		
	11	72	96,26		
	12	43	95,21		

Kruskal Wallis H Test was used to reveal the differences in students' attitudes towards mind and intelligence games according to their grades. According to the results obtained in Table 7, it was determined that the attitude scores towards mind and intelligence games did not differ statistically significantly according to the classes ($H=0,744$, $p=0,863$).

Kruskal Wallis H Test was conducted to examine whether high school students' attitudes towards mind and intelligence games differed according to their mother's education level. The findings obtained are presented in Table 8.

Table 8

Kruskal Wallis H Test Results Regarding High School Students' Attitude Levels Towards Mind and Intelligence Games According to Mother's Education Status

Variables	Categories	N	Row Mean.	χ^2	p
Attitudes towards Mind and Intelligence Games	Never Read	2	102,75	1,726	,943
	Primary School	94	97,89		
	Middle School	35	88,63		
	High School	46	100,66		
	Associate degree	3	87,33		
	Undergraduate	10	88,45		
	Postgraduate	2	121,00		

Kruskal Wallis H Test was used to reveal the differences in students' attitudes towards mind and intelligence games according to their mother's education status. According to the results obtained in Table 8, it was determined that the attitude scores towards mind and intelligence games did not differ statistically significantly according to the mother's education level ($H=1,726$, $p=0,943$).

Kruskal Wallis H Test was conducted to examine whether high school students' attitudes towards mind and intelligence games differed according to their father's education level. The findings obtained are presented in Table 9.

Table 9

Kruskal Wallis H Test Results Regarding the Attitude Levels of High School Students Towards Mind and Intelligence Games According to Father's Education Status

Variables	Categories	N	Row Mean.	χ^2	p
Attitudes towards Mind and Intelligence Games	Never Read	2	64,25	6,549	,365
	Primary School	43	95,87		
	Middle School	46	97,68		
	High School	64	96,91		
	Associate degree	11	123,91		
	Undergraduate	20	94,00		
	Postgraduate	6	56,42		

Kruskal Wallis H Test was used to reveal the differences in students' attitudes towards mind and intelligence games according to their father's education level. According to the results obtained in Table 9, it was determined that the attitude scores towards mind and intelligence games did not differ statistically significantly according to the father's education level ($H=6,549$, $p=0,365$).

Kruskal Wallis H Test was conducted to examine whether high school students' attitudes towards mind and intelligence games differed according to the income status of the family. The findings obtained are presented in Table 10.

Table 10

Kruskal Wallis H Test Results Regarding High School Students' Attitudes Towards Mind and Intelligence Games According to Family Income Status

Variables	Categories	N	Row Mean.	χ^2	p
Attitudes towards Mind and Intelligence Games	Under 17.001 TL	48	95,56	,631	,729
	17.002 TL - 45.000 TL	120	98,43		
	Over 45.000 TL	24	88,71		

The Kruskal Wallis H Test was used to reveal the differences in students' attitudes towards mind and intelligence games according to family income status. According to the results obtained in Table 10, it was determined that the attitude scores towards mind and intelligence games did not differ statistically significantly according to family income status ($H=0,631$, $p=0,729$).

Mann-Whitney U Test was conducted to examine whether the attitudes of high school students towards mind and intelligence games differed according to whether they had received a training on mind and intelligence games before. The findings obtained are presented in Table 11.

Table 11

Mann-Whitney U Test Results Regarding the Attitude Levels of High School Students According to Whether They Have Received a Training on Mind and Intelligence Games Before or Not

Variables	Categories	N	Row Mean.	sd	χ^2	p
Attitudes towards Mind and Intelligence Games	Trained	70	100,86	370,415	3.964,500	,410
	No Trained	122	94,00			

Mann Whitney U Test was used to reveal the differences in students' attitudes towards mind and intelligence games according to whether or not they had received any previous education. According to the results obtained in Table 11, it was determined that the attitude scores towards mind and intelligence games did not differ statistically significantly according to whether or not they had received a training on this subject before ($U=3.964,500$, $p=0,41$).

CONCLUSION, DISCUSSION AND RECOMMENDATION

Key Findings

Mind and intelligence games have shown significant effects on a variety of factors such as students' academic performance, class participation and motivation to learn. However, as these studies only focus on specific disciplines, there remains a gap in the literature regarding the framework for learning across academic programs. As a result, the efficient integration of mind and intelligence games into the educational process has become an important area for academic research. (Vlachopoulos & Makri, 2017, p. 15).

According to the findings obtained from the analysis of the data obtained with the participation of 192 high school students, it was determined that high school students had an attitude towards mind and intelligence games at the level of participation ($x=3.47$). Discussions in the academic literature are generally in the direction that mind and intelligence games are seen as fun by students (Ketamo, 2013; Meijering et al., 2018). In this context, while the main expectation was that the students' attitudes towards mind and intelligence games would be positive at a high level, it was found to be at a relatively lower level but still positive. It is thought that the reason for this situation is that the students have not interacted with mind and intelligence games at a sufficient level in their schools and therefore do not know mind and intelligence games sufficiently.

Another finding obtained in the research is in terms of the sub-dimensions of attitude towards mind and intelligence games. Accordingly, it was observed that students had a disagree level attitude towards the negative attitude factor ($x=2,34$), an agree level attitude towards the positive attitude factor ($x=3,70$) and an undecided level attitude towards the behavioral element factor ($x=2,81$). When a comparison was made between the sub-factors, it was determined that the highest attitude was in the positive attitude factor, followed by the behavioral element and the negative attitude factor, respectively. It is seen that the relatively positive attitude factor has a significantly higher average attitude than the other

factors. This result was generally as expected. This result shows that high school students have a relatively high level of attitude towards mind and intelligence games, albeit lower than expected, but this attitude is not reflected in behavior at the same level.

Unexpected Results

Therefore, it was evaluated that there is a need for various searches to increase the level of positive attitude in students, but there is also a need for strategies to transform this attitude into behavior. Because the positive attitude at the level of participation ($x=3,70$) turns into behavior at the level of ambivalence ($x=2,81$). However, the fact that the lowest factor is in the negative attitude factor ($x=2,34$) is considered as a positive situation.

In addition, the level of differentiation of high school students' attitudes towards mind and intelligence games was examined according to gender, grade level, mother's education level, father's education level, family income level and participation in a training on mind and intelligence games before. According to the findings obtained from Mann-Whitney U and Kruskal-Wallis H Tests, it was determined that high school students' attitudes towards mind and intelligence games did not differ statistically significantly according to any demographic variable.

Budak & Saban (2023) analyzed 44 studies, 21 of which were theses and 23 articles, in their research on the examination of scientific research on mind and intelligence games in 2014-2022. According to the findings obtained by the researchers, 10 of the studies published in the literature between these dates were conducted on teachers, 6 on prospective teachers, 1 on preschool students, 6 on primary school students, 11 on secondary school students and 1 on parents, and the remaining 9 were evaluated in other categories such as document review, book review, etc. (Budak & Saban, 2023, p. 895). The most important finding concerning our research is that there is no research on the high school sample group in the literature between the relevant dates. Therefore, there is no research in the literature on mind and intelligence games in the universe of high school students. As a result, this study is the first research on mind and intelligence games that takes high school students as the study group. In this respect, it is thought to make important contributions to the literature.

Policy Implications

One of the factors affecting the positive gains of the integration of mind and intelligence games into lessons is the student's attitude towards it. In fact, it would be quite realistic to develop assumptions that the gains obtained by students with positive attitudes towards mind and intelligence games are more than students with relatively low levels of positive attitudes. In this context, examining students' attitudes towards mind and intelligence games and thus determining the current situation can provide important contributions to teachers, school administrators, educational administrators, families and researchers working on this subject. In addition, determining some demographic characteristics that affect students' attitude levels is very meaningful in terms of guiding the educational policies to be developed in this regard. In this context, our study is very valuable

in terms of determining the attitudes of high school students towards mind and intelligence games and some demographic characteristics affecting their attitudes.

It was assumed that the participants responded to the data collection tools used in the study in a way that reflected their true thoughts and that there was no interaction between the participating students during the implementation of the questionnaires that would affect the results of the research. It was also assumed that the students who participated in the surveys had the competence to comprehend and understand the meaning of the scale items and to code them, and that there were no external factors (e.g. teacher pressure, etc.) that would affect the feelings and thoughts of the participating students. The findings obtained in the study are limited to the data obtained from 192 students studying in a public school in Selçuklu district of Konya province in the 2023-2024 academic year and the responses of the participant students to the data collection tools used.

REFERENCES

- Adalıyılmaz, F. (2022). *Akıl ve Zeka oyunları Öğretiminin Bilgi İşlemsel Düşünme Becerileri Erişimine Etkisi ve Bu Konuda Öğrenci Görüşleri [The Effect Of Teaching Mind And Intelligence Games On Achievement Of Computational Thinking Skills And Student Opinions On This Topic]* [Master's Thesis]. Necmettin Erbakan University Institute of Educational Sciences.
- Allen, K. R., Brändle, F., Botvinick, M. M., Fan, J., Gershman, S. J., Gopnik, A., Griffiths, T. L., Hartshorne, J. K., Hauser, T. U., Ho, M. K., De Leeuw, J. R., Ma, W. J., Murayama, K., Nelson, J. D., Van Opheusden, B., Pouncy, H. T., Rafner, J., Rahwan, I., Rutledge, R., ... Schulz, E. (2023). *Using Games to Understand the Mind*. 1035–1043 (2024). <https://doi.org/10.1038/s41562-024-01878-9>
- Altura, G. J., & Curwood, J. S. (2015). Hitting Restart: Learning and Gaming in an Australian Classroom. *Journal of Adolescent & Adult Literacy*, 59(1), 25-27. <https://doi.org/10.1002/jaal.438>
- Angin, N. (2022). *Investigation of the Effect of Mind and Intelligence Games Applications on the Attitude, Motive and Learning Strategies of Middle School 7th Grade Students towards Mathematics Course* [Master's Thesis]. Aydın Adnan Menderes University Institute of Science and Technology.
- Ayar, A. (2022). *Akıl ve Zeka Oyunlarının İlkokul 4. Sınıf Öğrencilerinin Yaratıcı Düşünme, Üst Bilişsel Farkındalık, Dikkat ve Sosyal Skeri Düzeylerine Etkinin İncelenmesi [The Effects of Mind and Intelligence Games in Primary School: An In-depth Analysis]* [Master's Thesis]. Ege University Institute of Educational Sciences.
- Baş, O., Kuzu, O., & Gök, B. (2020). The Effects of Mind Games on Higher Level Thinking Skills in Gifted Students. *Journal of Education and Future*, 17, 1-13. <https://doi.org/10.30786/jef.506669>
- Bizer, G. Y., Barden, J. C., & Petty, R. E. (2006). Attitudes. In L. Nadel (Ed.), *Encyclopedia of*

Cognitive Science (1st bs). Wiley. <https://doi.org/10.1002/0470018860.s00483>

- Bottino, R. M., Ott, M., & Tavella, M. (2013a). Children's Performance with Digital Mind Games and Evidence for Learning Behavior. In M. D. Lytras, D. Ruan, R. D. Tennyson, P. Ordonez De Pablos, F. J. García Peñalvo, & L. Rusu (Eds.), *Information Systems, E-learning, and Knowledge Management Research* (Vol. 278, pp. 235-243). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-35879-1_28
- Bottino, R. M., Ott, M., & Tavella, M. (2013b). Investigating the Relationship Between School Performance and the Abilities to Play Mind Games. In *Proceedings of the European Conference on Games Based Learning*, 62-71.
- Budak, D., & Saban, A. İ. (2023). Investigation of Scientific Research on Mind and Intelligence Games. *National Journal of Education*, 3(5), 890-904. <https://doi.org/10.5281/ZENODO.8070101>
- Cabrillos, L. E., Gapasin, J. D., Marfil, J. A., & Jr, V. L. C. (2023). Examining the Effects of Online Games on The Academic Performance of BPed Students of Sultan Kudarat State University, Philippines. *Indonesian Journal of Educational Research and Technology*, 3(1), 13-18. <https://doi.org/10.17509/ijert.v3i1.43732>
- Çağan, B., & Usta, N. (2023). Investigation of the Effect of Mind and Intelligence Games on Mathematics Achievement of Secondary School Students. *The Journal of Academic Social Resources*, 8(52), 3331-3341. <https://doi.org/10.29228/ASRJOURNAL.71353>
- Çalışkan, M., & Şahin, A. (2022). Parent Attitude Scale Towards Mind and Intelligence Games. *Uşak University Journal of Social Sciences*, XV(2), 1-13.
- Çalışkan, S. H. (2019). *Teacher and Student Opinions on the Secondary School Zekâ Games Course Curriculum* [Master's Thesis]. Hacettepe University Institute of Educational Sciences.
- Dokumacı Sütçü, N. (2021). Thematic and Methodological Analysis of Scientific Research on Intelligence Games. *Electronic Journal of Social Sciences*, 20(78), 988-1007. <https://doi.org/10.17755/esosder.826045>
- Ekiçi, M., Öztürk, F., & Adalar, H. (2017). Prospective Social Studies Teachers' Opinions on Intelligence Games. *Researcher Social Science Studies*, 5(IV), 489-502.
- Esen, M. (2019). *Investigation of the Effect of Zekâ Games on 4th Grade Students' Decision- Making Skills Related to Problem Solving, Patience Behavior and School Doyum* [Master's Thesis]. Mersin University Institute of Educational Sciences.
- Gabrito, R. C., Ibañez, R. Y., & Velza, J. F. P. (2023). Impact of Online Gaming on the Academic Performance of DEBESMSCAT-Cawayan Campus Students. *Scientific Journal of Informatics*, 10(4), 423-434. <https://doi.org/10.15294/sji.v10i4.45007/>
- Gençay, Ö. A., Gür, E., Gençay, S., Gür, Y., Tan, M., & Gençay, E. (2019). The Effect of Intelligence Games on Aggression Behaviors of 12-15 Year Old Children. *Journal of Sport Education*, 3(1), 36-43.

- Güneş, D., & Yünkül, E. (2021). Classroom Teachers' Evaluations on the Use of Mind and Intelligence Games in Primary School. *International Journal of Academy of Social Sciences*, 3(5), 784-803. <https://doi.org/10.47994/usbad.893591>
- Ikhianosime, F. E., & Akalue, A. I. (2021). Conceptualizing the Mind in Western Philosophical Tradition. *AMAMIHE: Journal of Applied Philosophy*, 19(1), 82-95. <https://doi.org/10.13140/RG.2.2.36675.73766>
- Kaleci, F. (2018). *Application and Effectiveness of In-Service Training Program for Integration of Information and Communication Technologies into Mathematics Education Process* [Doctoral Dissertation]. Necmettin Erbakan University Institute of Educational Sciences.
- Kama Yılmaz, Ş. (2019). *Teachers' Opinions on Elective Zekâ Games Course* [Master's Thesis]. Balıkesir University Institute of Science and Technology.
- Kel, S., & Kul, B. (2021). Contributions of Mind and Intelligence Games to Students: Opinions of Educators. *International Journal of Science and Education*, 4(3), 207-225. <https://doi.org/10.47477/ubed.840868>
- Ketamo, H. (2013). Learning Analytics with Games Based Learning. In P. Escudeiro & C. DeCarvalho (Eds.), *Satakunta University of Applied Sciences* (pp. 284-289).
- Kumar, D.P., Deepa. S.D., & Bhoomika, A.V. (2023). Effect of Brain Games and Physical Activity in the Improvement of Academic Performance in School Children-A Comparative Study. *Korean Journal of Physiology and Pharmacology*, 27(4), 618- 623. <http://kjppor.com/index.php/kjpp/article/view/411>
- Koklu, N., & Sulak, S. A. (2021). World geography with augmented reality. *International Journal of Progressive Sciences and Technologies*, 29(1), 94-108.
- Kurupınar, A., & Aydoğan, Y. (2020). Development of the Attitude Scale Towards Intelligence Games (ZOTÖ): Validity and Reliability Study. *Turkish Studies- Educational Sciences*, 15(6), 4383-4400. <https://doi.org/10.47423/TurkishStudies.46454>
- Marangoz, D., & Demirtaş, Z. (2017). The Effect of Mechanical Intelligence Games on the Mental Skill Levels of Primary School 2nd Grade Students. *Journal of International Social Research*, 10(53), 612-621. <https://doi.org/10.17719/jisr.20175334149>
- Meijering, B., Taatgen, N., Verbrugge, R., Wierda, S., & van Rijn, H. (2018). Stepwise Training Supports Strategic Second Order Theory of Mind in Turn Taking Games. *Judgment and Decision Making*, 13(1), 79-98. <https://doi.org/10.1017/S1930297500008846>
- Perinbanayagam, R. S. (2006). *Games and Sport in Everyday Life: Dialogues and Narratives of the Self* (C. 37). Paradigm Publishers. <https://doi.org/10.4324/9781315634555>
- Saygi, E., Umay, A., & Alkaş Ulusoy, Ç. (2016). Primary Mathematics Teachers' Opinions on Intelligence Games Course. *Hacettepe University Journal of Education*, 32(2), 280-294. <https://doi.org/10.16986/HUJE.2016018494>

- Sulak, S. A., & Koklu, N. (2024). Analysis of Depression, Anxiety, Stress Scale (DASS-42) With Methods of Data Mining. *European Journal of Education*, e12778. <https://doi.org/10.1111/ejed.12778>
- Şanlıdağ, M., & Aykaç, N. (2021). The Effect of Intelligence Games Course on Students' Mathematics Problem Solving Attitudes and Reflective Thinking Skills Towards Mathematics Problem Solving. *Muğla Sıtkı Koçman University Journal of Faculty of Education*, 8(2), 597-611. <https://doi.org/10.21666/muefd.846312>
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics* (Sixth Edition). Pearson.
- Turkish Language Association TDK Dictionary*. (2023). <https://sozluk.gov.tr/?kelime=zekâ>
- Türkoğlu, B., & Uslu, M. (2016). The Effect of Game-Based Cognitive Development Program on Cognitive Development of 60-72 Month Old Children. *International Journal of Educational Sciences*, 3(6), 50-68.
- Vlachopoulos, D., & Makri, A. (2017). The Effect of Games and Simulations on Higher Education: A Systematic Literature Review. *International Journal of Educational Technology in Higher Education*, 14(1), 1-33. <https://doi.org/10.1186/s41239-017-0062-1>
- Whitton, N. (2013). Games for Learning: Creating a Level Playing Field or Stacking the Deck? *International Review of Qualitative Research*, 6(3), 424-439. <https://doi.org/10.1525/irqr.2013.6.3.424>
- Williams, C. (2007). Research Methods. *Journal of Business & Economic Research*, 5(3), 65- 72. <https://doi.org/10.19030/jber.v5i3.2532>
- Yağlı, M. C. (2019). *Zeka Oyunlarının İlkokul Öğrencilerinin Dikkat ve Görsel Algı Düzeylerine Etkisi [Intelligent games to the attention and visual perception levels of the primary school students]* [Master's Thesis]. Çanakkale Onsekiz Mart University Institute of Educational Sciences.
- Yılmaz, Ş., & İkikardeş, N. Y. (2020). Secondary School Teachers' Opinions on the Intelligence Games Course. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education*, 14(1), 528-576. <https://doi.org/10.17522/balikesirnef.671642>

Data Availability Declaration

Data Availability Upon Formal Request:

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

*Multiple Authors with Distinct Roles:**Author Contributions:*

Süleyman Alparslan Sulak spearheaded the conceptualization, designed the research methodology, and supervised the entire project. Neslihan Erbaşı was responsible for the data collection, analysis, and interpretation, bringing analytical rigor to the study. Süleyman Alparslan Sulak took the lead in drafting the manuscript, ensuring its alignment with scholarly standards, and revising it for intellectual depth. All authors collaboratively discussed the results, provided critical insights, and contributed to the final manuscript. They have read, approved, and take joint accountability for the presented work's accuracy and integrity.

Author(s)' statements on ethics and conflict of interest

Ethics statement: We hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. We take full responsibility for the content of the paper in case of dispute.

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The Effect of Prosocial Behavior Psychoeducation Program on Problematic Behaviors and Self-Regulation Skills of 5-6 Year-Old Children¹

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Abstract:

The purpose of this study was to investigate how a prosocial behavior psychoeducation program affected the problem behaviors and self-regulation abilities of preschoolers. In the study that employed the experimental research technique, a pretest-posttest control group was part of a quasi-experimental design. In the 2nd semester of the 2023–2024 academic year, there were 16 students in the experimental group and 18 in the control group, all of whom were preschoolers in the 5–6 age range. Data were gathered using the Problem Behavior subscale of the Preschool and Kindergarten Behavior Scale and the Self-Regulation Skills Scale for 4-6 Year-Old Children. It was determined that there was a significant difference in favor of positive ranks between the pre-test and post-test mean scores of the experimental group children regarding the inhibitory control-emotion subscale and self-regulation skills total. It was determined that there was a significant difference in favor of negative ranks between the pre-test and post-test mean scores of the experimental group children regarding the problem of expression, learning problems, and total values of problem behavior. Significant improvements were recorded in the variables considered in the experimental group after only nine weeks of training, demonstrating the effectiveness and feasibility of implementing age-appropriate programs in early childhood classrooms to improve children's social-emotional competence by enhancing their self-regulation skills and reducing problem behaviors.

Keywords: Child, problem behavior, prosocial behavior, self-regulation.

Citation:

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INTRODUCTION

Preschool, which offers unique opportunities to form the basis for healthy development, is a period in which many developmental experiences and skills are acquired. It is important that the first experiences of prosocial behaviors, which are considered as a part of social emotional development and are important for the harmonious functioning of societies, are built on solid foundations during this period. Prosocial behavior, which aims to benefit others, is generally accepted as the basis of human relations (Eisenberg & Fabes, 1998; Staub, 1979, as cited in Knafo & Plomin, 2006). Prosocial behavior is defined as behavior that aims to benefit others without seeking any benefit (Eisenberg et al., 2006, p.646). Prosocial behaviors are defined as a multidimensional structure that includes behaviors such as consoling people, offering psychological assistance, cooperating, helping, protecting, exchanging resources, and empathizing (Brownell et al., 2009; Carlo & Randall, 2001; Hay & Cook, 2007; Hogg & Vaughan, 2007). Prosocial behavior occurs when an individual recognizes the negative experiences of others, determines the causes of these experiences, generates an appropriate response, and takes action to intervene. This behavior is shaped by intuitive, automatic, and emotion-based evaluations that require understanding the negative situations of others and determining their causes (Geraci & Franchin, 2021). According to the literature, children around 18 months of age can show help and sharing, and make an effort to soothe a person who appears upset (Brownell et al., 2009). These behaviors, which increase in frequency and variety from the age of two, are motivated by empathic concern, which is defined as an emotional response for another person, including sensing another's distress or attending to their distress and needs (Eisenberg et al., 2006; Hoffman, 2000; Zahn-Waxler et al., 1992). Gaining the capacity to recognize and act upon clear indications from others, who express their wants or wishes, may be necessary to cultivate the ability to freely share important resources with others. When young children have the ability to empathic approach, this contributes to the development of their mental capacity. With these developing skills, children are increasingly conscious of the suffering of others and begin to interpret and respond more appropriately (Landers, 1991). The preschool period is when children can comprehend their own behaviors and shape them accordingly by understanding the reasons for their own and others' behaviors (Sepitci & Gültekin, 2019). In this process, the development of children's prosocial actions largely depends on their ability to regulate themselves (Liew, 2012; Riggs et al., 2006). The capacity of the youngster to effectively manage their conduct is referred to as self-regulation, and it is a broad concept that encompasses cognitive, emotional, and social processes (Dan, 2016). Self-regulation, according to Vallotton and Ayoub (2011), is a fundamental social skill that helps children engage with peers and adults, take part in educational activities, and adjust to novel or difficult circumstances. The behavioral components of this ability are described as "using focus adaptability, memory retention, and inhibitory control over actions" by researchers studying self-regulation in the context of education (McClelland & Cameron, 2011, p.32). Self-regulation skills consist of three

interrelated domains: emotional, behavioral, and cognitive self-regulation. Cognitive self-regulation includes the skills of problem solving, focusing attention, making decisions, and using cognitive skills flexibly; emotional self-regulation includes the ability to manage and regulate emotional states that facilitate adaptive functioning; behavioral self-regulation encompasses the ability to regulate behavior in a goal-directed manner, control impulses, and exhibit rule-compliant behavior (Blair, 2002; Murray et al., 2015). Attention and emotional regulation appear to be interrelated in children's early years (Williams et al., 2017). Emotional regulation capacity aids in their calming down after experiencing emotional discomfort, which gives them more resources and time to direct their attention to other elements in the environment. Similarly, the ability to pay attention to environmental and social cues plays a supporting role in kids' learning of emotional regulation skills and their use of adult regulatory strategies. Culotta et al. (2024) stated that self-regulation is an important indicator for predicting success in later life and that this skill begins in early childhood and continues to develop throughout life. Accordingly, in early childhood, it is crucial that children learn to use and integrate their regulatory skills. It seems likely that children with stronger self-regulatory skills have a greater capacity to respond to others in prosocial ways. In particular, displaying prosocial behaviors in peer relationships that become more complex as they grow older leads to successful interactions, facilitating peer acceptance, which is expressed as a primary developmental task for preschool children (Corsaro, 1985, as cited in Wang et al., 2018; Rose & Rudolph, 2006). It is thought that the first experiences gained in prosocial behaviors, which are considered as one of the important elements of social emotional development, contribute to the formation of positive behavioral patterns such as social adaptation, cooperation, and empathy in children, as well as affecting their self-regulation skills, which develop rapidly during this period (Greenberg et al., 2003). Lane et al. (2004) said that traits like "following directions" and "controlling anger with peers" are examples of prosocial conduct. In the preschool period, when learning and development progress rapidly and multidimensionally, children are expected to learn to organize their behavior in line with the values of society and to develop healthy relationships with others by minimizing negative behaviors and making positive behaviors a habit (Ramazan & Dönmez, 2018). However, during this period, some undesirable behavioral patterns may be encountered. Problem behaviors are defined as behaviors that prevent an individual from acquiring a new skill, cause exclusion from their environment, harm oneself or others, and are contrary to the social norms of the society in which they live (Kargı & Erkan, 2004; Öz, 1997; Pickens, 2009). Behavior problems have negative effects on both the child and their environment. When problem behaviors cannot be prevented through appropriate educational processes, these habits become ingrained in the child's mentality, raising the likelihood that they eventually develop into unpleasant and violent conduct (Ural et al., 2015). These problem behaviors, which begin at an early age, can cause many young children to be expelled from preschool education institutions, to deteriorate in their social relationships, and to be excluded from their peer group as a result of exhibiting aggressive and destructive behaviors in their communication (Burke et al., 2010; Fox et al.,

2002; Hughes et al., 2000; Gülay-Ogelman & Çiftçi-Topaloğlu, 2014; Şehirli, 2007). Peer relations in the preschool period are the first examples in life and have very important functions that can affect all areas of development. Peer relationships support the formation of environments that will enable the learning and implementation of social skills, social norms and roles, in terms of social development (Merrell & Holland, 1997). Prosocial conduct is thought to be a facet of social competence that influences how well children form relationships with their peers. For this reason, the requirement to examine patterns of social and antisocial conduct in relation to one another is increasingly on the agenda (Zahn-Waxler et al., 1986, as cited in Zahn-Waxler & Smith, 1992). Studies demonstrate an association between prosocial behaviors and positive developmental outcomes; children who exhibit prosocial behaviors have been found to develop positive biases and socially effective response strategies (Nelson & Crick, 1999; Laible et al., 2014). Laible et al. (2014) emphasize that prosocial behaviors have the potential to evoke positive reactions in others, which in turn strengthens children's internalized favorable role models and their faith in other people. Additionally, there is evidence that reduced prosocial behavior is linked to early conduct issues (Barker et al., 2010) and that, five years later, lower levels of prosocial behavior are associated with early externalizing behaviors (Kouros et al., 2010). At this point, preschool education, which provides the opportunity to recognize, nurture, and build the positive social behavior development that blossoms as a consequence of how children engage with their environment, plays a critical role (Edwards et al., 2005; Ellis, 2008).

The preschool education environment is considered an important social area because it offers many opportunities for children to socialize with their classmates (Anthony et al., 2005; Epstein, 2009; Ryan, 2011). It is demonstrated in the literature that there are many studies regarding the importance of some variables (parental attitudes, perception of social support, appropriate friend and parent models, self-perception, etc.) and personal factors (age, gender, socio-economic level, parental variables, etc.) in multi-dimensional terms, in relation to prosocial behaviors (Aydın & Karakelle, 2016; Doescher & Sugawara, 1992; Eisenberg et al., 1999; Gülay-Ogelman & Canbeldek, 2016; Svetlova et al., 2010; Uzmen & Mağden, 2002). In studies on self-regulation skills, problem behaviors, and prosocial behaviors, Caprara et al. (2014) investigated the effects of school-based interventions designed to promote prosocial behavior on aggressive behavior. Williams and Berthelsen (2017) examined the predictive function of early parental approaches on self-regulation skills and prosocial behaviors. Viglas and Perlman (2018) explored the impact of a mindfulness-based technique on self-control, hyperactivity, and prosocial behavior in young children. Eke (2018) investigated the relations between social behaviors, self-regulation skills, and values in preschool children. Ezmeci (2019) investigated the effects of a self-regulation technique on self-regulation, social skills, and problem behavior of preschool children. Yurdakul et al. (2022) investigated the relations between prosocial behaviors and self-regulation skill set in preschool kids. Bozkurt-Polat and Özbey (2021) examined the effects of the social values education system on the self-regulation, social skill

set, and problem behaviors of preschool children. It is thought that self-regulation skills and prosocial behaviors are among the important developmental tasks in early childhood, and should be supported during this period when basic knowledge and skills are acquired.

Conte et al. (2023) investigated the effects of a universal school-based mental health program on preschool children's social-emotional learning competencies, social behaviors, and academic outcomes. Jansen et al. (2024) and Haines et al. (2023) investigated the effects of a mindfulness-based Kindness Program on children's social and emotional functions. Erten and Güneş (2024) investigated the effects of children participating in a mindfulness program on prosocial behavior, physical aggression, and depressive behaviors. Berti and Cigala (2020) and Courbet et al. (2024) investigated the effects of children participating in a mindfulness-based social and emotional learning program on emotional, behavioral, and relational problems. Previous studies have reported that children with prosocial behavior have stronger interpersonal skills and can establish healthy relationships with their peers characterized by trust and warmth. These behaviors play a critical role in children's social-emotional development and promote the formation of healthy peer relationships by providing opportunities for the acquisition of skills such as role-taking, conflict resolution, and cooperation. In this context, prosocial behavior is considered an important characteristic that should be developed in children from an early age (Asscheman et al., 2020; Jambon & Malti, 2022; Rubin et al., 2013). In addition, due to their multifaceted positive outcomes, self-regulation skills and social behaviors are considered among the important developmental tasks in early childhood and should be supported during this period when basic knowledge and skills are acquired. While babies are largely dependent on external regulation in the first years of life, over time, children become more successful in monitoring their own behavior, directing their attention, and regulating their emotional states. This process shows significant development in self-regulation. Children's self-control is often considered one of the positive social skill sets that should be given to all kids (Diamond, 2012; Ritgens vd., 2024). It is considered important to carry out interventions in this direction in early childhood, when both prosocial behaviors and self-regulation skills are further developed, and children face many social and academic difficulties (Raffaelli et al., 2005; Tintori et al., 2021).

Considering the literature, the need for studies that demonstrate how programs that aim to support the development of prosocial behaviors work of preschool children on self-regulation skills and problem behaviors has gained prominence. The program used in this study is designed to support and encourage the development of prosocial behavior and includes various activities suitable for the 5-6 age group. It is thought that the findings will provide important information about how activities that support awareness and development of prosocial behaviors, will contribute to the self-regulation skills of preschool children, and how they will affect their problem behaviors.

Purpose of the Study

The purpose of this study is to examine the effects of educational practices that support the development of prosocial behavior on the self-regulation skills and problem behaviors of children aged 5-6. In this context, answers to the following sub-objectives were sought.

- 1) Is there a significant difference between the pre-test scores of the experiment and control group children in terms of self-regulation skills?
- 2) Is there a significant difference between the pre-test scores of the experiment and control group children in terms of problem behavior?
- 3) Is there a significant difference between the pre-test and post-test scores of the experiment group children in terms of self-regulation skills?
- 4) Is there a significant difference between the pre-test and post-test scores of the experiment group children in terms of problem behavior?
- 5) Is there a significant difference between the pre-test and post-test scores of the control group children in terms of self-regulation skills?
- 6) Is there a significant difference between the pre-test and post-test scores of the control group children in terms of problem behavior?
- 7) Is there a significant difference between the post-test scores of the experiment and control group children in terms of self-regulation skills?
- 8) Is there a significant difference between the post-test scores of the experiment and control group children in terms of problem behavior?

METHOD

Research Model

In this study, the experimental research method was used because it allows the effects of a variable to be observed and is the most valid and reliable way to test cause-effect relationships. In the study, since the researcher carried out the applications in the experimental group during the education and training hours, a separate suitable classroom environment could not be provided also. It was not possible to create subject pairs and assign them to the groups randomly. For this reason, no unbiased assignment was made to the experimental and control groups, and an attempt was made to match two kindergarten classes of a school. The matched groups were assigned to the treatment groups randomly. Accordingly, in the study, an alternative design was used in cases where random assignment could not be made a pre-test-post-test control group quasi-experimental design (Fraenkel & Wallen, 2006 as cited in Büyüköztürk et al., 2012, p.195). The dependent variable of the study are the self-regulation skills and problem behaviors of 5-6 year old children,

and the independent variable is the Educational Practices Supporting the Development of Prosocial Behavior. In the study, the Pre-School Education Program of the Ministry of National Education continued to be applied by the classroom teachers to the children in the experimental and control groups. In addition, the education program created by Bağcı-Çetin (2021) was implemented with the kids in the experimental group. The symbolic view of the research design is given in Table 1.

Table 1

Experimental Procedure

Groups	Pre-test	Procedure	Post-test	Retention-test
GE	O1.1	X	O1.2	O1.3.
GC	O2.1	-	O2.2	

GD: Experiment group,

GK: Control group,

O1.1: Experiment group pre-test,

O1.2: Experiment group post-test,

O1.3. Experiment group retention-test

O2.1: Control group pre-test,

O2.2: Control group post-test measurements,

X: Experimental procedure (Prosocial Behavior Psychoeducation Program applications) (Büyüköztürk et al., 2012, p.208).

Table 1 reveals that, before the experimental procedure was applied, measurements regarding self-regulation skills and problem behaviors were made in both groups (Büyüköztürk et al., 2010, p.212). The experimental procedure was implemented on the experimental group after the pre-test was used on both the experimental and control groups. After the experimental procedure, a post-test was administered to both groups regarding self-regulation skills and problem behaviors. The permanence test was used only for the experimental group.

Study Group

A list showing independent kindergartens and preschool classes affiliated with the Ministry of National Education in the Efeler District of Aydın Province was compiled to create the study group. From this list, the school that allowed the researcher easy access to conduct the application was determined among the schools with at least two classes in the same age group (Büyüköztürk, 2002; Yıldırım & Şimşek, 2000). One of the branches continuing half-day education in the same school was assigned as the experimental group and the other as the control group. In this regard, 16 students from the 5-6 age group who

continued pre-school education in the second semester of the 2023-2024 academic year made up the experimental group and 18 students constituted the control group.

Program Implementation Process

The aim of the program prepared to support the development of prosocial behavior as one of the basic elements of social development of children aged 5-6, is to raise awareness about prosocial behaviors such as empathy, sharing, helping each other, and cooperation. These behaviors have a significant part in ensuring and sustaining social integrity and peace through group life. In this direction, 27 educational situations were used in the preliminary application of two programs designed by Bağcı-Çetin (2021). The content of the program includes emotions, empathy, helping, sharing, cooperation, and comforting/consoling. The program included Turkish language, art, music, games, movements, and drama activities developed by Bağcı-Çetin (2021) or compiled from other sources. During the application process over 9 weeks, a total of 27 educational situations were applied, including preliminary applications, three times a week with the kids in the experiment group. To make the children comfortable, each application started with warm-up games, and various visual and auditory materials (posters, banners, puppets, music, nursery rhymes, books, slide shows, videos, etc.) were used in the activities. At the beginning of the application process, information was provided in accordance with the content of the work to be done that day; the activities in the program were implemented, and the work was supported with short group discussions. After each session, the aim was for the children to reinforce their gains with family-participated home activities. To facilitate understanding, bulletins, brochures, or an activity plan to be implemented at home were sent to the families with instructions and materials to inform them about the work done during the day and the prosocial behaviors addressed. The activities conducted in the context of these family-participation activities were shared and discussed by the volunteer children with their group friends at the beginning of the next session. In addition, the previous session was summarized with the children and the researcher at the beginning of each session, thus establishing a connection between the sessions.

Data Collection Tools

Self-Regulation Skills Scale for 4-6 Year-Old Children (Mother Form)

The scale was developed by Erol and İvrendi (2018) based on parental feedback to assess children's abilities in self-regulation between the ages of 4-6. Concurrent criterion validity, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA) were employed in the construct validity analyses. The scale has 20 items and 4 sub-dimensions (working memory, emotion inhibitory control, behavioral inhibitory control, and attention), which together accounted for 61% of the variation in the overall variance, according to the EFA results. The model's fit indices ($\chi^2/df=1.91$, RMSEA=.07, SRMR=.07) derived using CFA were found to be within an acceptable range. The items' correlations with the total scores ranged from .36 to .70, and scales' Cronbach Alpha internal consistency was found to be .90.

Concurrent validity was found to be 0.84, and test-retest reliability was 0.77. The test-retest reliability was .77 and the concurrent validity score was .84. According to moms, the scale is a valid and trustworthy measuring instrument for assessing the self-regulation abilities of 4-6 year old kids, which is consistent with our findings. The dependability coefficient value for the complete scale in the current investigation was determined to be 0.91.

Preschool and Kindergarten Behavior Scale

Merrell (2003) created the scale to be able to assess children's social skills and problem behaviors (Fazlıoğlu et al., 2011). The measurement tool includes of 2 scales as social skills and problem behavior scales. In this study, the problem behavior scale designed to evaluate children's problem behaviors was employed. The problem behavior scale, which includes two sub-dimensions, namely, learning and expressing problems, has 42 items in its original form. It is expected that each item related to kids' problem behaviors will be answered according to the frequency of occurrence in the past three months. The scale is graded as "never-0, rarely-1, sometimes-2, often-3" and the increase in the scores obtained indicate that children's levels of exhibiting problem behaviors are high. Turkish adaptation of the scale was realized by Fazlıoğlu et al. (2011). It was stated that the factor structure of the measurement scale was maintained within Turkish culture, as formed after an item was removed from the measurement tool, with the confirmatory factor analysis conducted for validity. To find out the discrimination of the items in the measurement tool, the t-test was conducted to determine the significance level of the difference in item scores between the upper and lower 27% groups, and it was stated that the differences were significant for all items. The Alpha reliability coefficient of Cronbach which was calculated for the entire problem behavior scale and its sub-dimensions was .96, the issue of expressing problems was .96, and the learning problem was .89. The reliability coefficient values calculated for the current study were found to be .95 for the entire scale. The coefficient value of reliability calculated for the current study was 0.90 for the entire scale.

Data Collection

Prior to the data collection process of the study, ethics committee approval was obtained, and Aydın Provincial Directorate of National Education granted the necessary permissions for the study to continue as planned. The researcher met with the administrators and preschool educators of the school, which provided easy access and implementation opportunities, and informed them about the purpose and method of the study. Two kindergarten classes in the school were matched. To identify the children and families who volunteered to participate in the study, the information note regarding the study, including the measurement tools expected to be filled out by the parents and the parental consent form, were filed and delivered to the families of the students in these classes through the classroom teachers. The forms sent to the families of the students who were accepted to participate in the study were forwarded again through the classroom

teacher and collected. Before the application, the experimental and control groups were formed by random assignment. The Self-Regulation abilities Scale for 4-6 Year-Old Children (Mother Form) was completed as a pre-test for each child by their mothers in order to ascertain whether the groups' levels of self-regulation abilities varied and the pre-test scores of the groups were analyzed by comparison. The Pre-School and Kindergarten Behavior Scale (Problem Behavior subscale) regarding the problem behaviors of the groups was filled out by the classroom teachers and the groups' pre-test results were examined. The kids in the control group continued their daily education programs in line with the Pre-School Education Program of the MoNE by their teachers. Within the scope of the research, a program including 27 educational situations was conducted to the kids in the experiment group for 2,5 months, 3days a week, together with the Pre-School Education Program of the MoNE. After the program applications, post-test forms were filled out by the mothers and teachers of the children in the control and experimental groups. Statistical analysis of the collected data was performed.

Data Analysis

Statistical analyses of the obtained values were conducted via the SPSS 22.0 program. In the analyses, the normality of the distribution was first tested. Since there was no normal distribution and the sample size was $n < 30$, the data were analyzed using nonparametric tests (Büyüköztürk, 2010). The youngsters in the experiment and control groups had their pre- and post-test results compared using the Mann Whitney U Test. The Wilcoxon Signed Rank Test was used to ascertain whether there were any statistically significant differences between the pre- and post-test results for the children in the experiment group and the control group. This was following the application of the prosocial behavior psychoeducation program to the experiment group. The significant difference in the distributions was examined in order to determine which measurement was more advantageous by comparing the pre- and post-test (Büyüköztürk, 2010).

Ethical considerations

Ethical Review Board: Adnan Menderes University Educational Research Ethics Committee

Date of Ethics Review Decision: 20.09.2023

Ethics Assessment Document Issue Number: E-84982664-050.01.04-424626

RESULTS

In this section, the data obtained from statistical analyses regarding the problem status and sub-problems of the research are presented and interpreted in tables.

Sub-Problem 1: Is there a significant difference between the pre-test scores of the self-regulation skills of the experiment and control group children? Findings Related to the Question

Table 2

Mann–Whitney U Test Results Related to the Pre-Test Scores of the Self-Regulation Skills Scale of the Experiment and Control Group Children

	Groups	<i>n</i>	Rank Total	Rank Average	<i>U</i>	<i>Z</i>	<i>p</i>
Attention	Experiment	16	275	17.19	139	-.17	.86
	Control	18	320	17.78			
Working Memory	Experiment	16	277	17.31	141	-.10	.91
	Control	18	318	17.67			
Inhibitory Control (emotion)	Experiment	16	270	16.88	134	-.35	.72
	Control	18	325	18.06			
Inhibitory Control (behavior)	Experiment	16	283	17.69	141	-.10	.91
	Control	18	312	17.33			
Self-regulation Skills Total	Experiment	16	273.5	17.09	137.5	-.22	.82
	Control	18	321.5	17.86			

* $p < 0.01$

The children in the experiment and control groups did not significantly vary in their average scores in the sub-dimensions of working memory ($U=141$; $p > .05$), attention ($U=139$; $p > .05$), inhibitory control-emotion ($U=134$; $p > .05$), inhibitory control-behavior ($U=141$; $p > .05$) and self-regulation total ($U=137$; $p > .05$) according to the results of the Mann Whitney U test.

Sub-Problem 2: Is there a significant difference among the problem behavior pre test scores of the experiment and control group children? Findings Related to the Question

Table 3

Mann–Whitney U Test Results Related to the Pre-Test Scores of the Pre-School and Kindergarten Behavior Scale (Problem behavior sub-scale) of the Experiment and Control Group Children

	Groups	<i>n</i>	Rank Total	Rank Average	<i>U</i>	<i>Z</i>	<i>p</i>
Problem expressing problems	Experiment	16	273.5	17.09	137.5	-.22	.82
	Control	18	321.5	17.86			
Learning problem	Experiment	16	278.5	17.41	142.5	-.05	.95
	Control	18	316.5	17.58			
Problem behavior total	Experiment	16	274	17.13	138	-.20	.85
	Control	18	321	17.83			

* $p < .05$

The results of the Mann-Whitney U test show that there is no statistically significant difference between the experiment and control group kids' average scores on the problem behavior sub-dimension, specifically the issue of expressing problems ($U=137.5$; $p > .05$) and the problem behavior total ($U=138$; $p > .05$), and the mean ranks are close to each other.

Sub-Problem 3: Is there a significant difference between the mean pre-test and post-test scores of the children in the experiment group regarding self-regulation skills? Findings Related to the Question

Table 4

Wilcoxon Signed Rank Test Results Regarding the Pre-Test-Post-Test Scores of the Self-Regulation Skills Scale of the Children in the Experiment Group

			<i>n</i>	Rank Total	Rank Average	<i>Z</i>	<i>p</i>
Attention		Negative Order	0	0	0	-1.34	.180
		Positive Order	2	3	1.5		
		Ties	14				
Working Memory		Negative Order	0	0	0	-1.63	.102
		Positive Order	3	6	2		
		Ties	13				
Inhibitory (emotion)	Control	Negative Order	0	0	0	-2.40*	.016*
		Positive Order	7	28	4		
		Ties	9				
Inhibitory (behavior)	Control	Negative Order	0	0	0	-1.84	.066
		Positive Order	4	10	2.5		
		Ties	12				
Self-regulation Total	Skills	Negative Order	0	0	0	-2.67**	.008**
		Positive Order	9	45	5		
		Ties	7				

*Arranged based on negative ranks.

* $p < .05$

** $p < .01$

The values obtained for inhibitory control-emotion ($z = -2.40$, $p < .05$) and self-regulation skills total ($z = -2.67$, $p < .01$) at the Wilcoxon Signed Rank Test show that there is a significant difference between the pre- and post-test average scores of the experiment group children. When the average ranks and total scores are examined, it is observed that the difference between the pre- and post-test is in favor of positive ranks for the inhibitory control-emotion sub-dimension and self-regulation skills total score. However, no significant difference was found between the pre- and post-tests of the experimental group children in the attention ($z = -1.34$, $p > .05$), working memory ($z = -1.63$, $p > .05$) and inhibitory control-behavior ($z = -1.84$, $p > .05$) sub-dimensions.

Sub-Problem 4: Is there a significant difference between the pre-test and post-test mean scores of the experimental group children regarding problem behavior? Findings Regarding the Question

Table 5

Wilcoxon Signed Rank Test Results Regarding the Pre-Test-Post-Test Scores of the Pre-School and Kindergarten Behavior Scale (Problem behavior sub-scale) of the Experiment Group Children

			<i>n</i>	Rank Total	Rank Average	<i>Z</i>	<i>p</i>
Problem expressing problems		Negative Order	6	21	3.5	-2.25*	.024*
		Positive Order	0	0	0		
		Equal	10				
Learning problem		Negative Order	5	15	3	-2.07*	.038*
		Positive Order	0	0	0		
		Equal	11				
Problem behavior total		Negative Order	7	28	4	-2.40*	.016*
		Positive Order	0	0	0		

Equal	9
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a. Organized based on positive ranks.

* $p < .05$

When Table 5 is checked, the results of Wilcoxon Signed Rank Test for the problem expression problem ($z = -2.25$, $p < .05$), learning problem ($z = -2.07$, $p < .05$) and problem behavior total ($z = -2.40$, $p < .05$) values show that the children in the experiment group had significantly different average scores on the pre- and post-tests. According to the mean ranks and total ranks, the difference between the pre- and post-tests supports negative ranks for the problem expression and learning problem sub-dimensions and the problem behavior total.

Sub-Problem 5: Is there a significant difference between the pre-test and post-test mean scores of the control group children regarding self-regulation skills? Findings Related to the Question

Table 6

Wilcoxon Signed Rank Test Results Regarding the Pre-Test-Post-Test Scores of the Control Group Children on the Self-Regulation Scale

		<i>n</i>	Rank Total	Rank Average	<i>Z</i>	<i>p</i>
Attention	Negative Order	0	0	0	-1.00	.317
	Positive Order	1	1	1		
	Equal	17				
Working Memory	Negative Order	2	4	2	-.57	.564
	Positive Order	1	2	2		
	Equal	15				
Inhibitory (emotion)	Negative Order	5	20	4	-1.13	.257
	Positive Order	2	8	4		
	Equal	11				
Inhibitory (behavior)	Negative Order	1	2.5	2.5	-1.00	.317
	Positive Order	3	7.5	2.5		
	Equal	14				
Self-regulation Total	Negative Order	6	35.5	5.92	-.23	.813
	Positive Order	5	30.5	6.10		
	Equal	7				

a. Organized based on negative ranks.

b. Organized based on positive ranks.

* $p < .05$

When Table 6 is examined, the values obtained from the Wilcoxon Signed Rank Test regarding the sub-dimensions of attention ($z = -1.00$, $p > .05$), working memory ($z = -.57$, $p > .05$), inhibitory control-emotion ($z = -1.13$, $p > .05$), inhibitory control-behavior ($z = -1.00$, $p > .05$), and the total self-regulation skills ($z = -.23$, $p > .05$) are reported. These tests show that there is no significant difference between the pre-test and post-test mean scores of the control group children.

Sub-Problem 6: Is there a significant difference between the pre-test and post-test mean scores of the control group children regarding problem behavior? Findings Regarding the Question

Table 7

Wilcoxon Signed Rank Test Results Regarding the Pre-Test-Post-Test Scores of the Control Group Children on the Pre-School and Kindergarten Behavior Scale (Problem behavior sub-scale)

			<i>n</i>	Rank Total	Rank Average	Z	<i>p</i>
Problem expressing problems		Negative Order	5	21	4.20	-1.26	.206
		Positive Order	2	7	3.5		
		Equal	11				
Learning problem		Negative Order	1	3.5	3.5	-1.63	.102
		Positive Order	5	17.5	3.5		
		Equal	12				
Problem behavior total		Negative Order	5	33	6.60	-1.00	1
		Positive Order	6	33	5.50		
		Equal	7				

a. The sum of negative ranks equals the sum of positive ranks

b. Organized based on negative ranks.

c. Organized based on positive ranks.

* $p < .05$

When Table 7 is examined, the expressing problems ($z = -1.26$, $p > .05$), learning problems ($z = -1.63$, $p > .05$), and problem behavior total ($z = -1.00$, $p > .05$) values obtained as a result of the Wilcoxon Signed Ranks Test show that there is no significant difference between the pre-test and post-test mean scores of the control group children.

Sub-Problem 7: Is there a significant difference between the self-regulation skills post-test scores of the experiment and control group children? Findings Related to the Question

Table 8

Mann-Whitney U Test Results Related to the Self-regulation Skills Scale Post-Test Scores of the Experiment and Control Group Children

	Groups	<i>n</i>	Rank Total	Rank Average	U	Z	<i>p</i>
Attention	Experiment	16	276	17.25	140	-.13	.905
	Control	18	319	17.72			
Working Memory	Experiment	16	292	18.25	132	-.42	.695
	Control	18	303	16.83			
Inhibitory Control (emotion)	Experiment	16	290.5	18.16	133.5	-.36	.721
	Control	18	304.5	16.92			
Inhibitory Control (behavior)	Experiment	16	289.5	18.09	134.5	-.33	.746
	Control	18	305.5	16.97			
Self-regulation Skills Total	Experiment	16	286.5	17.91	137.5	-.22	.825
	Control	18	308.5	17.14			

* $p < .05$

When the findings obtained from the Mann Whitney U test were examined, there was no statistically significant difference in the average scores of the experiment and control group children in the sub-dimensions of attention ($U = 140$; $p > .05$), working memory ($U = 132$; $p > .05$), inhibitory control-emotion ($U = 133.5$; $p > .05$), inhibitory control-behavior ($U = 134.5$; $p > .05$), and self-regulation skills ($U = 137.5$; $p > .05$).

Sub-Problem 8: Is there a significant difference between the problem behavior post test scores of the experimental and control group children? Findings Related to the Question

Table 9

Mann–Whitney U Test Results Related to the Preschool and Kindergarten Behavior Scale (Problem behavior sub-scale) Post-test Scores of the Experimental and Control Group Children

	Groups	n	Rank Total	Rank Average	U	Z	p
Problem expressing problems	Experiment	16	273.5	17.09	137.5	-.22	.822
	Control	18	321.5	17.86			
Learning problem	Experiment	16	271	16.94	135	-.31	.756
	Control	18	324	18.00			
Problem behavior total	Experiment	16	268	16.75	132	-.41	.679
	Control	18	327	18.17			

* $p < 0.05$

When the findings obtained from the Mann Whitney U test were analyzed, it was seen that the difference between the mean scores of the experiment and control group children in the problem of expressing problems sub-dimension ($U=137.5$; $p>.05$), learning problem sub-dimension ($U=135$; $p>.05$), and problem behavior total ($U=132$; $p>.05$) were not statistically significant.

DISCUSSION

This section discusses the results obtained from the study and their interpretation in light of the theoretical framework, classifying them according to the dependent variables of the study.

Results and Discussion Regarding the Self-Regulation Skills Mean Scores of the Experimental and Control Group Children

Upon closer inspection, the results reveal that the children in the experiment and control groups did not significantly differ in their overall mean scores in the sub-dimensions of working memory, attention, inhibition control-emotion, inhibition control-behavior, and self-regulation. It was determined that there was a significant difference in favor of positive ranks between the pre-and post-test score mean scores of the experiment group kids regarding the inhibitory control-emotion sub-dimension and self-regulation skills total. No significant difference was found between the pre-and post-test mean scores of the control group kids in terms of the sub-dimensions of attention, inhibitory control-behavior, inhibitory control-emotion, working memory, and self-regulation skills. In addition, no statistically significant difference was observed among the total mean scores of the experiment and control groups kids with regard to attention, self-regulation skill set, inhibitory control-behavior, inhibitory control-emotion, and working memory.

Many behavioral and neuroscientific studies have shown that experiences (especially social experiences) play a key role in both developing the neural circuits that assist self-

regulation and in developing the manifestations of behaviors in various contexts (Baker et al., 2012; Diamond & Lee, 2011; Sameroff, 2010; Zelazo et al., 2008). In a study conducted by Pazarbaşı and Cantez (2019), it was observed that as children's prosocial behavior scores increased, their behavior regulation scores also increased. In another study conducted by Hubert et al. (2017), it was observed that children's prosocial behavior in kindergarten affected cognitive self-regulation more than their prosocial behavior and peer acceptance in the first grade did. Therefore, the development of self-regulation through interpersonal interactions appears critical for children to be successful in demonstrating high levels of self-control. In studies conducted on children between the ages of 3 and 6, teachers reported that mindfulness programs implemented in the classroom were effective in managing emotional and behavioral disorders and in supporting children's self-regulation skills and executive functions (Razza et al., 2020). Although reviews have yielded mixed results in measuring self-regulation skills in young children, it has been observed that mindfulness-based practices generally support self-regulation and social-emotional development. In their research examining 18 studies conducted between 2010 and 2021, Bockmann and Yu (2022) found that mindfulness practices have mixed effects on self-regulation in children. A literature review by Sun et al. (2021) revealed that yoga and mindfulness practices for preschool children improve self-regulation and executive function skills in school settings. Flook et al.'s (2015) research shows that implementing a program designed to promote developing self-regulation and prosocial behavior in young children in preschool classrooms has positive effects on children's self-regulation skills and social and emotional competence. Such programs appear to help kids better understand themselves and manage their emotional states, as well as enable them to be more effective in social interactions (Diamond & Lee, 2011). Berti and Cigala (2020), in their study evaluating the effects of a mindfulness-based intervention, found that children in the experimental group demonstrated significant developments in prosocial behavior, inhibitory processes of self-regulation, and perspective-taking skills, especially in the cognitive and emotional components. In the research conducted by Eke (2018), it was found that there was a significant relation between children's values, self-regulation skills and social behavior. It was concluded that as children's responsibility and honesty value levels increased, their self-regulation skills also increased, and that as their cooperation value level increased, their total self-regulation skills improved. The study by Semple et al. (2010), which applied a mindfulness program, reported a decrease in children's attention problems. Similarly, the study results of Hawley (2003) and Özbey (2017, 2018) support the findings of the research. These studies show that children with developed value behaviors are successful in providing self-control and can manage their emotions. Among similar studies, it can be said that the finding that the story-based integrated social-emotional education program prepared by Tosun (2023) increases the self-regulation skills and prosocial behaviors of preschool children supports the results of the study. In addition, Williford et al. (2013) stated in their studies that children's positive relation with their teachers and friends and their active participation in activities are related to emotional regulation skills.

In this context, the activities included in the program, aimed at supporting positive social relationships, played an effective role in the increase observed in the inhibitory control-emotion dimension of the self-regulation skills of the experimental group children. In addition, in studies examining self-regulation skills in the preschool period, it is observed that education provided with a play-focused education program contributes to the development of children's self-regulation skills (Elias & Berk, 2002; Tominey & McClelland, 2011). In the studies of Arifiyanti and Suparno (2024), differences in the social behaviors of children were observed after participating in games with rules. Similarly, although the games and drama activities in the program applied in the current study aimed to increase prosocial behaviors, other areas of development can also be supported through games. The drama and game activities in the program were designed to integrate different aspects of development in a complex way. This approach is consistent with previous research emphasizing the potential of games to provide various benefits in the cognitive, motivational, emotional and sociocultural areas in the learning process (Plass et al., 2015). As a result, improving self-regulation through activities that support the development of prosocial behavior helps children understand themselves better and manage their emotional states, leading to better social-emotional skills. In this context, the frequent inclusion of active play and socio-dramatic games in the program used in the current study has a positive effect.

Results and Discussion Regarding the Problem Behavior Score Averages of Experimental and Control Group Children

It was determined according to the findings, that the difference between the problem behavior sub-dimensions of the problem behaviors of the children in the experiment and control groups, the problem of expressing problems and the learning problem and the problem behavior total score averages were not statistically significant, and their rank averages were close to each other. A significant difference was found in favor of negative ranks between the pre-test and post-test score averages of the problem of expressing problems, learning problem and problem behavior total values of the children in the experimental group. It was seen that there was no significant difference between the pre-test and post-test score averages of the problem of expressing problems, learning problem and problem behavior total values of the children in the control group. It was observed that the difference between the problem of expressing problems, learning problem sub-dimensions and the problem behavior total score averages of the children in the experiment and control groups was not statistically significant.

Childhood research reveals an inverse relation between prosocial and aggressive behavior (Laible et al., 2014; Nantel-Vivier et al., 2014). It has also been stated that prosocial behavior contributes to reducing the likelihood of problematic behaviors over time and influencing friends positively (Carlo et al., 2014). In the research conducted by Eke (2018), it was determined that there is a significant relationship between children's values and social

behavior. It was concluded that as children's respect and honesty value levels increase, their positive social behaviors also increase. Conversely, as friendship and sharing value levels increase, their relational aggression behaviors decrease. The study by Grazzani et al. (2016) study also suggested that young children behave kinder toward their peers after they are encouraged to talk about their feelings and learn about them. In a research by Adinugroho (2009), it was shown that books with prosocial content increased children's prosocial behaviors and decreased their aggressive behaviors. Flook et al. (2015) showed that a mindfulness-focused prosocial skills training curriculum resulted in more significant improvements in the social competence of children in the intervention group. Viglas and Perlman (2018) found that a mindfulness-based program had a positive effect on 3-6 year olds' self-regulation and social and non-compliant behaviors. In the study conducted by Bozkurt-Polat and Özbey (2021), it was observed that the Social Values Education Program positively affected children's self-regulation skills and reduced their problem behaviors. In the study by Battistich et al. (1989), it was observed that the program applied contributed to the social problem-solving skills and strategies of children by making them better understand problem situations, their showing more sensitivity to the needs and feelings of others, and developing their ability to think in a more detailed and results-focused manner. Conte et al.'s (2023) study findings show that the program designed to improve students' mental health and prevent negative behaviors improves preschool children's social-emotional learning competencies, social behaviors, and academic success. In line with the numerous practical activities carried out in the program, children's social behavioral skills increased, and internalized or externalized negative behaviors decreased. Similarly, the program consisting of 27 sessions in the current study was effective in reducing children's problem behaviors since it allowed for numerous activities. Courbet et al. (2024) stated that the mindfulness-based social and emotional learning program reduced children's emotional and behavioral problems, problems in peer relationships, and teacher-child conflicts. Jansen et al. (2024) showed that the mindfulness-based Kindness Curriculum for children aged 3-6 provided a significant improvement in the emotional and social functions of the experimental group children. Haines et al. (2023) found that children who participated in the Mindfulness-Based Kindness Curriculum experienced significant benefits in terms of social-emotional competence, social behavior, and executive functions. Erten and Güneş (2024) observed an increase in positive social behaviors and a decrease in physical aggression and depressive behaviors in children who participated in mindfulness practices. Apaydin-Demirci et al. (2020) found a significant positive relationship between children's emotion regulation skills and interpersonal problem-solving skills in their study. Considering that prosocial behaviors such as helping and cooperating contribute to the solution of interpersonal problems, this finding is consistent with our research. Many researchers have reported that games provide children with many opportunities to develop prosocial behaviors and that behavioral problems can be reduced through cooperative play (Cano-Moya et al., 2023; Li & Shao, 2022). In addition, it has been stated that traditional games played outdoors help children to be in harmony with their friends and their

environment, making their positive social behaviors more evident (Dewi et al., 2020; Junaedah et al., 2020). Arifiyanti and Suparno (2024) observed that children's ability to express themselves effectively has a significant impact on their positive social interactions and also revealed the role of language in encouraging prosocial behaviors. In the study by Gözüml and Aktulun (2021), it was concluded that children's receptive and expressive language skills positively affect their self-regulation skills. Considering the importance of language in supporting social interactions, it can be said that the program used in the current study included activities that allow children to start and end their day by expressing themselves. These activities also involve storytelling, songs, and poems with the theme of prosocial behavior, musical activities, puppet shows, and drama activities in each session, which play an active role in facilitating children's social relationships by supporting both receptive and expressive language skills. Based on the findings of the current study, it can be said that the positive effects of the program, which encourages children to exhibit prosocial behavior by improving their language skills, tend to decrease children's problem behaviors.

LIMITATIONS AND RECOMMENDATIONS

The current study supports the growing evidence that interventions that support the development of prosocial behavior positively affect the increase of self-regulation skills and reduce problem behaviors in preschool children. However, it is important to consider the findings within the framework of certain limitations. One limitation of the study is that self-regulation was assessed using parent reports, which means that direct measurement methods were not used. However, Haines et al. (2023) reported that parents' reports of their children's empathy and social-emotional skills paralleled those of teachers. In the current study, given that parent reports reflect whether children use self-regulation skills at home, the measurement tools completed by parents encourage the generalization of children's self-regulation skills outside the classroom (Bockmann & Yu, 2022). It should also be noted that there may be variability in the number of sessions attended by children due to absences. Since information on absences was not collected, the average effect of the intervention is assessed assuming that all children attended similarly often. Future research could focus on collecting this information to examine the effect of the duration of attendance. Another limitation is that the sustainability of the results cannot be confirmed because the children were not followed up long-term. It should also be noted that an alternative treatment was not provided to the control group, as they were intended to serve as a comparison for the effects of different types of interventions. Given these limitations, it is important to build on these preliminary findings to better understand the impact of programs that support the development of prosocial behavior in early childhood. Due to the exploratory nature of the study, additional research is needed with larger sample sizes and more meaningful comparison groups. Further studies on the subject will provide valuable information on how prosocial behavior can be developed in early childhood classrooms.

The findings of the study show that children's awareness of their thoughts, feelings, and emotions can support their social and emotional development, increase their self-regulation capacity, and improve their ability to understand the emotional and cognitive perspectives of others. In this context, the results of the study provide important clues for both families and educational institutions. Educational programs covering prosocial behavior skills in the preschool period can be prepared, and their contributions to children's development levels can be evaluated. Designs can be developed to disseminate such programs through the Ministry of National Education. Preschool teachers can receive training on sensitive classroom management to create classroom environments that support positive social behavior development and self-regulation. Teachers' adoption of such practices and their integration into existing educational practices can increase the sustainability of the benefits achieved because it provides more effective results. For example; programs that encourage children to use methods such as "stop and think" before responding can be integrated into classroom routines and increase self-regulation (Tominey & McClelland, 2011). In addition, activities themed around social-emotional learning, self-control, recognition and management of emotions, and interpersonal conflict resolution can improve both self-regulation and emotional responses (Liew & Spinrad, 2022). In addition, educators can focus on language development in these practices, fostering the development of children's self-regulation skills and encouraging more positive exchanges in their social interactions (Arifiyanti & Suparno, 2024; Gözümlü & Aktulun, 2021). Previous studies do not provide a definitive conclusion on the effects of applied interventions on self-regulation and executive function. While some studies find significant effects in certain tasks, the results observed in other tasks involving the same structure may not be significant (Poehlmann-Tynan et al., 2016; Razza et al., 2015). Therefore, considering the role of self-regulation skills in child development, it is important to conduct more research on which factors are affected by interventions and how these interventions can be made more effective. In addition, it is deemed necessary to identify children in need of intervention at an early stage and to derive specific intervention measures targeting specific competency gaps for a more detailed understanding of self-regulation skills (Ritgens et al., 2024). Such interventions should also be reinforced in out-of-class environments, and a consistent structure that promotes self-regulation skills and positive social behaviors should be created between the home and school environments (Goldberg et al., 2019). At this point, it can be recommended that parents and educators model these skills in both the home and school environment, and develop supportive routines by providing consistent rules and rewards.

Aside from all these suggestions, a noteworthy issue is the prevalence of digital technologies and their effects on children's education and development. While many studies in the literature emphasize that digital applications and their various contexts (e.g., duration and content) negatively affect children's social skills (Mundy et al., 2017; Paulus et al., 2021) and self-regulation skills (Canaslan-Akyar & Sungur, 2022; Gözümlü & Kandır, 2020), other findings suggest that well-designed digital content can help develop self-regulation skills

(Williams & Berthelsen, 2017) and increase positive social behaviors (Li & Zhang, 2022). However, Papadakis and Kalogiannakis (2020) revealed that only a few of the digital applications described as educational have positive effects on children's learning processes and development. It is a necessity to bring technology together with educational content and integrate it into the educational process. At this point, it can be said that educators, technology experts, and researchers have the responsibility to contribute to the design of digital applications with educational value by determining design principles suitable for early childhood education.

CONCLUSION

The program implemented in this study included various activities to support the prosocial behaviors of young children. Gains in the area of self-regulation helped children reduce their problem behaviors. The findings are parallel to existing research on preschool children. Many variables observed in the experimental group showed significant improvements after only nine weeks of training, demonstrating the feasibility of age-appropriate programs to develop self-regulation skills, increase social-emotional competencies, and reduce problem behaviors (Burke, 2010; Greenberg & Harris, 2012). It also emphasizes the need for more research on the implementation of programs aimed at improving self-regulation and behavior in early childhood classrooms.

REFERENCES

- Adinugroho, A.D. (2009). *The effect of self monitoring instruction package: Using picture books to increase preschooler's prosocial behavior* [Doctoral thesis, Purdue University The Graduate School].
- Anthony, L.G., Anthony, B. J., Glanville, D.N., Naiman, D.Q., Waanders, C., & Shaffer, S. (2005). The relationships between parenting stress, parenting behaviour and preschoolers' social competence and behaviour problems in the classroom. *Infant & Child Development*, 14(2), 133-154. <https://doi.org/10.1002/icd.385>
- Apaydın-Demirci, Z., Arslan, E., & Temel, M. (2020). Okul öncesi dönemdeki çocukların duygu düzenleme ve kişiler arası problem çözme becerilerinin incelenmesi [Investigation of emotion regulation and interpersonal problem solving skills of preschool children]. *Türk Eğitim Bilimleri Dergisi*, 18(2), 406–421. <https://doi.org/10.37217/tebd.714803>
- Arifiyanti, N., & Suparno, S. (2024). Promoting prosocial skill in early childhood by games with rules. *Retos*, 9-16. <https://doi.org/10.47197/retos.v56.103464>
- Asscheman, J.S., He, J., Koot, S., Buil, J.M., Krabbendam, L., & van Lier, P.A.C. (2020). Classroom peer preferences and the development of sharing behavior with friends and others. *International Journal of Behavioral Development*, 44(5), 412–423. <https://doi.org/10.1177/0165025420911094>

- Aydın, M.Ş., & Karakelle, S. (2016). 3-4 yaş çocuklarında zihin kuramı ve kendini düzenleme becerisinin yardım davranışları üzerindeki etkisi [The effect of theory of mind and self-regulation skills on helping behaviors in 3-4 year old children]. *Nesne* 4(8), 205-226.
- Bağcı-Çetin (2021). *Prososyal davranış psikoeğitim programının okul öncesi dönem 5-6 yaş çocuklarının prososyal davranışlarına, sosyal duygusal uyumuna ve yaşam doyumuna etkisi* The effect of prosocial behavior psychoeducation program on prosocial behaviors, social emotional adaptation and life satisfaction of 5-6 year old preschool children] [Doctoral thesis, Pamukkale University]. <https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp>
- Baker, C.E., Cameron, C.E., Rimm-Kaufman, S.E., & Grissmer, D. (2012). Family and sociodemographic predictors of school readiness among African American boys in kindergarten. *Early Education & Development*, 23, 833-854. <https://doi.org/10.1080/10409289.2011.607359>
- Barker, E.D., Oliver, B.R., & Maughan, B. (2010). Co-occurring problems of early onset persistent, childhood limited, and adolescent onset conduct problem youth. *Journal of Child Psychology and Psychiatry*, 51, 1217-1226.
- Battistich, V., Solomon, D., Watson, M., Solomon, J., & Schaps, E. (1989). Effects of an elementary school program to enhance prosocial behavior on children's cognitive social problem-solving skills and strategies. *Journal of Applied Developmental Psychology*, 10, 147-169.
- Berti, S., & Cigala, A. (2020). Mindfulness for preschoolers: Effects on prosocial behavior, self-regulation and perspective taking. *Early Education and Development*, 33(1), 38-57. <https://doi.org/10.1080/10409289.2020.1857990>
- Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American Psychologist*, 57, 111-127.
- Bockmann, J.O., & Yu, S.Y. (2022). Using mindfulness-based interventions to support self-regulation in young children: A review of the literature. *Early Childhood Education Journal*, 51, 693-703. <https://doi.org/10.1007/s10643-022-01333-2>
- Bozkurt-Polat, E., & Özbey, S. (2021). Okul öncesinde sosyal değerler eğitimi programının öz düzenleme, sosyal beceri ve problem davranışlar üzerindeki etkisi [The effect of social values education program in preschool on self-regulation, social skills and problem behaviors]. *FSM İlmî Araştırmalar İnsan ve Toplum Bilimleri Dergisi*, 18, 287-316. <https://doi.org/10.16947/fsmia.1050295>
- Brownell, C.A., Svetlova, M., & Nichols, S. (2009). To share or not to share: When do toddlers respond to another's needs? *Infancy*, 14(1), 117-130. <https://doi.org/10.1080/15250000802569868>

- Burke, C. (2010). Mindfulness-based approaches with children and adolescents: A preliminary review of current research in an emergent field. *Journal of Child and Family Studies*, 19(2), 133–144. <https://doi.org/10.1007/s10826-009-9282-x>.
- Burke, R.V., Kuhn, B.R., Peterson, J.L., Peterson, R.W., & Badura Brack, A.S. (2010). Don't kick me out!: Day treatment for two preschool children with severe behavior problems. *Clinical Case Studies*, 9(1), 28–40.
- Büyüköztürk, Ş. (2002). Faktör analizi: Temel kavramlar ve ölçek geliştirmede kullanımı [Factor analysis: Basic concepts and use in scale development]. *Kuram ve Uygulamada Eğitim Yönetimi*, 32, 470–483.
- Büyüköztürk, Ş. (2010). *Veri analizi el kitabı: İstatistik, araştırma deseni spss uygulamaları ve yorum* (11. Baskı) [Data analysis handbook: Statistics, research design spss applications and interpretation]. Pegem Akademik Yayıncılık.
- Büyüköztürk, Ş., Kılıç-Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2012). *Bilimsel araştırma yöntemleri* (12. Baskı) [Scientific research methods]. Pegem Akademi Yayınları.
- Canaslan-Akyar, B., & Sungur, S. (2022). Preschool children's digital media usage and self-regulation skill. *Turkish Journal of Education*, 11(2), 126–142. <https://doi.org/10.19128/turje.889549>
- Cano-Moya, J. L., Isaza-Gómez, G. D., & Valencia-Guzmán, J.D. (2023). El juego como estrategia didáctica para la construcción de habilidades sociales en los niños de la comuna 20 de la ciudad de Cali [The game as a didactic strategy for the construction of social skills in the children of the 20 communes of the city of Cali]. *Retos*, 48, 261–270. <https://recyt.fecyt.es/index.php/retos/article/view/96989>
- Caprara, G.V., Kanacri, B.P.L., Gerbino, M., Alessandri, G., Pastorelli, C., Caprara, E., Zuffiano, A., Vecchio, G., & Bridgall, B. (2014). Positive effects of promoting prosocial behavior in early adolescence: Evidence from a school-based intervention. *International Journal of Behavioral Development*, 1–11. <https://doi.org/10.1177/0165025414531464>
- Carlo, G., & Randall, B.A. (2001). Are all prosocial behavior equal? A socioecological developmental conception of prosocial behavior. *Advances in Psychology Research*, 2, 151–170.
- Carlo, G., Mestre, M.V., McGinley, M.M., Tur-Porcar, A., Samper, P., & Opal, D. (2014). The protective role of prosocial behaviors on antisocial behaviors: The mediating effects of deviant peer affiliation. *Journal of Adolescence*, 37(4), 359–366.
- Conte, E., Cavioni, V., Ornaghi, V., Agliati, A., Gandellini, S., Santos, M.F., Santos, A.C., Simões, C., & Grazzani, I. (2023). Supporting preschoolers' mental health and academic learning through the PROMEHS Program: A training study. *Children*, 10(6), 1070. <https://www.mdpi.com/2227-9067/10/6/1070>

- Courbet, O., Daviot, Q., Kalamarides, V., Habib, M., & Villemonteix, T. (2024). Promoting psychological well-being in preschoolers through mindfulness-based socio-emotional learning: A randomized-controlled trial. *Research on Child and Adolescent Psychopathology*, 52(10), 1487-1502. <https://doi.org/10.1007/s10802-024-01220-x>
- Culotta, E., Dicarlo, C.F., & Rueter, D. (2024). Using mindfulness practices to increase self-regulation in pre-kindergarten and kindergarten-aged children. *Child & Youth Care Forum*, <https://link.springer.com/article/10.1007/s10566-024-09842-4>
- Dan, A. (2016). Supporting and developing self-regulatory behaviours in early childhood in young children with high levels of impulsive behaviour. *Contemporary Issues in Education Research*, 9(4), 189-200. <https://doi.org/10.19030/cier.v9i4.9789>
- Dewi, N.L., Suryati, Y., Rudhiati, F., & Mediani, H.S. (2020). The Effect of Traditional Play of Magoak-Goakan To Theprosocial Behavior Among Preschool Children (5-6 Years Old) At Maria Fatima Kindergarten Jembrana Bali. *Early Child Development*, 7(5), 1–7. <https://doi.org/10.9790/1959-0705020107>
- Diamond, A. (2012). Executive functions. *Annual Review of Psychology*, 64, 135–168. <https://doi.org/10.1146/annurev-psych-113011-143750>
- Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*, 333, 959–964. <https://doi.org/10.1126/science.1204529>
- Doescher, S.M., & Sugawara, A.I. (1992). Impact of prosocial home- and school-based interventions on preschool children's cooperative behavior. *Family Relations*, 41(2), 200–204.
- Edwards, D., Hunt, M., Meyers, J., Grogg, K., & Jarrett, O. (2005). Acceptability and student outcomes of a violence prevention curriculum. *Journal of Primary Prevention*, 26(5), 401–418.
- Eisenberg, N., & Fabes, R. (1998). *Prosocial development*. In W. Damon ve N. Eisenberg (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (3, pp. 701–778). Wiley
- Eisenberg, N., Fabes, R. A., & Spinrad, T. L. (2006). *Prosocial development*. In N. Eisenberg, W. Damon, ve R. M. Lerner (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (Vol. 3. 6th ed.), (pp. 646–718). Wiley.
- Eisenberg, N., Guthrie, I.K., Murphy, B.C., Shepard, S.A., Cumberland, A., & Carlo, G. (1999). Consistency and development of prosocial dispositions: A longitudinal study. *Child Development*, 70(6), 1360-1372.
- Eke, K. (2018, Ekim). Okul öncesi dönem çocuklarında değerler, öz düzenleme becerileri ve sosyal davranışlar arasındaki ilişkinin incelenmesi [Investigation of the relationship between values, self-regulation skills and social behaviors in preschool children]. *ISOEVA Konferansı*, Antalya. Access address: <https://www.researchgate.net/publication/344413256>

- Elias, C.L., & Berk, L.E. (2002). Self-regulation in young children: Is there a role for sociodramatic play? *Early Childhood Research Quarterly*, 17(2), 216-238.
- Ellis, S.M. (2008). *Supporting social concepts in the preschool play environment: Perspectives on teacher decision making* [Master thesis, University of Florida].
- Epstein, A. (2009). *Me, you, us: Social-emotional learning in preschool*. High Scope Press.
- Erol, A., & İvrendi, A. (2018). 4-6 yaş çocuklarına yönelik öz-düzenleme becerileri ölçeğinin geliştirilmesi (anne formu) [Development of self-regulation skills scale for 4-6 year old children (mother form)]. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 44, 178-195.
- Erten, C., & Güneş, G. (2024). Social behaviour changes via mindfulness practices in early childhood. *Children and Youth Services Review*, 158. <https://doi.org/10.1016/j.chidyouth.2024.107452>
- Ezmeci, F. (2019). *Okul öncesi öz-düzenleme programı'nın çocukların özdüzenleme, problem davranışları ve sosyal becerilerine etkisi* [The effect of preschool self-regulation program on children's self-regulation, problem behaviors and social skills]. [Doctoral thesis, Hacettepe University]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezDetay.jsp?id=5UpXuJKy9pY4g5jOAWjV8w&no=y0pijXwPpae5Ce_2N0L4kQ
- Flook, L., Goldberg, S.B., Pinger, L., & Davidson, R.J. (2015). Promoting prosocial behavior and self-regulatory skills in preschool children through a mindfulness-based kindness curriculum. *Developmental Psychology*, 51(1), 44-51. <https://doi.org/10.1037/a0038256>.
- Fox, L., Dunlap, G., & Powell, D. (2002). Young children with challenging behavior: Issues and considerations for behavior support. *Journal of Positive Behavior Interventions*, 4(4), 208-217.
- Geraci, A., & Franchin, L. (2021). Is defensive behavior a subtype of prosocial behaviors? *Front. Psychol.* 12:678370. <https://doi.org/10.3389/fpsyg.2021.678370>
- Goldberg, J.M., Sklad, M., Elfrink, T.R., Schreurs, K.M.G., Bohlmeijer, E.T., & Clarke, A.M. (2019). Effectiveness of interventions adopting a whole school approach to enhancing social and emotional development: A meta-analysis. *Eur. J. Psychol. Educ.*, 34, 755-782. <https://doi.org/10.1007/s10212-018-0406-9>
- Gözüm, A.İ.C., & Aktulun, Ö.U. (2021). Relationship between Pre-Schoolers' self-regulation, language, and early academic skills: The mediating role of self-regulation and moderating role of gender. *Curr Psychol*, 40, 4718-4740. <https://doi.org/10.1007/s12144-021-01699-3>
- Gözüm, A.İ.C., & Kandır, A. (2020). Okul öncesi çocukların dijital oyun oynama sürelerine göre oyun eğilimi ile konsantrasyon düzeylerinin incelenmesi [Investigation of play tendency and concentration levels of preschool children according to their digital game playing time]. *Atatürk Üniversitesi Kazım Karabekir Eğitim Fakültesi Dergisi*, 41, 82-100.

- Grazzani, I., Ornaghi, V., Agliati, A., & Brazzelli, E. (2016). How to foster toddlers' mental-state talk, emotion understanding, and prosocial behavior: A conversation-based intervention at nursery school. *Infancy*, 21(2), 199–227. <https://doi.org/10.1111/infa.12107>.
- Greenberg, M.T., & Harris, A.R. (2012). Nurturing mindfulness in children and youth: Current state of research. *Child Development Perspectives*, 6(2), 161–166. <https://doi.org/10.1111/j.17508606.2011.00215.x>.
- Greenberg, M.T., Weissberg, R.P., O'Brien, M.U., Zins, J.E., Fredericks, L., Resnik, H., & Elias, M.J.(2003). Enhancing school-based prevention and youth development through coordinated social and emotional learning. *American Psychologist*, 58, 466–474.
- Gülay-Ogelman, H., & Canbeldek, M. (2016). Anne-baba-öğretmen görüşlerine göre küçük çocukların olumlu sosyal davranışları ve anne-baba-çocuk olumlu sosyal davranışları arasındaki ilişkinin incelenmesi [Investigation of the relationship between young children's positive social behaviors and parent-child positive social behaviors according to parent-teacher opinions]. *Adıyaman University Journal of Educational Sciences*, 6(1), 96-111. <http://dx.doi.org/10.17984/adyuebd.70471>
- Gülay-Ogelman, H., & Çiftçi-Topaloğlu, Z. (2014). 4-5 yaş çocuklarının sosyal yetkinlik, saldırganlık, kaygı düzeyleri ile anne babalarının ebeveyn özyeterliliği algısı arasındaki ilişkilerin incelenmesi [Investigation of the relationships between social competence, aggression, anxiety levels of 4-5 year old children and their parents' perception of parental self-efficacy]. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 14(1), 241-271.
- Haines, B.A., Hong, P.Y., Immel, K.R., & Lishner, D.A. (2023). The mindfulness-based kindness curriculum for preschoolers: An applied multi-site randomized control trial. *Mindfulness*, 14, 2195–2210. <https://doi.org/10.1007/s12671-023-02210-8>
- Hawley, P.H. (2003). Strategies of control, aggression, and morality in preschoolers: An evolutionary perspective. *J. Experimental Child Psychology*, 85, 213–235.
- Hay, D.F., & Cook, K.V. (2007). The transformation of prosocial behavior from infancy to childhood. In C. A. Brownell ve C. B. Kopp (Eds.), *Socioemotional development in the toddler years: Transitions and transformation* (pp. 100-131). Guilford Press.
- Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice*. Cambridge University Press.
- Hogg, M. A., & Vaughan, G. M. (2007). *Social psychology*. Prentice Hall.
- Hubert, B., Guimard, P., & Florin, A. (2017). Cognitive self-regulation and social functioning among French children: A longitudinal study from kindergarten to first grade. *PsyCh journal*, 6(1), 57-75. <https://doi.org/10.1002/pchj.160>
- Hughes, C., White, A., Sharpen, J., & Dunn, J. (2000). Antisocial, angry, and unsympathetic: "Hard-to-manage" preschoolers' peer problems and possible cognitive influences. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 41(2), 169-179.

- Jambon, M., & Malti, T. (2022). Developmental relations between children's peer relationship quality and prosocial behavior: The Mediating Role of Trust. *Journal of Genetic Psychology*, 183(3), 197–210. <https://doi.org/10.1080/00221325.2022.2030293>
- Jansen, P., Siebertz, M., & Portele, C. (2024). A Kind mind: Enhancing socio-emotional skills in german preschool children through the mindfulness-based kindness curriculum. *The Journal of Genetic Psychology*. <https://doi.org/10.1080/00221325.2024.2438383>
- Junaedah, J., Thalib, S.B., & Ahmad, M.A. (2020). The outdoor learning modules based on traditional plays in improving prosocial behaviour of early childhood. *International Education Studies*, 13(10), 88. <https://doi.org/10.5539/ies.v13n10p88>
- Kargı, E., & Erkan, S. (2004). Okul öncesi dönem çocuklarının sorun davranışlarının incelenmesi (Ankara ili örneği) [Investigation of problem behaviors of preschool children (Ankara province sample)]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 27, 135-144.
- Knafo, A., & Plomin, R. (2006). Prosocial behavior from early to middle childhood: Genetic And environmental influences on stability and change. *Developmental Psychology*, 42(5), 771-786.
- Kouros, C.D., Cummings, E.M., & Davies, P.T. (2010). Early trajectories of interparental conflict and externalizing problems as predictors of social competence in preadolescence. *Developmental Psychopathology*, 22, 527–537.
- Laible, D., McGinley, M., Carlo, G., Augustine, M., & Murphy, T. (2014). Does engaging in prosocial behavior make children see the world through rose-colored glasses? *Developmental Psychology*, 50(3), 872–880. <https://doi.org/10.1037/a0033905>.
- Landers, C. (1991). The development of aggression and prosocial behavior in early childhood. *The Consultative Group on Early Childhood Care and Development*, Coordinators' Notebook No. 10, October.
- Lane, K.L., Givner, C.C., & Pierson, M.R. (2004). Teacher expectations of student behavior: Social skills necessary for success in elementary school classrooms. *Journal of Special Education*, 38(2), 104–110.
- Li, H., & Zhang, Q. (2022). Effects of prosocial video games on prosocial thoughts and prosocial behaviors. *Social Science Computer Review*, 41(3). <https://doi.org/10.1177/08944393211069599>
- Li, J., & Shao, W. (2022). Influence of sports activities on prosocial behavior of children and adolescents: A systematic literature review. *International Journal of Environmental Research and Public Health*, 19(11). <https://doi.org/10.3390/ijerph19116484>
- Liew, J. (2012). Effortful control, executive functions, and education: Bringing self-regulatory and social-emotional competencies to the table. *Child Development Perspectives*, 6(2), 105–111. <https://doi.org/10.1111/j.1750-8606.2011.00196.x>

- Liew, J., & Spinrad, T.L. (2022). *Emotional self-regulation processes as foundation for social-emotional competencies and whole-child school success*, In book: Routledge Encyclopedia of Education Publisher: Taylor & Francis Group.
- McClelland, M.M., & Cameron, C.E. (2012). Self-regulation in early childhood: Improving conceptual clarity and developing ecologically valid measures. *Child Development Perspectives*, 6(2), 136-142. <https://doi.org/10.1111/j.1750-8606.2011.00191.x>
- Merrell, K.E., & Holland, M.L. (1997). Social-emotional behavior of preschool aged children with and without developmental delays. *Research in Developmental Disabilities*, 18(6), 393-405.
- Mundy, L.K., Canterford, L., Olds, T., Allen, N.B., & Patton, G.C. (2017). The association between electronic media and emotional and behavioral problems in late childhood. *Academic Pediatrics*, 17, 620–24. <https://doi.org/10.1016/j.acap.2016.12.014>.
- Murray, D.W., Rosanbalm, K., Christopoulos, C. & Hamoudi, A. (2015, January). Self-regulation and toxic stress: Foundations for understanding self-regulation from an applied developmental perspective (Vol. 21). *OPRE Report*.
- Nantel-Vivier, A., Pihl, R.O., Côté, S., & Tremblay, R.E. (2014). Developmental association of prosocial behaviour with aggression, anxiety and depression from infancy to preadolescence. *Journal of Child Psychology & Psychiatry*, 55(10), 1135–1144. <https://doi.org/10.1111/jcpp.12235>.
- Nelson, D.A., & Crick, N.R. (1999). Rose-colored glasses: Examining the social information processing of prosocial young adolescents. *Journal of Early Adolescence*, 19, 17–38.
- Öz, G. (1997). *Çocukta uyum ve davranış bozuklukları [Adaptation and behavioral disorders in children]*. Kök yayıncılık.
- Özbey, S. (2017). A study on the relation between the value behaviour and problem solving skills of the pre-school children. *European Journal of Education Studies*, 3(4) 1-19.
- Özbey, S. (2018). Okul öncesi dönem çocuklarının ahlaki değer davranışları ile motivasyon düzeyleri arasındaki ilişkinin incelenmesi [Investigation of the relationship between moral value behaviors and motivation levels of preschool children]. *Uluslararası Eğitim Bilimleri Dergisi*, 16, 1–15.
- Papadakis, S., & Kalogiannakis, M. (Eds.) (2020). *Mobile Learning Applications in Early Childhood Education*. IGI Global. <https://doi.org/10.4018/978-1-7998-1486-3>
- Paulus, F.W., Möhler, E., Recktenwald, F., Albert, A., & Mall, V. (2021). Electronic media and early childhood: A review. *Klinische Pädiatrie*, 233(4), 157-172. <https://doi.org/10.1055/a-1335-4936>
- Pazarbaşı, H., & Cantez, K.E. (2019). The relationship between self-regulation skills and peer relations among 66 months-old children attending kindergarten. *IBAD Journal of Social Sciences*, (5), 267-283. <https://doi.org/10.21733/ibad.624687>

- Pickens, J. (2009). Socio-emotional programme promotes positive behavior in preschoolers. *Child Care in Practice*, 15(4), 261-278.
- Plass, J.L., Homer, B.D., & Kinzer, C.K. (2015). Foundations of play -based learning. *Educational Psychologist*, 50(4), 258-283.
- Poehlmann-Tynan, J., Vigna, A.B., Weymouth, L.A., Gerstein, E.D., Burnson, C., Zabransky, M., Lee, P., & Zahnwaxler, C. (2016). A pilot study of contemplative practices with economically disadvantaged preschoolers: Children's empathic and self-regulatory behaviors. *Mindfulness*, 7(1), 46-58. <https://doi.org/10.1007/s12671-015-0426-3>
- Raffaelli, M., Crockett, L.J., & Shen, Y.L. (2005). Developmental stability and change in self-regulation from childhood to adolescence. *J. Genet. Psychol.* 166, 54-76. <https://doi.org/10.3200/GNTP.166.1.54-76>
- Ramazan, O., & Dönmez, Ö. (2018). Definition, scope and importance of social skills. In H. Gülay Ogelman (Ed.), *Social skills in the first years of life*. Eğiten Publication. 1, 17-30.
- Razza, R.A., Bergen-Cico, D., & Raymond, K. (2015). Enhancing preschoolers' self-regulation via mindful yoga. *Journal of Child and Family Studies*, 24(2), 372-385. <https://doi.org/10.1007/s10826-013-9847-6>
- Razza, R.A., Linsner, R.U., Bergen-Cico, D., Carlson, E., & Reid, S. (2020). The feasibility and effectiveness of mindful yoga for preschoolers exposed to high levels of trauma. *Journal of Child and Family Studies*, 29(5), 82-93. <https://doi.org/10.1007/s10826-019-01582-7>
- Riggs, N.R., Jahromi, L.B., Razza, R.P., Dillworth-Bart, J.E., & Mueller, U. (2006). Executive function and the promotion of social-emotional competence. *Journal of Applied Developmental Psychology*, 27(4), 300-309.
- Ritgens, C., Bondü, R., & Warschburger, P. (2024). Links between self-regulation patterns and prosocial behavior trajectories from middle childhood to early adolescence: A longitudinal study. *Front. Psychol.*, 15, 1480046. <https://doi.org/10.3389/fpsyg.2024.1480046>
- Rose, A.J., & Rudolph, K.D. (2006). A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin*, 132(1), 98-131. <https://doi.org/10.1037/0033-2909.132.1.98>
- Rubin, K.H., Bowker, J.C., McDonald, K.L., & Menzer, M. (2013). Peer relationships in childhood oxford handbooks online. In *The Oxford Handbook of Developmental Psychology* (Vol. 2, Issue October). https://www.researchgate.net/publication/235695164_Peer_Relationships_in_Childhood
- Ryan, C.L. (2011). *Head Start teachers' beliefs and practices related to positive teacher child relationships in the classroom* [Doctorate thesis, University of Minnesota]. <https://www.proquest.com/docview/889930921>
- Sameroff, A. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development*, 81, 6-22. <https://doi.org/10.1111/j.1467-8624.2009.01378.x>

- Semple, R.J., Lee, J., Rosa, D., & Miller, L.F. (2010). A randomized trial of mindfulness-based cognitive therapy for children: Promoting mindful attention to enhance social-emotional resiliency in children. *Journal of Child and Family Studies*, 19(2), 218–229.
- Sepitci, S.,M., & Gültekin A.G. (2019). The relationship between school adaptation of self-regulatory skills of 5-6 years of children. *The Journal of International Social Research*, 12(63), 867-883. http://www.sosyalarastirmalar.com/cilt12/sayi63_pdf/volume63_5egitim.htm
- Sun, Y., Lamoreau, R., O'Connell, S., Horlick, R., & Bazzano, A.N. (2021). Yoga and mindfulness interventions for preschool-aged children in educational settings: A systematic review. *International Journal of Environmental Research and Public Health*, 18(11), 6091. <https://doi.org/10.3390/ijerp181116091>
- Svetlova, M., Nichols, S.R., & Brownell, C.A. (2010). Toddlers' prosocial behavior: From instrumental to empathic to altruistic helping. *Child Development*, 81, 1814-1827.
- Şehirli, N. (2007). *Çocuk Davranışlarını Değerlendirme Ölçeği'nin geliştirilmesi ve bazı değişkenlere göre incelenmesi. [Development of Child Behavior Assessment Scale and examination according to some variables behavior]* [Master Thesis, Gazi University].
- Tintori, A., Ciancimino, G., Palomba, R., Clementi, C., & Cerbara, L. (2021). The impact of socialisation on children's prosocial behaviour. A study on primary school students. *Int. J. Environ. Res. Public Health*, 18, 12017. <https://doi.org/10.3390/ijerph182212017>
- Tominey, S.L., & McClelland, M.M. (2011). Red light, purple light: findings from a randomized trial using circle time games to improve behavioral self-regulation in preschool. *Early Educ. Dev.*, 22, 489–519. <https://doi.org/10.1080/10409289.2011.574258>
- Tosun, D. (2023). *Öykü temelli hazırlanan bütünleştirilmiş sosyal-duygusal eğitim programının okul öncesi dönem çocuklarının öz düzenleme becerileri ve prososyal davranışlarına etkisinin incelenmesi [Investigation of the effect of story-based integrated social-emotional education program on self-regulation skills and prosocial behaviors of preschool children]* [Master Thesis, Necmettin Erbakan Üniversitesi]. <https://acikerisim.erbakan.edu.tr/items/e0a4fbfa-9c5d-487d-8ea1-0ed15b210cc4>
- Ural, O., Güven, G., Sezer, T., Efe-Azkeskin, K., & Yılmaz, E. (2015). Okul öncesi dönemdeki çocukların bağlanma biçimleri ile sosyal yetkinlik ve duygu düzenleme becerileri arasındaki ilişkinin incelenmesi [Investigation of the relationship between attachment styles of preschool children and social competence and emotion regulation skills]. *Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Dergisi*, 1(2), 589-598.
- Uzmen, S., & Mağden, D. (2002). Okulöncesi eğitim kurumlarına devam eden altı yaş çocuklarının prososyal davranışlarının resimli çocuk kitapları ile desteklenmesi [Supporting the prosocial behaviors of six-year-old children attending preschool education institutions with illustrated children's books]. *M.Ü. Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*, 15, 193-212.

- Vallotton, C., & Ayoub, C. (2011). Use your words: The role of language in the development of toddlers' self-regulation. *Early Childhood Research Quarterly*, 26(2), 169-181.
- Viglas, M., & Perlman, M. (2018). Effects of a mindfulness-based program on young children's self-regulation, prosocial behavior and hyperactivity. *J Child Fam Stud*, 27, 1150-1161. <https://doi.org/10.1007/s10826-017-0971-6>
- Wang, Y., Kajamies, A., Hurme, T.R., Kinosh, J., & Palonen, T. (2018). Now it's your turn. Preschool children's social and motional interaction in small Groups. *Journal of Early Childhood Education Research*, 7(2), 255-281.
- Williams, K.E., & Berthelsen, D. (2017). The development of prosocial behaviour in early childhood: Contributions of early parenting and self-regulation. *International Journal of Early Childhood*, 49, 73-94. <https://doi.org/10.1007/s13158-017-0185-5>
- Williams, K.E., Berthelsen, D., Walker, S., & Nicholson, J.M. (2017). A developmental cascade model of behavioral sleep problems and emotional and attentional self-regulation across early childhood. *Behavioral Sleep Medicine*, 15(1), 1-21. <https://doi.org/10.1080/15402002.2015.1065410>.
- Williford, A.P., Whittaker, J.E.V., Vitiello, V.E., & Downer, J.T. (2013). Children's engagement within the preschool classroom and their development of self-regulation. *Early Education Development*, 24(2), 162-187. <https://doi.org/10.1080/10409289.2011.628270>
- Yıldırım, A., & Şimşek, H. (2000). *Sosyal bilimlerde nitel araştırma yöntemleri* (9. Baskı) [Qualitative research methods in social sciences]. Seçkin Yayıncılık.
- Yurdakul, Y., İlhan-İldız, G., & Bütün-Ayhan, A. (2022). Okul öncesi dönem çocuklarında öz düzenleme becerileri ile prososyal davranışları arasındaki ilişkinin incelenmesi [Investigation of the relationship between self-regulation skills and prosocial behaviors in preschool children]. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi*, 62, 354-376. <https://doi.org/10.21764/maeuefd.1008817>
- Zahn-Waxler, C., & Smith, K.D. (1992). The development of prosocial behavior. In V. B. Van Hasselt & M. Hersen (Eds.), *Handbook of social development: A lifespan perspective* (pp. 229-256). Plenum Press. https://doi.org/10.1007/978-1-4899-0694-6_10
- Zahn-Waxler, C., Radke-Yarrow, M., Wagner, E., & Chapman, M. (1992). Development of concern for others. *Developmental Psychology*, 28, 126-136.
- Zelazo, P.D., Carlson, S.M., & Kesek, A. (2008). The development of executive function in childhood. In C. A. Nelson & M. Luciana (Eds.), *Handbook of developmental cognitive neuroscience* (2nd ed. pp. 553-574). Cambridge, MA: MIT Press.

Data Availability Declaration

Data Availability Upon Formal Request:

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

Author Contributions

The sole author of this research, Burcu BAĞCI-ÇETİN, was responsible for the conceptualization, methodology formulation, data collection, analysis, and interpretation. Furthermore, Burcu BAĞCI-ÇETİN took charge of drafting the initial manuscript, revising it critically for vital intellectual content, and finalizing it for publication. The author has read and approved the final manuscript and takes full accountability for the accuracy and integrity of the work presented.

Author(s)' statements on ethics and conflict of interest

Ethics statement: We hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. We take full responsibility for the content of the paper in case of dispute.

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Adapting the Self-Regulation Scale for Online Learning to the Turkish Context

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Abstract:

The Self-Regulation for Learning – Online (SRL-O) scale was developed to encompass a broad range of motivational beliefs and learning strategies commonly used in online or blended learning environments. This study aims to determine the validity and reliability of the SRL-O scale, developed by Broadbent et al. (2023) to address shortcomings in existing measurement instruments, within the Turkish context. The 44-item, 7-point Likert-type scale was administered to a total of 803 undergraduate and graduate students. A confirmatory factor analysis (CFA) was conducted to examine the 10-factor structure of the scale, which includes (1) online self-efficacy, (2) online intrinsic motivation, (3) online extrinsic motivation, (4) online negative achievement emotion, (5) planning and time management, (6) metacognition, (7) study environment, (8) online effort regulation, (9) online social support, and (10) online task strategies. The results indicated that the 10-factor structure was consistent with the original scale and demonstrated good model fit. Internal consistency coefficients were calculated for the entire scale and its subdimensions to assess reliability. Additionally, the scale was found to have two higher-order factors: motivational beliefs and learning strategies. The Cronbach's alpha coefficient for the overall scale was calculated as 0.91. The SRL-O is expected to meet the need for a comprehensive instrument that captures a wide range of motivational beliefs and learning strategies in the context of online self-regulated learning.

Keywords: Learning Strategies, Online Learning, Motivation, Self-Regulated Learning

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INTRODUCTION

In recent years, the proportion of students participating in online education has steadily increased (Ortagus, 2017; Yang & Chui, 2021; Xu & Xue, 2023). Online technologies have become integral to higher education, with many programs adopting blended learning formats that combine face-to-face instruction with digital tools and platforms (Rasheed et al., 2020). The shift toward digital learning environments was significantly accelerated by the COVID-19 pandemic, during which nearly all university students worldwide were exposed to what became known as "emergency remote teaching" (Hodges et al., 2020). More recently, the devastating earthquake that struck Türkiye and Syria in 2023 once again compelled universities in Türkiye to switch to fully online education, highlighting the ongoing vulnerability of traditional educational systems to unexpected disruptions.

Online learning is widely valued for its promise of flexibility—allowing students to access educational content anytime and anywhere. However, this flexibility often comes with a reduction in structured interaction with instructors and peers, which places a greater burden on learners to manage their own learning processes (Broadbent & Lodge, 2020). As a result, students must exercise higher levels of autonomy, responsibility, and self-direction to succeed in online learning environments. This underscores the importance of self-regulated learning (SRL)—a process through which learners actively control their motivation, behavior, and cognition to achieve academic goals (Zimmerman, 2000).

Extensive research has shown that SRL plays a critical role in students' academic achievement, particularly in online and blended learning contexts where external support is limited (Broadbent & Poon, 2015; Broadbent, 2017; Xu et. al., 2023). However, effective measurement of SRL in these contexts remains a challenge. There is a growing demand for psychometrically sound instruments that can capture both the motivational and strategic dimensions of self-regulated learning specific to digital environments.

To address this need, Broadbent et al. (2023) developed the Self-Regulation for Learning – Online (SRL-O) scale. This instrument was designed to reflect a comprehensive view of SRL in online settings, encompassing various motivational beliefs and learning strategies. The present study aims to adapt the SRL-O scale into Turkish and to examine its psychometric properties within a sample of Turkish higher education students. Using a well-established scale allows for comparability across studies and contexts, facilitating cumulative research and meta-analyses (Molenaar et al., 2022; Dağgöl, 2023). Adapting robust scales supports the advancement of SRL research by enabling researchers to focus on contextual differences and new applications, rather than repeatedly establishing basic measurement properties (Artino & Stephens, 2006). The field is moving toward integrating multimodal and technology-enhanced measurement approaches, but foundational, validated scales remain essential for benchmarking and validation (Molenaar et. al., 2022). In summary, the introduction of a scale adaptation study should clearly articulate the solid

foundations of the original scale and justify its selection. This approach ensures methodological rigor and supports the broader research community by building on established, validated instruments. By providing a culturally appropriate and methodologically robust tool, this study seeks to contribute to both the assessment and enhancement of self-regulated learning in online education. By providing a culturally appropriate and methodologically robust tool, this study seeks to contribute to both the assessment and enhancement of self-regulated learning in online education. Specifically, the study aims to test whether the original factor structure and constructs of the SRL-O scale hold true in the Turkish higher education context, thereby examining the potential influence of cultural and contextual differences on the measurement of self-regulated learning.

Self-Regulated Learning

University students' self-regulated learning (SRL) processes can take place not only in traditional classroom environments but also through digital learning platforms and online resources. This process supports students in guiding their own learning journeys and achieving personal goals. Empirical research has shown that self-regulated learning enhances students' motivation (Boekaerts, 1996), deepens their learning processes (Hattie & Timperley, 2007), and helps them develop sustainable learning habits (Dinsmore, Alexander & Loughlin, 2008). For university students, SRL plays a critical role by fostering motivation through the opportunity to select topics aligned with their interests and learning styles, providing flexibility to regulate their own pace and methods of learning, encouraging independence by taking responsibility for their learning, and offering opportunities to develop critical thinking skills. Beyond these benefits, identifying which strategies are effective in the SRL process and determining the instructional approaches needed to support online learning can provide valuable insights for researchers, improving the quality of university education and optimizing student achievement.

Learners vary in the extent of their engagement in self-regulation to achieve learning goals: setting objectives, planning, and applying strategies. Through processes of self-assessment and reflection, learners monitor and adjust these strategies to enhance their progress toward goals (Zimmerman, 1986). A successful self-regulated learner typically demonstrates goal orientation, persistence in the face of challenges, effective time management, and help-seeking when needed (Pintrich et al., 1993). Meta-analytic studies have shown that SRL strategies are positively associated with academic outcomes across primary, secondary, and higher education settings (Dignath & Büttner, 2008; Richardson et al., 2012), as well as in online learning environments (Broadbent & Poon, 2015). Furthermore, a meta-analysis on the effects of self-regulated learning (SRL) training demonstrated that it could improve academic achievement, motivation, metacognitive thinking, and the use of learning strategies such as resource management (Theobald, 2021). As students increasingly engage in online or blended learning—whether by necessity or

choice—it becomes important to understand which SRL strategies are most essential in these contexts.

Online Self-Regulated Learning Scale

This study addresses the need for the development and validation of a comprehensive measurement tool suitable for online or blended learning contexts for self-regulated learning (SRL) that encompasses motivational beliefs (such as self-efficacy) and SRL strategies (such as metacognition). This need has become even more critical in the post-pandemic era and in learning processes affected by emergency situations such as earthquakes and other natural disasters.

Based on a social-cognitive perspective and drawing on the key components of SRL theory highlighted in studies by Zimmerman and Moylan (2009), Pintrich et al. (1993), and Broadbent et al. (2023), the SRL scale developed by Broadbent et al. (2023) has been adapted into Turkish. The comprehensive SRL scale created in this context includes both motivational beliefs and self-regulated learning strategies. It has been observed that motivational beliefs are critical at both the beginning and throughout the learning process, while learning strategies become particularly important during the performance stage (Zimmerman & Moylan, 2009). To assess motivational beliefs, components such as expectations, values, and emotions have been emphasized (Pintrich et al., 1993).

Existing online SRL scales were reviewed, and components related to learning strategies and motivational beliefs were identified. This analysis provides guidance on the significance and necessity of a reliable SRL measurement tool that is both theoretically stable and contextually suitable for practical application in the current literature. The reason for preferring the SRL scale developed by Broadbent et al. (2023) lies in its comprehensiveness and its alignment with contemporary academic needs, in contrast to other frequently cited SRL-related scales (e.g., Pintrich et al., 1991; Artino & Mc, Coach, 2008; Barnard et al., 2009; Cheng & Tsai, 2011; Wang et al., 2013; Cho & Cho, 2017; Kizilcec et al., 2017; Tladi, 2017; Jansen et al., 2017; Alibak et al., 2019). Broadbent et al.'s (2023) scale extends the factor structures of these previous scales and provides a more up-to-date measure.

In summary, scales focusing on online learning are context-specific, with the most frequently included subscales in online SRL surveys being peer learning and help-seeking, time management, environmental structuring, metacognition, and self-efficacy. These scales predominantly focus on SRL motivational beliefs or strategies. However, most online SRL scales are centered around specific learning environments and do not adequately address motivational beliefs or the wide-ranging contexts of modern online education. Although the Motivation Strategies for Learning Scale, developed by Pintrich et al. (1991), is one of the most comprehensive tools, it may not fully meet the needs of modern learning environments, particularly in areas such as test anxiety or help-seeking. Broadbent et al.'s (2023) Online SRL scale provides an updated tool for online and blended learning contexts,

encompassing both motivational beliefs and learning strategies. This SRL scale adapts the best features from other scales in the literature, ensuring content validity through expert opinions and student feedback, followed by, testing the factor structure with exploratory and confirmatory factor analyses (Broadbent et al., 2023). The psychometric robustness of the scale, its wide coverage, and its cost-effectiveness offer an effective measurement for online SRL, particularly for undergraduate students.

A review of the literature on self-regulated learning found that no Turkish measurement tool has been specifically designed to assess online SRL. Taking this into consideration, the present study aims to adapt the Self-Regulation for Learning Online (SRL-O) Scale, developed by Broadbent et al. (2023) for higher education students, into Turkish.

METHOD

The main aim of this study is to test the validity and reliability of the Online Self-Regulated Learning Scale. In line with this purpose, this section of the study presents explanations regarding the research model, participants, validity and reliability, data collection, and data analysis.

Research Model

In this study, a general survey model has been used. General survey models are surveys conducted on the entire population or a sample selected from the population to make a general judgment about the population, which consists of many elements (Karasar, 2014, p. 79). In this context, a study group representing the population has been created for the research conducted using the general survey model.

Participants

This study was conducted with 803 higher education students aged between 18 and 44. Of the students, 67% (n=538) are female, and 33% (n=265) are male. When examining the distribution of students according to their academic year, 22.8% (n=185) are in the first year, 21.2% (n=168) are in the second year, 11.9% (n=96) are in the third year, 12.5% (n=98) are in the fourth year, and 31.6% (n=256) are in other academic levels (such as preparatory or extended programs). In the study, the data from 266 students were used for Exploratory Factor Analysis (EFA), 254 for Confirmatory Factor Analysis (CFA), and 230 for criterion validity testing. The participants came from two different universities, each with more than thirty years of educational activity. The university is divided into four faculties, each consisting of broad groups of related disciplines that are grouped into various departments. The four faculties are: (1) Education and Arts; (2) Health (Nutrition, Health and Social Development, Medicine, and Psychology); (3) Engineering; (4) Business and Law. Participants were not limited to any specific department or faculty. Both hybrid and online students were allowed to participate in the survey without distinction. It was determined that all students, regardless of enrollment status, had received 100% (or near 100%) online

education during the COVID-19 pandemic and the earthquake disaster in 2020 and 2021. Preparatory students who continued their education at the initial level were not distinguished.

Measurement Tool Used

The original English version of the Online Self-Regulated Learning Scale (SRL-O), developed by Broadbent et al. (2023), was obtained from the article in which the scale was published. The SRL-O consists of 10 factors and 44 items, which are: (1) Online Self-Efficacy (4 items), (2) Online Intrinsic Motivation (5 items), (3) Online Extrinsic Motivation (3 items), (4) Online Negative Achievement Emotion (5 items), (5) Planning and Time Management (5 items), (6) Metacognition (5 items), (7) Study Environment (3 items), (8) Online Effort Regulation (4 items), (9) Online Social Support (5 items), and (10) Online Task Strategies (5 items). Additionally, the SRL-O has two higher-order factors, motivational beliefs and learning strategies, which consist of ten factors in total. The first four factors represent motivational beliefs, while the last six factors form learning strategies.

Items 26, 27, 28, 29, and 30 are negatively worded, while all other items are positively worded. The scale administration time varies from 15 to 35 minutes. Participants indicate their degree of agreement with each statement on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

The structural validity of the original scale was examined through confirmatory and exploratory factor analyses. As a result of the analyses, it was found that the two higher-order factor structures of the scale yielded the best fit values. For the criterion validity of the SRL-O, criteria were identified that aligned with the ten sub-factors described in the upper sections. Correlations calculated between these criteria and the factor scores of the SRL-O ranged from 0.50 to -0.56. The reliability of the factors in the original scale was examined using Cronbach's alpha coefficient. The alpha values found for the factors ranged from 0.76 to 0.90 (Broadbent et al., 2023).

Data Analysis and Procedures

During the adaptation process of the scale, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to examine the factor structure of the scores obtained from Turkish higher education students in line with the approach used in the scale's development. Thus, the construct validity of the scale was investigated using two different factor analysis techniques.

Exploratory factor analysis (EFA) aims to group a large number of related variables into fewer, conceptually meaningful variables (Stevens, 2002; Çokluk, Şekercioğlu, & Büyüköztürk, 2010). In EFA, when determining which factor an item should belong to, factor loadings are considered. Items with a factor loading of 0.30 or higher can be retained in the scale (Kline, 2023). Various methods, such as principal component analysis, maximum

likelihood factor analysis, image factor analysis, and principal factor analysis, can be used during the factor extraction process. Among these, principal component analysis is one of the most widely used and easiest-to-interpret techniques (Büyüköztürk, 2002). In this study, principal component analysis was used to reduce the number of variables, and combine them under a smaller number of components (Tabachnick & Fidell, 2013). SPSS 22.0 was used for exploratory factor analysis.

Confirmatory Factor Analysis (CFA) is an advanced statistical technique used to test a pre-established factor structure of a scale or measurement model. CFA primarily aims to assess the degree of fit between the proposed model and the real data, making it a hypothesis testing approach (Byrne, 2010). CFA is used to evaluate the relationships between the factors defined by the researcher and the observed variables (items), as well as the connections among these factors. This analysis examines model fit indices (such as RMSEA, CFI, TLI, SRMR) and factor loadings to determine the validity of a model. Factor loadings are generally expected to be 0.50 or higher, but this threshold may vary depending on the nature of the study (Hair et al., 2014). CFA is a crucial tool, particularly in scale development and adaptation processes. This technique allows researchers to test the accuracy of the theoretically proposed structure and provides valuable insights into the validity and reliability of the measurement model (Kline, 2023). AMOS 19.0 was used for confirmatory factor analysis.

To examine the factor structure of the scale, an initial unrotated principal component analysis was conducted. Subsequently, to make the factors easier to interpret and understand, the analysis was repeated using the equamax orthogonal rotation method. Equamax is a combination of the varimax and quartimax rotation methods and is used to simplify both the factors and the variables simultaneously (Çokluk, Şekercioğlu & Büyüköztürk, 2010). After completing EFA, CFA was applied to evaluate the suitability of the original scale for the Turkish culture, and test its construct validity. In this process, the maximum likelihood method was preferred for CFA.

The corrected item-total correlation was calculated to determine how well the items of the scale could differentiate individuals based on the features they measure, and to evaluate the internal consistency of the test. Additionally, the significance of the difference between the item scores of the bottom and top 27% of the total scores was analyzed using a t-test (Büyüköztürk, 2011). To assess the reliability of the scale, Cronbach's alpha internal consistency coefficients were calculated. Furthermore, the mean and standard deviation values for the factors were reported, and the relationships between the factors were examined using Pearson's correlation coefficient.

Cultural and Linguistic Adaptation into Turkish

The original English version of the scale was culturally and linguistically adapted into Turkish through a systematic and expert-guided translation process. Initially, the scale was independently translated into Turkish by three experts who conduct higher education

courses in English. These initial translations were then reviewed by three additional professionals with expertise in mathematics education, Turkish language education, and educational measurement and evaluation, leading to the development of a preliminary Turkish draft. To ensure cultural and contextual appropriateness, the Turkish draft was evaluated using an Expert Review Form. Specialists assessed the items based on cultural relevance, linguistic clarity, methodological soundness, and psychometric integrity. Items were retained if they met the criteria of a mean score of 4.0 or above and a standard deviation of 0.7 or below, indicating consensus among experts regarding item–factor alignment.

Following this step, the culturally adapted Turkish version was back-translated into English by a linguist and an education expert. Both the Turkish and back-translated English forms were then compared by two experts in English language teaching with the original version. The comparison confirmed a high level of consistency and conceptual equivalence between the original and adapted forms, supporting the validity of the Turkish version within its cultural context.

Ethical considerations

In the course of this research, we paid scrupulous attention to ethical guidelines, ensuring that the integrity and reliability of the study were never compromised. In the course of this research, ethical principles were carefully observed throughout the scale adaptation process, ensuring that the integrity and reliability of the study were never compromised. For the adaptation of the scale, permission for the use of the original scale was available at <https://www.srl-o.com/>, the official project website. However, an email request was sent to the authorized individuals to formally obtain permission. In addition, ethics committee approval was secured for conducting the validity and reliability studies.

The ethical approval for the study was obtained from the Istanbul Aydın University Educational Sciences Ethics Committee with the decision numbered 2023-07, dated June 22, 2023. Furthermore, the participation of individuals in the study was based on voluntary consent. Prior to their involvement, participants were informed about the purpose of the study clear instructions regarding their right to withdraw from the study at any time without any negative consequences. All personal and consent-related documents were stored securely, adhering to strict confidentiality measures.

Ethical Review Board: Istanbul Aydın University Educational Sciences Ethics Committee

Date of Ethics Review Decision: 22.06.2023

Ethics Assessment Document Issue Number: 2023-07

FINDINGS

Results of the Exploratory Factor Analysis (EFA)

Before performing Exploratory Factor Analysis (EFA), it is essential to assess the adequacy of the sample size (Çokluk, Yılmaz, & Demirtaş, 2010). In this context, the Kaiser-Meyer-Olkin (KMO) test yielded a value of 0.965, indicating that the sample size was sufficient and suitable for factor analysis (Tavşancıl, 2010). Additionally, it is emphasized in the literature that for the validity of EFA, the data should exhibit a normal distribution (Tabachnick & Fidell, 2013). The suitability of the data was tested using Bartlett's Test of Sphericity, which produced a Chi-square value of $\chi^2 = 24721.7$, $p < .000$, indicating that the data were appropriate for factor analysis.

The initial EFA revealed a six-factor structure. However, some items loaded significantly on more than one factor. To clarify the factor structure, the analysis was repeated using the Equamax rotation method, which resulted in a structure closely resembling the original version. Ultimately, a ten-factor solution—consistent with the original scale—was identified. These findings support the structural validity of the adapted scale. Detailed results of the EFA are presented in Table 1.

The ten identified factors explained a total of 79% of the variance. The eigenvalues and explained variance for each factor were as follows: the first factor had an eigenvalue of 18.83 accounting for 48.3% of the variance, the second factor had an eigenvalue of 4.14 accounting for 10.62%, the third had an eigenvalue of 1.77 accounting for 4.55%, the fourth had an eigenvalue of 1.27 accounting for 3.27%, the fifth had an eigenvalue of 1.18 accounting for 3.02%, and the sixth had an eigenvalue of 1.03 accounting for 2.64%, with the remaining factors contributing accordingly. The comparison between the EFA results and the original ten-factor structure showed a complete alignment of items with their respective factors, thereby confirming the construct validity of the scale.

Table 1

Factor Load Values of "Self-Regulation Scale for Online Learning" Items

Item	Common Factor Variance	Factor Loading Values*									
		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
SE1	,799							,577			
SE2	,838							,669			
SE3	,822							,634			
SE4	,801							,661			
EM1	,840					,894					
EM2	,851					,927					
EM3	,719					,759					
PM1	,720						,718				
PM2	,741						,703				
PM3	,736						,729				
PM4	,777						,772				

PM5	,796			,539		
SEM1	,844	,356			,340	
SEM2	,800					-,516
SEM3	,830					-,344
SS1	,728			-,482		
SS2	,722			-,753		
SS3	,809			-,828		
SS4	,818			-,930		
SS5	,757			-,822		
IM1						
IM2	,845					-,508
IM3	,835					-,356
IM4	,855					-,530
IM5						
NAE1	,692	,770				
NAE2	,811	,922				
NAE3	,765	,736				
NAE4	,846	,902				
NAE5	,845	,866				
M1	,808		,847			
M2	,778		,809			
M3	,727		,581			
M4	,753		,524			
M5	,740		,443			
ER1	,802	,617				
ER2	,791	,472				
ER3						
ER4	,769	,634				
TS1						
TS2						
TS3	,834					-,442
TS4	,840					-,407
TS5	,742	,333				-,364

*Values below ± 0.33 are not shown.

Results of the Confirmatory Factor Analysis (CFA)

To assess the construct validity of the Online Self-Regulated Learning Scale (SRL-O), a Confirmatory Factor Analysis (CFA) was conducted to test whether the ten-factor structure of the original instrument could be replicated. Model fit indices were calculated for the ten-factor model as specified in the original version.

The initial CFA results yielded the following fit indices: $\chi^2(866) = 2515.276$, $p < .001$, CFI = .932, GFI = .88, AGFI = .84, RMSEA = .061, SRMR = .07, and NFI = .910. Although some of these indices indicated an acceptable model fit, others suggested suboptimal alignment between the model and the observed data.

An examination of the modification indices revealed substantial covariance between the error terms of several item pairs (IM1–IM5, NA3–TS1, TS5–TS4). These item pairs were found to belong to the same latent constructs in the original scale. In consultation with

subject-matter experts, it was decided to include these correlated error terms in the model to improve fit.

Following these modifications, the model was reanalyzed. The resulting CFA model showed statistically significant factor loadings ranging from 0.65 to 0.93 ($p < 0.001$), indicating strong and meaningful relationships between items and their respective latent factors. The final model is presented in Figure 1 and supports the structural validity of the Turkish adaptation of the SRL-O scale.

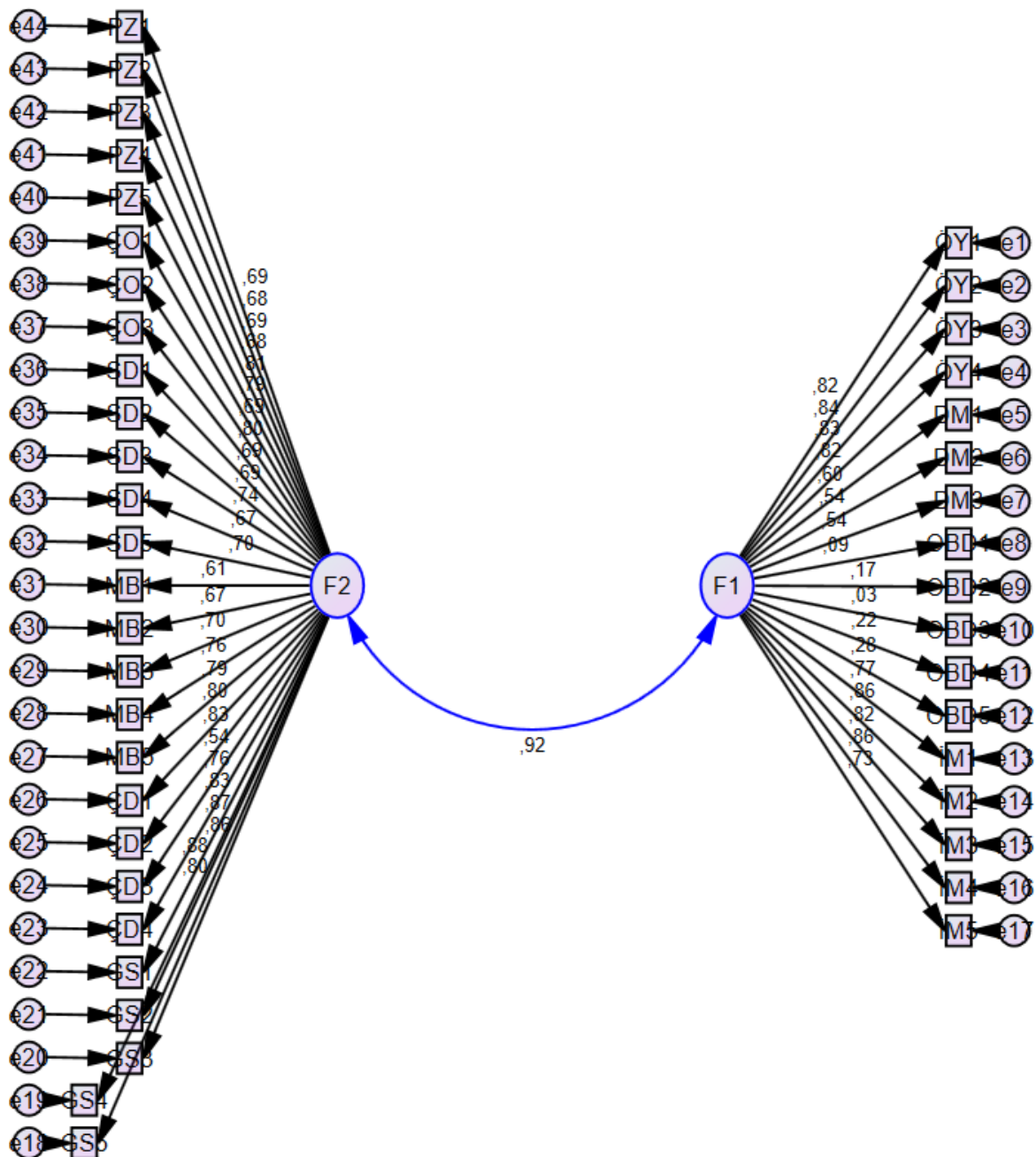


Figure 1. DFA with standardized results

The model tested through Confirmatory Factor Analysis (CFA) revealed that the Chi-square statistic was significant ($\chi^2 = 2515.276$, $N = 765$, $df = 657$, $p < .001$). However, since Chi-

square values are sensitive to large sample sizes—often resulting in significant outcomes regardless of model fit—, it is recommended to consider the ratio of Chi-square to degrees of freedom (χ^2/df) for a more accurate assessment of fit (Büyüköztürk, Akgün, Özkahveci, & Demirel, 2004). The calculated χ^2/df ratio was 3.82, which falls within the acceptable range, suggesting an adequate model fit.

Additional fit indices supported the model's suitability: RMSEA = .06, SRMR = .06, CFI = .932, GFI = .88, AGFI = .84, NFI = .910, and IFI = .92 (see Table 2). These results indicate that the ten-factor model demonstrates an acceptable level of fit, consistent with the original scale structure.

Table 2

Criteria for Acceptance of Model Fit Indices and Comparison with Original Scale

Fit Indices	Original Scale	Turkish Scale	Acceptable Fit
χ^2 /sd	1.67	3.82	≤ 5
RMSEA	0.05	0.06	≤ 0.08
SRMR	-	0.07	≤ 0.08
GFI	-	0.78	≥ 0.85
AGFI	-	0.84	≥ 0.80
NFI	-	0.910	≥ 0.90
CFI	0.872	0.932	≥ 0.95

To assess the reliability of the Online Self-Regulated Learning Scale (SRL-O), Cronbach's alpha coefficients were calculated for each subdimension of the scale. Additionally, corrected item-total correlation values were computed to evaluate how well each item discriminated between individuals. To further test item discrimination, independent samples t-tests were conducted between the top 27% and bottom 27% groups based on total scores. The results obtained are presented in Table 3.

Table 3

Item Correlation Values and T-Test Results of Upper and Lower Groups According to Total Scores

Factor Name	Item No	Corrected Item-Total Correlation	t (top 27% - bottom 27%)	Factor Name	Item No	Corrected Item-Total Correlation	t (top 27% - bottom 27%)
Self-Efficacy	SE1	.78	23.06*	Planning and Time Management	PM1	.67	16.6*
	SE2	.79	22.4*		PM2	.63	15.6*
	SE3	.79	20.9*		PM3	.63	14.6*
	SE4	.78	19.9*		PM4	.62	15.8*
External Motivation	EM1	.56	14.8*	Effort Regulation	PM5	.78	21.6*
	EM2	.50	13.7*		ER1	.77	22.8*
	EM3	.52	11.9*		ER2	.81	22.7*
Social Support	SS1	.64	16.01*	Negative Achievement Emotions	ER4	.73	21.5*
	SS2	.65	16.8*		NAE1	.53	3.9*
	SS3	.71	17.3*		NAE2	.70	6.1*
	SS4	.62	15.5*		NAE3	.47	3.05*
	SS5	.65	16.8*		NAE4	.80	7.1*

Metacognition	M1	,52	12.2*	Task Strategies	NAE5	,80	8.0*
	M2	,58	14.5*		TS3	,78	20.8*
	M3	,61	14.1*		TS4	,81	21.7*
	M4	,69	17.8*		TS5	,73	17.9*
	M5	,72	18.7*		IM2	,81	21.9*
Study Environment	SEM1	,81	25.1*	Intrinsic Motivation	IM3	,78	24.7*
	SEM2	,72	18.2*		IM4	,81	22.2*
	SEM3	,82	22.7*				

According to the results, the corrected item-total correlation values of the items in the Online Self-Regulated Learning Scale (SRL-O) range from 0.47 to 0.82. The t-test results comparing the mean scores of the top 27% and bottom 27% groups to determine the discriminability of the scale indicated a significant difference for all items. Additionally, a t-test conducted on the total scores of the items to determine their discriminative ability between the top 27% and bottom 27% groups also showed a significant difference [$t(341)=57.1$, $p<.01$]. The Cronbach alpha values calculated for both the original and Turkish forms of the scale are presented in Table 4. The Cronbach alpha values for the Turkish form range from 0.84 to 0.92.

Table 4

Examining the Reliability of "Self-Regulation Scale for Online Learning Scale" Scores

Factor Name	Alpha		Factor Name	Alpha	
	Original	Turkish		Original	Turkish
Self-Efficacy	.88	.92	Planning and Time Management	.81	.89
External Motivation	.74	.84	Effort Regulation	.85	.89
Social Support	.86	.90	Negative Achievement Emotions	.91	.90
Metacognition	.75	.89	Task Strategies	.76	.91
Study Environment	.78	.90	Intrinsic Motivation	.86	.92

In the next step, the mean and standard deviation values for the dimensions of the SRL-O were calculated, along with the correlations between the dimensions of the SRL-O (Table 5). The correlation values between the dimensions of the scale range from -0.30 to 0.71.

Table 5

The Correlation Values Between Dimensions of The Scale

Variables	ER	NAE	M	SS	EM	PM	SE	TS	IM	SEM
1 ER										
2 NAE	,18									
3 M	,33	-.06								
4 SS	-.40	-.02	-.50							
5 EM	,35	-.04	,35	-.46						
6 PM	,39	,04	,50	-.52	,42					

7	SE	,43	,21	,30	-,45	,40	,43			
8	TS	-,13	-,31	,28	-,18	-,25	-,14	-,31		
9	IM	-,22	-,22	,32	-,28	-,24	-,34	,11	-,22	
10	SEM	-,19	-,15	,23	-,18	-,19	-,26	,09	,14	-,15

**p<0.01

DISCUSSION AND RESULTS

In this study, the Online Self-Regulated Learning Scale (SRL-O), developed by Broadbent and others (2023), was examined for validity and reliability with a group of Turkish higher education students. To evaluate the construct validity of the scale, Exploratory Factor Analysis (EFA) was first conducted, followed by Confirmatory Factor Analysis (CFA) based on theoretical foundations and the structure obtained from the EFA.

When examining the EFA results of the SRL-O, it was found that a factor structure identical to the original scale emerged. The factors discovered in the EFA were consistent with the original scale and consisted of 10 factors: (1) online self-efficacy, (2) online intrinsic motivation, (3) online extrinsic motivation, (4) online negative success emotions, (5) planning and time management, (6) metacognition, (7) study environment, (8) online effort regulation, (9) online social support, and (10) online task strategies. It was also found that SRL-O determined two higher-order factors: motivational beliefs and learning strategies.

The ten-factor structure of SRL-O was tested using CFA, similarly to how the original scale was tested. The obtained fit values ($\chi^2/sd = 2.10$; RMSEA = 0.06, SRMR = 0.06, CFI = 0.93, GFI = 0.88, AGFI = 0.84, NFI = 0.91, IFI = 0.92) suggest that the model showed a very good fit, particularly with the χ^2/sd ratio and IFI (0.92) (Bollen, 1989; Sümer, 2000). Other fit indices, RMSEA (0.06) and SRMR (0.06), have similar values, which indicates that the model has an acceptable fit. RMSEA and SRMR values ideally should be close to zero, with values equal to or less than 0.05, indicating very good fit (Browne & Cudeck, 1993; Cheung & Rensvold, 2002). Some researchers suggest that for more complex models, RMSEA values below 0.08 (Browne & Cudeck, 1993; Byrne, 1998; Hu & Bentler, 1999; Sümer, 2000) and SRMR values below 0.10 (Anderson & Gerbing, 1984; Cole, 1987; Marsh, Balla, & McDonald, 1988) are within acceptable limits. In this context, the RMSEA and SRMR values, which range from 0.05 to 0.08, show that the model's fit level is acceptable.

Other fit indices obtained in the study were the absolute fit indices Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI). Studies indicate that GFI and AGFI values close to 0.80 are acceptable for fit (Anderson & Gerbing, 1984; Jöreskog & Sörbom, 1993; Schumacker & Lomax, 2016; Kline, 2023). The GFI and AGFI values obtained in this study indicate acceptable levels of fit.

The study also used incremental fit indices known as NFI (Normed Fit Index) and CFI (Comparative Fit Index). Values between 0.90 and 0.95 for these indices are considered to indicate acceptable fit (Bentler, 1992; Sümer, 2000). Recent literature shows that NFI and CFI values above 0.90 indicate good fit (Schumacker & Lomax, 2016; Kline, 2023). The NFI (0.91)

and CFI (0.93) values obtained in this study also meet these criteria, indicating that the model's fit is at an acceptable level.

When comparing the fit values of the original SRL-O with the ones obtained in this study, it was observed that the χ^2/sd ratio and CFI indices are quite similar, and both values are at an acceptable fit level. On the other hand, while the RMSEA and SRMR values calculated for the original SRL-O indicate excellent fit, the RMSEA (0.06) and SRMR (0.06) values calculated in this study show that the model's fit is at an acceptable level.

In the study, t-test results based on the upper and lower 27% groups' scores revealed a significant difference in the mean scores of all items. This finding indicates that the scale's items have discriminatory features and the scale is effective in identifying differences between groups. The Cronbach's alpha coefficients calculated for the dimensions of SRL-O range from 0.80 to 0.94. These values are very close to the alpha coefficients calculated for the original form of the scale, and demonstrate that the internal consistency of the scale is high.

As a result of this study, it was found that the Turkish adaptation of SRL-O consists of ten factors, consistent with the original form, and fits well with the data of the higher education students who participated in the study. The internal consistency coefficients of the scale's factors are at acceptable levels, and the scale successfully serves its intended measurement purpose. These findings show that the Turkish version of SRL-O can be used as an effective tool for assessing online self-regulated learning resources for higher education students. In further studies, it can be used as a scale for Learning Strategies, Motivation, and Self-Regulated Learning for online or hybrid education at the higher education level. In addition, other studies can be conducted to use this scale at different levels of higher education.

REFERENCES

- Alibak, M., Talebi, H., & Neshat-Doost, H. T. (2019). Development and validation of a test anxiety inventory for online learning students. *Journal of Educators Online*, 16(2), n2. <https://eric.ed.gov/?id=EJ1223936>
- Anderson, J. C., & Gerbing, D. W. (1984). The effect of sampling error on convergence, improper solutions, and goodness-of-fit indices for maximum likelihood confirmatory factor analysis. *Psychometrika*, 49(2), 155–173.
- Artino, A. R., Jr., & McCoach, D. B. (2008). Development and initial validation of the online learning value and self-efficacy scale. *Journal of Educational Computing Research*, 38(3), 279–303. <https://doi.org/10.2190/EC.38.3.c>
- Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S. L. (2009). Measuring self-regulation in online and blended learning environments. *The Internet and Higher Education*, 12(1), 1–6. <https://doi.org/10.1016/j.iheduc.2008.10.005>

- Bentler, P. M. (1992). On the fit of models to covariances and methodology to the Bulletin. *Psychological Bulletin*, 112(3), 400–404.
- Boekaerts, M. (1996). Self-regulated learning at the junction of cognition and motivation. *European psychologist*, 1(2), 100-112.
- Bollen, K. A. (1989). *Structural equations with latent variables*. Wiley.
- Broadbent, J. & Lodge, J.M. (2020) Engaging large first year classes using digital technology: A case study. In S. Morrissey, G.J. Rich, A. Padilla-López, L. Karine de Souza, Taylor, J. Jaafar (Eds). *Teaching Psychology Around the World* (pp. 205–217). Cambridge Scholars Publishing.
- Broadbent, J. (2017). Comparing online and blended learner's self-regulated learning strategies and academic performance. *Internet High. Educ.*, 33, 24-32. <https://doi.org/10.1016/j.IHEDUC.2017.01.004>.
- Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education*, 27, 1–13. <https://doi.org/10.1016/j.iheduc.2015.04.007>
- Broadbent, J., Panadero, E., Lodge, J. M., & Fuller-Tyszkiewicz, M. (2023). The self-regulation for learning online (SRL-O) questionnaire. *Metacognition and Learning*, 18(1), 135-163.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Sage.
- Büyüköztürk, Ş. (2002). Faktör analizi: Temel kavramlar ve ölçek geliştirmede kullanımı [Factor analysis: Basic concepts and use in scale development]. *Kuram ve uygulamada eğitim yönetimi*, 32(32), 470-483.
- Büyüköztürk, Ş. (2011). *Sosyal bilimler için veri analizi el kitabı: İstatistik, araştırma deseni* [Handbook of data analysis for the social sciences: Statistics, research design], *SPSS uygulamaları ve yorum* (15. bs.). Pegem Akademi.
- Büyüköztürk, Ş., Akgün, Ö. E., Özkahveci, Ö., & Demirel, F. (2004). Güdülenme ve öğrenme stratejileri ile başarı arasındaki ilişki [The relationship between motivation, learning strategies and success]. *Kuram ve Uygulamada Eğitim Bilimleri*, 4(2), 207–229.
- Byrne, B. M. (1998). *Structural equation modeling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications, and programming*. Lawrence Erlbaum Associates.
- Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (2nd ed.). Routledge.
- Cheng, K. H., & Tsai, C. C. (2011). An investigation of Taiwan University students' perceptions of online academic help seeking, and their web-based learning self-efficacy. *The Internet and Higher Education*, 14(3), 150–157. <https://doi.org/10.1016/j.iheduc.2011.04.002>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5
- Cho, M. H., & Cho, Y. (2017). Self-regulation in three types of online interaction: A scale development. *Distance Education*, 38(1), 70–83. <https://doi.org/10.1080/01587919.2017.1299563>
- Cole, D. A. (1987). Utility of confirmatory factor analysis in test validation research. *Journal of Consulting and Clinical Psychology*, 55(4), 584–594.
- Çokluk, Ö., Şekercioğlu, G., & Büyüköztürk, Ş. (2012). *Sosyal bilimler için çok değişkenli istatistik: SPSS ve LISREL uygulamaları* (Vol. 2) [Multivariate statistics for the social sciences: Applications of SPSS and LISREL]. Pegem akademi.

- Çokluk, Ö., Yılmaz, K., & Demirtaş, H. (2010). *Sosyal bilimler için çok değişkenli istatistik: SPSS ve LISREL uygulamaları* [Multivariate statistics for the social sciences: Applications of SPSS and LISREL]. Pegem Akademi.
- Dignath, C., & Büttner, G. (2008). Components of fostering self-regulated learning among students. A meta-analysis on intervention studies at primary and secondary school level. *Metacognition and Learning*, 3(3), 231–264. <https://doi.org/10.1007/s11409-008-9029-x>
- Dinsmore, D. L., Alexander, P. A., & Loughlin, S. M. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning. *Educational psychology review*, 20, 391–409.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis* (7th ed.). Pearson Education.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of educational research*, 77(1), 81–112.
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause review*, 27(1), 1–9.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Jansen, R. S., Van Leeuwen, A., Janssen, J., Kester, L., & Kalz, M. (2017). Validation of the self-regulated online learning questionnaire. *Journal of Computing in Higher Education*, 29(1), 6–27. <https://doi.org/10.1007/s12528-016-9125-x>
- Jöreskog, K. G., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language*. Scientific Software International.
- Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses. *Computers & Education*, 104, 18–33. <https://doi.org/10.1016/j.compedu.2016.10.001>
- Kline, R. B. (2023). *Principles and practice of structural equation modeling*. Guilford publications.
- Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin*, 103(3), 391–410.
- Ortagus, J. (2017). From the periphery to prominence: An examination of the changing profile of online students in American higher education. *Internet High. Educ.*, 32, 47–57. <https://doi.org/10.1016/j.IHEDUC.2016.09.002>
- Pintrich, P. R. Smith, D. A., García, T., & McKeachie, W. J. (1991). *A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. Retrieved January 8, 2021 from <https://eric.ed.gov/?id=ED338122>
- Pintrich, P. R., Smith, D. A., García, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement*, 53(3), 801–813. <https://doi.org/10.1177/0013164493053003024>
- Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the online component of blended learning: A systematic review. *Computers & education*, 144, 103701.
- Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin*, 138(2), 353. <https://doi.org/10.1037/a0026838>
- Schumacker, R. E., & Lomax, R. G. (2016). *A beginner's guide to structural equation modeling* (4th ed.). Routledge.

- Stevens, J. (2002). *Applied multivariate statistics for the social sciences* (Vol. 4). Mahwah, NJ: Lawrence Erlbaum Associates.
- Sümer, N. (2000). Yapısal eşitlik modelleri: Temel kavramlar ve örnek uygulamalar [Structural equation models: Basic concepts and sample applications]. *Türk Psikoloji Yazıları*, 3(6), 49–74.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson Education.
- Tavşancıl, E. (2010). *Tutumların ölçülmesi ve SPSS ile veri analizi* [Measuring attitudes and data analysis with SPSS] (4. Edition). Nobel Yayın Dağıtım.
- Theobald, M. (2021). Self-regulated learning training programs enhance university students' academic performance, self-regulated learning strategies, and motivation: A meta-analysis. *Contemporary Educational Psychology*, 66, 101976. <https://doi.org/10.1016/j.cedpsych.2021.101976>
- Tladi, L. S. (2017). Perceived ability and success: Which self-efficacy measures matter? A distance learning perspective. *Open Learning: The Journal of Open, Distance and e-Learning*, 32(3), 243–261. <https://doi.org/10.1080/02680513.2017.1356711>
- Wang, C. H., Shannon, D. M., & Ross, M. E. (2013). Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning. *Distance Education*, 34(3), 302–323. <https://doi.org/10.1080/01587919.2013.835779>
- Xu, T., & Xue, L. (2023). Satisfaction with online education among students, faculty, and parents before and after the COVID-19 outbreak: Evidence from a meta-analysis. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1128034>
- Xu, Z., Zhao, Y., Liew, J., Zhou, X., & Kogut, A. (2023). Synthesizing research evidence on self-regulated learning and academic achievement in online and blended learning environments: A scoping review. *Educational Research Review*. <https://doi.org/10.1016/j.edurev.2023.100510>
- Yang, Y., & Cui, Y. (2021, December). Proportion of College Students' Internet Education Data Based on Big Data Analysis Technology. In *International conference on Big Data Analytics for Cyber-Physical-Systems* (pp. 475–483). Singapore: Springer Singapore.
- Zimmerman, B. J. (1986). Becoming a self-regulated learner: Which are the key subprocesses?. *Contemporary educational psychology*, 11(4), 307–313.
- Zimmerman, B. J., & Moylan, A. R. (2009). Self-regulation: Where metacognition and motivation intersect. In D. J. Hacker, J. Dunlosky, & A. C. Graesser (Eds.), *Handbook of metacognition in education* (pp. 299–315). Routledge.

Author Contributions

Author Contributions: The sole author of this research, Mustafa Çağrı Gürbüz, was responsible for the conceptualization, methodology formulation, data collection, analysis, and interpretation. Furthermore, Mustafa Çağrı Gürbüz took charge of drafting the initial manuscript, revising it critically for vital intellectual content, and finalizing it for publication. The author has read and approved the final manuscript and takes full accountability for the accuracy and integrity of the work presented.

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Developmental Assessment Practices in Early Childhood Education: An Analysis of Teacher Approaches and Strategies¹

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Abstract:

This study focused on the importance of developmental assessment in early childhood and the approaches used by teachers in this process. This study examined how teachers conduct assessment processes based on individual differences and child-centered approaches. This study used a mixed-method design and was conducted with 181 preschool teachers in Turkey. Data were collected using the "Child Recognition and Assessment Techniques Attitude Scale," a semi-structured interview form, and personal information forms.

According to the results, teachers frequently used methods such as observation, portfolio, play-based assessment, and family interviews. However, methods such as drama and sociometry are less preferred. While teachers generally pay attention to individual differences in developmental assessment processes, elements such as confidentiality, language use, and developmental integrity are less emphasized.

Female teachers were found to be more positive towards developmental assessment processes, however, variables such as age, professional seniority, and class size did not have a significant effect on their attitudes. The findings revealed that professional development programs should be organized to include evaluation processes, and that teachers should be supported with digital tools. This study offers suggestions for the development of a more comprehensive and holistic understanding of assessment in preschools.

Keywords: Preschool period, preschool education, developmental assessment

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INTRODUCTION

Development is a lifelong process involving both quantitative and qualitative changes. This process reflects how an individual's innate characteristics interact with environmental factors. In particular, the 0-6 age range, which is called the "early childhood period," is when development and learning are the most rapid and fundamental. Scientific studies have shown that children's positive environmental conditions significantly affect their cognitive, emotional, and social development during this critical period, and this process forms the basis of their future social and academic lives (MoNE, 2015; Bayhan, 2017). In this context, the developmental assessment of children in early childhood is of great importance for the implementation of effective and individualized education processes.

Early Childhood and Assessment Process

The education and assessment processes carried out in early childhood are considered a time during which the foundations of basic knowledge, skills, and habits that individuals will need throughout their lives are laid (Aral, Can Yaşar, & Kandır, 2002). The correct understanding of a child's cognitive, motor, language, social, and emotional developmental characteristics and the development of appropriate educational strategies are based on developmental assessments made during this period (Bayraktar, 2018). Developmental assessment guides the organization of learning environments and the design of educational materials in accordance with the child's needs and individual differences.

According to the Ministry of National Education (2015), the process of recognizing and assessing children refers to the objective, flexible, and consistent collection of information about children through a wide variety of tools, as well as recording this information and transforming these findings into meaningful decisions. This process is critical for understanding children's learning and developmental characteristics, discovering their strengths and weaknesses, and planning appropriate educational interventions. However, this process is not limited to measuring a child's performance. It also includes a multifaceted function, such as revealing the child's individual potential, shaping educational programs, and strengthening cooperation with families (Bayhan, 2017; McAfee, Leong & Bodrova, 2015).

Functions of the Evaluation Process

The functions of developmental assessment primarily include understanding children's pre-instructional levels and supporting their individual developmental processes. Assessments enable teachers to prepare individualized teaching plans tailored to their students by utilizing detailed information about the child (MoNE, 2015). Additionally, the feedback provided to families offers a broader perspective on the child's developmental trajectory. For instance, children's portfolios and developmental files serve as valuable tools for both teachers and parents in terms of long-term monitoring and evaluation. Recent research has emphasized that developmental assessment in early childhood should not only

focus on observable behaviors but also consider children's emerging metacognitive awareness, which is often shaped through teacher-child dialogue and collaborative problem-solving activities. This perspective broadens the traditional scope of assessment and underlines the importance of enculturating thinking through purposeful classroom interactions (Gómez-Barreto, Lara, & Pinedo-González, 2023).

In this context, one of the most important elements of developmental assessment is to consider assessment tools from a multisource and diverse perspective. Standardized tests are used in the assessment process, as well as methods such as observation, anecdotal recording, interviews, and home visits (McAfee, Leong & Bodrova, 2015). These methods enable a deep understanding of not only the child's academic performance but also the child's social, emotional, and psychological structures. As a result, teachers can create strategies to support children's holistic development.

The Role of Preschool Teachers

Preschool teachers are at the center of both developmental assessments and educational practices. In early childhood, teachers are responsible for understanding children's individual differences, organizing learning environments, and developing educational materials appropriate to their needs (MoNE, 2015). Individualized educational approaches, especially with sociocultural differences, require the use of the right tools and methods for assessment. Bayraktar (2018) and other studies show that to fulfill this role successfully, it is essential to improve teachers' assessment skills in terms of both theory and practice.

Research has shown that teachers' effective use of assessment techniques can lead to significant progress in children's learning (McAfee, Leong & Bodrova, 2015). However, whether teacher training programs and existing professional development training meet current needs is another important question to investigate.

In recent years, there has been a significant expansion in international literature on digital assessment processes in early childhood. Su and Yang's (2023) systematic review revealed that teachers' digital competencies should be assessed through multidimensional building blocks such as pedagogical content knowledge, cultural awareness, and digital safety. Similarly, Darling-Hammond and Oakes (2019) emphasized that teacher preparation processes should focus not only on technical skills but also on deep learning, critical thinking, and the capacity to use digital tools in a cultural context. Al-Mansour's (2022) study suggests that culturally responsive teaching approaches contribute to assessment processes that take into account individual differences in early childhood. In this context, children's cognitive, social, emotional, and cultural competencies can be monitored through digital environments, necessitating the development of an assessment approach compatible with international frameworks for teacher competencies.

Problem Statement and Importance of the Study

The literature comprises a wide range of studies highlighting the complexities, challenges, and pedagogical opportunities that arise in the developmental assessment practices of early childhood education. While many of these studies offer valuable insights, they are predominantly rooted in international contexts, with a strong emphasis on policy implementation, interdisciplinary collaboration, and equity-oriented assessment approaches (Bascopé, Perasso & Reiss, 2019). In contrast, research conducted specifically within the Turkish context remains relatively limited. This gap underscores the need for locally grounded yet globally informed studies that can both enrich the diversity of perspectives and contribute to the international discourse on inclusive and developmentally appropriate assessment. In particular, sociocultural dynamics and regional disparities in Turkey necessitate a closer examination of how teachers interpret and adapt assessment strategies in varying contexts. For instance, Yavuzer (2021) emphasizes that teachers' assessment practices differ significantly across socioeconomic settings, which has direct implications for ensuring equity in educational opportunities and developmental outcomes. Therefore, comparative research that contextualizes Turkish findings within the broader international framework is essential for enhancing the generalizability and transformative potential of national educational policies and teacher education programs.

This study aimed to shed light on teachers' approaches to developmental assessment practices in preschools in Turkey. The findings of this study are important in providing a better understanding of teachers' assessment strategies and to contribute to policy and program development processes in this regard.

Purpose of the Study

The overall aim of this study is to understand preschool teachers' attitudes towards developmental assessment practices, to identify the strategies used, and to assess how these practices differ according to various variables (e.g., professional experience, class size, gender). The study also aims to understand the areas of use for the assessment data obtained, and the needs and challenges teachers face in this process.

This study seeks answers to the following sub-problems:

- Is there a significant difference between preschool teachers' developmental assessment practices and gender?
- Is there a significant difference between preschool teachers' developmental assessment practices and their age?
- Is there a significant difference between preschool teachers' developmental assessment practices and professional seniority?
- Is there a significant difference between preschool teachers' developmental assessment practices and number of children in their classes?

- What are preschool teachers' developmental assessment strategies?
- What are the points preschool teachers pay attention to in developmental assessment activities?
- How do do preschool teachers use the data obtained as a result of developmental assessment?
- What are the thoughts of preschool teachers about the appropriateness of the strategies they use in the developmental assessment process for the developmental assessment objectives they set?

METHOD

Research Model

Using a mixed research method, in which qualitative and quantitative data collection techniques were used together to conduct the study, this study aimed to examine the knowledge of preschool teachers working in preschool education institutions on developmental assessment and their views on practices. The mixed methods aim to obtain more detailed information using both qualitative and quantitative methods.

Mixed-method research is defined as a research method in which the researcher collects, analyzes, and makes inferences using qualitative and quantitative methods together (Tashakkori & Creswell, 2007). As the research design, "sequential-explanatory design," one of the four dimensions of the mixed research model, was used. In sequential-exploratory design, the process of collecting and analyzing quantitative and qualitative data takes place in two stages. In the first stage, quantitative data were collected through the answers the study questions, and, the data obtained were analyzed. In the next stage, qualitative data were collected and analyzed to complement data (Creswell & Clark, 2018).

Qualitative and quantitative models offer two different research perspectives. In studies conducted in the social sciences, both models possess characteristics that cannot be adequately explained by other methods. Therefore, these two research models complement each other (Yıldırım & Şimşek, 2011).

Participants

The study group consisted of preschool teachers working in private and public preschool education institutions affiliated with the Ministry of National Education in Turkey in the 2022-2023 academic year. The 181 teachers who had these characteristics and were included in the study group participated in line with the principles of voluntariness and accessibility. In the study aiming to examine preschool teachers' attitudes towards developmental assessment practices, the participants were determined according to the purposive sampling method.

Data Collection Tools

In the study, the "Child Recognition and Assessment Techniques Attitude Scale" (CRATAS) developed by Ulusoy (2019), the semi-structured Teacher Interview Form, which is largely based on open-ended questions, and the "Personal Information Form," prepared by the researcher, were used to measure teacher attitudes towards child recognition and assessment. The "Personal Information Form" was designed to obtain information about the participants' gender, age, faculty of graduation, education level, professional seniority, and the number of students in their classes.

Child Recognition and Assessment Techniques Attitude Scale

The Child Recognition and Assessment Techniques Attitude Scale (CRATAS) was developed by Ulusoy (2019) to measure the attitudes of preschool teachers working in preschool education institutions towards child recognition and assessment techniques. The 38-item scale was a five-point Likert-type scale. The responses to the items in the scale consist of "Strongly Agree," "Agree," "Undecided," "Disagree," "Strongly Disagree" options.

Personal Information Form

A personal information form prepared by the researcher was designed to obtain information about the teachers participating in the study. In this form, there were questions regarding demographic information on the teacher's gender, age, faculty of graduation, level of education, professional seniority, and number of students in the class.

Teacher Interview Form

The interview form prepared by the researcher consisted of semi-structured questions to determine preschool teachers' views on recognizing and evaluating preschool children. To ensure the reliability of the interview form, expert opinions were consulted, the interview questions were rearranged according to the opinions received from the experts, and the final version was created. The Teacher Interview Form was administered to the five teachers with the highest scores and the five teachers with the lowest scores on the Child Recognition and Assessment Techniques Attitude Scale (CRATAS).

Data Analysis

Quantitative and qualitative data analysis techniques were applied to the research data. Quantitative data were analyzed using SPSS 22. Kruskal-Wallis H Test was used for comparisons between three or more groups due to non-normally distributed data; independent t-test was used for comparisons between paired groups due to normally distributed data; and ANOVA was used when comparing three or more groups with normally distributed data. Descriptive statistics were used to evaluate the data. 0.05 was used as the significance level. A significant difference or correlation was observed when $p < 0.05$, and no significant difference or correlation was observed when $p > 0.05$.

The qualitative data were analyzed using descriptive statistics. First, the researcher transcribed the data obtained from interviews with the teachers. The coding process was then included in the analysis. Quotations from the information obtained from the participants were included to ensure validity and reliability and the data were presented to the readers in a straightforward manner with minimal changes.

Ethical considerations

In the course of this research, we paid scrupulous attention to ethical guidelines, ensuring that the integrity and reliability of the study were never compromised.

For the quantitative phase, data was meticulously harvested electronically, ensuring the privacy and anonymity of respondents. The absence of demographic data collection further cemented this confidentiality. Moving onto the qualitative portion, every interviewee was formally apprised of the research's objectives, methodologies, and potential implications. Importantly, they were reassured in writing about their right to withdraw from the study without any repercussions. All data acquired, including the interview tools and participants' consent documents, were securely housed on the researcher's personal computer, fortified by stringent password protection measures.

In alignment with the overarching commitment to ethics, this study stringently adhered to all provisions delineated in the "Higher Education Institutions Scientific Research and Publication Ethics Directive." It is imperative to note that there were zero instances of activities which might infringe upon the clauses stated under the "Actions Against Scientific Research and Publication Ethics."

Ethical Review Board: Akdeniz University Social Sciences and Humanities Scientific Research and Publication Ethics Committee

Date of Ethics Review Decision: 20.12.2022

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FINDINGS

In this section, the findings obtained for the solutions to the sub-problems of the research are systematically analyzed. First, quantitative data were presented, and then qualitative data were analyzed.

Findings Related to the First Sub-Problem

Table 1. Results of the Analysis Showing the Difference of the Mean Scores of the Child Recognition and Assessment Techniques Attitude Scale According to the Gender of the Teachers

Gender	n	Mean	Median	Minimum	Maximum	SS	t	p
Female	169	157,53	158,00	116,00	190,00	14,77		
Male	12	146,25	149,00	122,00	167,00	14,23		
Total	181	156,78	157,00	116,00	190,00	14,97	2,562	0,011

When the findings in Table 1 were analyzed, it was found that the scores of 'Child Recognition and Assessment Techniques Attitude Scale' showed a significant difference between male and female preschool teachers ($p < 0.05$). The scores of female preschool teachers on the "Child Recognition and Assessment Techniques Attitude Scale" were significantly higher than those of their male counterparts.

Findings Related to the Second Sub-Problem

Table 2. Results of the Analysis Showing the Difference in the Mean Scores of the Child Recognition and Assessment Techniques Attitude Scale According to the Age of the Teachers

Age	n	Mean	Median	Minimum	Maximum	ss	F	P
22-28 age	79	158,42	159,00	119,00	190,00	14,47		
29-35 age	45	155,76	158,00	122,00	186,00	14,93		
35-40 age	32	155,06	151,50	135,00	185,00	15,87		
41 and over age	25	155,68	154,00	116,00	188,00	15,78		
Total	181	156,78	157,00	116,00	190,00	14,97	0,567	0,637

When the findings in Table 2 are analyzed, it is found that the scores of the "Child Recognition and Assessment Techniques Attitude Scale" do not show a significant difference according to the age variable of preschool teachers ($p > 0.05$). Although not statistically significant, the "Child Recognition and Assessment Techniques Attitude Scale" scores of teachers in the 22-28 age group were higher than those of other age groups.

Findings Related to the Third Sub-Problem

Table 3. Results of the Analysis Showing the Difference of the Mean Scores of the Child Recognition and Assessment Techniques Attitude Scale According to the Professional Seniority of the Teachers

Seniority	n	Mean	Median	Minimum	Maximum	ss	F	p
1-5 year	96	157,69	159,50	119,00	190,00	14,33		
6-10 year	34	153,76	151,50	129,00	186,00	14,51		
11-15 year	28	158,36	159,00	135,00	188,00	16,55		
16 and over year	23	155,57	154,00	116,00	185,00	16,47		
Total	181	156,78	157,00	116,00	190,00	14,97	0,729	0,536

Analysis of the findings in Table 3 revealed that the scores of the "Child Recognition and Assessment Techniques Attitude Scale" did not show a significant difference according to the professional seniority of preschool teachers ($p > 0.05$). Although not statistically significant, the scale scores of those with 11-15 years of experience were higher.

Findings Related to the Fourth Sub-Problem

Table 4. Results of the Analysis Showing the Difference of the Mean Scores of the Attitude Scale for Child Recognition and Assessment Techniques According to the Average Number of Children in Teachers' Classes

Child	n	Mean	Median	Minimum	Maximum	ss	T	p
10-20 Child	139	156,93	157,00	119,00	190,00	15,05		
21 and over child	42	156,31	159,00	116,00	183,00	14,85		
Total	181	156,78	157,00	116,00	190,00	14,97	0,234	0,815

When the findings in Table 4 were analyzed, it was found that the scores of the "Child Recognition and Assessment Techniques Attitude Scale" did not show a significant difference according to the average number of children in preschool teachers' classes ($p>0.05$).

Findings Related to the Fifth Sub-Problem

Theme 1. Developmental Assessment Strategies Used

In this study, the developmental assessment strategies used by teachers working in preschool education institutions were determined: including observation, interviews, portfolios, home visits, play, anecdotal records, development reports, child pictures, drama, and sociometry techniques. According to the findings, observation and interviews were the most frequently used methods, while drama and sociometry were among the least frequently used techniques. Table 5 presents the frequency distributions.

Table 5. Distribution of developmental assessment strategies used by preschool teachers working in preschool education institutions

Theme 1: Developmental Assessment Strategies Used	f	%
Sub-themes		
Observation	10	100
Interview	9	90
Portfolio	6	60
Home Visit	5	50
Play	5	50
Anecdotal Record	5	50
Development Report	3	30
Child Pictures	2	20
Drama	1	10
Sociometry	1	10

Observation stood out as a strategy used by all the teachers. Teachers generally use observation as the first step in understanding children's behaviors in learning processes. For example, teacher 10 emphasized this with the statement, "I usually observe my children during classroom activities."

Interviewing is a method frequently mentioned by teachers, especially who attach importance to exchanging information with their families. Teacher 1 explained this method by saying, "We call a family to school every week and talk about the child."

Portfolio was defined as another important strategy, preferred by six teachers that enabled the recording of the individual development of children. Teacher 4 stated, "Portfolio file is one of the most effective methods for us."

Home visits are frequently preferred to collect individual information. Teacher 4, one of the interviewed teachers, stated: "I get important information about the child and the family through home visits."

Play and anecdotal recordings are among the methods used by teachers to monitor children in the natural environment, and record the information obtained. For example, teacher 5 stated, "I observe children's behavior during free play and record anecdotes."

Less frequently used strategies included development reports, photos of children, dramas, and sociometry. For example, teacher 5 stated, "I use drama in group activities to observe children's behaviors in accordance with their roles."

As a result, it was determined that observation and interview techniques were widely preferred, whereas techniques such as drama and sociometry were used less frequently. The findings showed that teachers use various methods to understand children's development.

Findings Related to the Sixth Sub-Problem

Theme 2. Considerations in Developmental Assessment Practices

Table 6. Distribution of the points that preschool teachers working in preschool education institutions pay attention to in developmental assessment practices

Theme 2: Points Considered in Developmental Assessment Practices	f	%
Sub-themes		
Individual Differences	7	70
Child-Centered Approach	5	50
Family Participation	4	40
Natural Environment	3	30
Language Used	2	20
Confidentiality	2	20
Integrity in Development	1	10
Objectivity	1	10

In this study, the following subthemes were identified: individual differences, child-centered approach, family involvement, natural environment, language used, confidentiality, integrity in development, and objectivity. When Table 6 is examined, one can see that teachers emphasized individual differences (70%) and a child-centered approach (50%), whereas they mentioned integrity in development (10%) and objectivity (10%).

Individual Differences

The majority of teachers who participated in the interviews ($n=7$) stated that they considered individual differences in developmental assessment processes. Teachers stated that they

were aware of children's unique developmental rates and learning characteristics, and shaped their assessments accordingly.

One of the teachers explained this situation by saying, *"I do not apply it to every child in the same way." For example, one of my children grew up without a family. Therefore, I direct the questions accordingly. I ask questions without hurting him/her.* Another teacher said, *"Each child is unique, and an appropriate method should be followed in his or her development."* These statements show that teachers place children's individual differences at the center of their assessment practices.

Child-Centered Approach

When we analyzed the opinions of the teachers, it was observed that five participants adopted a child-centered approach. Teachers emphasized that putting children at the center of the assessment process enables them to make the best use of their abilities.

One teacher summarized this situation by saying, *"I usually put the child at the center, I give them the opportunity to showcase what they can do uniquely, and I encounter incredible results in this process."* Another teacher emphasized the child-centered assessment approach by saying, *"I try to understand what the child needs and focus on their individual interests."*

Family Engagement

The importance of involving families in the evaluation process was also emphasized. According to four teachers, family involvement is an important element that integrates education, provides more information about the child, and strengthens the evaluation processes.

One of the teachers emphasized the importance of family involvement by saying, *"We definitely involve parents in the process, because it is not right to associate children's development only with the school."* Another teacher said, *"One of my students had a speech problem. We strengthened this learning process by continuously working with the family and demonstrated the results of effective collaboration."*

Natural Environment

Three teachers (n=3) stated that they preferred to observe children in their natural environment while assessing them. Teachers stated that the observations made in children's natural environments were more reliable.

One teacher emphasized the importance of this method by saying, *"I make sure that the children are in a comfortable environment during the assessment. I obtain more accurate results if they do not feel that I am observing them."*

Language Used

Two teachers (n=2) specifically mentioned that they paid attention to the correct choice of language used during the assessment. Teachers emphasized that the words used in communication with both children and parents should be carefully chosen.

One teacher explained, *"I avoid calling my students naughty or using harsh expressions." Instead, I describe the student's behavior in a constructive way."*

Confidentiality

Among the participants, two teachers (n=2) stated that confidentiality of information about children is very important, especially in assessment studies. This requires the protection of the privacy of both children and families.

One teacher said, *"I never share information about the child with parents or other students. This is a sensitive issue that emphasizes the principle of confidentiality."*

Integrity and Objectivity in Development

Some teachers stated that they paid attention to holism and objectivity in development during the assessment process, but these elements were among the lesser emphasized categories (n=1).

One teacher expressed this holistic perspective by saying, *"I carefully evaluate all areas of development; development is not just about one area."* Another teacher stated, *"I approach my observations with complete transparency and try to collect unbiased data about the child."*

The findings of the study show that teachers attach particular importance to individual differences, a child-centered approach, and family involvement in the developmental assessment process. They believe that assessments conducted in a natural environment yield reliable results, and that details such as confidentiality and language also affect the process. However, integrity and objectivity in development were less emphasis on integrity and objectivity in development suggests that more awareness should be raised regarding these issues.

Findings Related to the Seventh Sub-Problem

Theme 3. Areas of Use of Developmental Assessment Data

In this study, it was found that preschool teachers used the data obtained during developmental assessment processes, mostly in the areas of informing families, directing families to the necessary units, supporting development, and planning activities. These areas enable teachers to identify individual differences in children, provide appropriate support, and collaborate with stakeholders.

Table 7. *Distribution of the areas in which preschool teachers working in preschool education institutions use the data obtained from developmental assessment practices*

Theme 3: Areas where Developmental Assessment Data are Used	f	%
Sub-themes		
Informing Families	8	80
Referral to Necessary Units	6	60
Supporting Development	6	60
Planning Activities	4	40
Collaborating with Stakeholders	1	10
Preparation for Primary School	1	10

Informing Families

Most of the teachers (80%) stated that they use the data obtained during developmental assessment processes to share with families. Teachers stated that they held regular

meetings with families in order to both support children's strengths and draw the attention of families to problem areas.

One teacher explained her practice in this process as follows:

"As a result of home visits and all my developmental assessments, I inform the family appropriately, emphasize the child's strengths, and offer support."

Another teacher expressed the importance of families as follows:

"If the child has a tendency to hit others, I talk to the family and try to understand the source of the behavior so that we can develop solutions together."

In addition, some teachers emphasized that family information is not only about problems, but that it is also important to share positive behaviors

"Every child and every parent deserves to receive positive feedback. I inform the family about the child's success not only when there are problems but also in positive situations."

Referral to Necessary Units

60% of the teachers stated that they use assessment data to refer children with special education needs, or in need of guidance services, to appropriate units.

One teacher expressed this situation as follows:

"In some cases, we need to refer to our guidance service or CRC. For example, we recommended that a child with violent tendencies receive psychological support after meeting with the family."

Another teacher explained the process as follows:

"If there is a situation beyond my capacity, we first coordinate with the guidance service and then with the GRC to determine the child's needs."

Supporting Development

Another important area emphasized by teachers was the use of the data obtained to support children's development (60%). At this point, teachers stated that they identified individual differences and deficient areas, and made effective interventions.

One teacher explains:

"For a child with poor language development, I try to increase their practice with rhymes and storytelling activities."

Another teacher's opinion is as follows:

"I have a child diagnosed with atypical autism. I worked in cooperation with the special education teacher to support the student's language development. The process is progressing positively."

Planning Activities

40% of the teachers stated that the data were regularly used for planning activities. Teachers were reported to use the information obtained from the children to plan daily long-term activities.

One teacher expressed this situation as follows:

"When determining the activities we will do during the semester, I make adjustments in accordance with the developmental levels of the children."

Another teacher shared the following about this process:

"With the results I obtain, I determine which activity will be most appropriate for children and plan accordingly."

Collaboration with Stakeholders

Some teachers (10%) use assessment data on children in collaboration with stakeholders. These stakeholders include special education teachers and guidance counselors.

One teacher stated the following in this regard:

"We are in constant communication with the special education teacher at the GRC. Together, we plan which steps to take. This sharing makes the process much more effective."

Preparation for Primary School

Some of the teachers indicated that they use the data to support preparation for primary school. This includes guiding children to acquire basic skills.

The statements of one teacher in this regard are as follows:

"According to the report cards and development reports that I obtain, I plan activities that will help the child better prepare for primary school."

Findings Related to the Eighth Sub-Problem

In this study, preschool teachers' opinions on the fitness for the purpose of the developmental assessment strategies they used were categorized under three headings: 'they are fit for purpose', 'they are fit for purpose but can be better', and 'they may vary according to practices'. According to the data in Table 8, 80% of the teachers think that "the strategies they use serve the purposes they set." A smaller number of teachers (10%) stated that the strategies were generally appropriate but could be improved, whereas another group (10%) stated that the strategies showed variable effects depending on the practices.

Table 8. *Distribution of preschool teachers' opinions on the appropriateness of the strategies they use in developmental assessment practices*

Theme 4: Opinions on the Purposefulness of the Strategies Used	f	%
Sub-themes		
Purposeful	8	80
Purposeful but Could Be Better	1	10
May Vary According to Applications	1	10

Purposeful

In this theme, the majority of the interviews showed teachers believed the strategies they used achieved their goals. Teachers emphasized that these strategies were effective in achieving the targeted outcomes.

The sample teachers' statements were as follows:

Teacher 1: *"Yes, I think the strategies match the objectives. If they do not, I prefer different methods."*

Teacher 2: *"I always receive positive feedback from my children in my practice." I see that it really serves my purpose."*

Teacher 3: *"The strategies I use allow me to observe differences in the development of my students. For example, there can be significant differences between the child at the beginning of the year and the child at the end of the year"*

Teacher 4: *"The portfolio method is incredibly effective. The parents and we can see very clearly, where the child has come from."*

Teacher 6: *"I think these techniques are suitable for this purpose." I develop appropriate strategies to move forward in a goal-oriented way."*

These statements show that teachers choose strategies in line with the goals set, they think these strategies support children's development in general.

Purposeful but Could Be Better

Another theme, "it is suitable for the purpose but it can be better" reveals that although some strategies serve the purpose, they need to be improved. One teacher expressed the following opinions on this issue:

Teacher 8: *"Yes, the strategies serve their purpose because I can observe children's development, but they can be better, of course."*

This statement shows that teachers maintain a critical perspective of current strategies and are open to better methods.

May Vary According to Applications

Some teachers (n=1) stated that the practice varied. This view reveals that sometimes the strategies are effective fail to achieve their objectives.

Teacher 9: *"Sometimes, I make observations, and I can see very clearly that the strategy achieves the goal." However, in other cases, I do not obtain the expected result. The effect of these strategies can vary depending on the practice."*

This view shows that assessment strategies do not always achieve the set objectives and that other techniques or methods may be needed in some cases.

DISCUSSION

The study aimed to understand preschool teachers' approaches to developmental assessment practices, the main points they considered, and how the data obtained from the assessment results were used. While these findings significantly overlap with existing literature, they offer new conclusions about the practical implications of educational processes.

The study revealed that female teachers had more positive attitudes towards developmental assessment strategies than male teachers. This suggests that empathy and attention to detail in developmental assessment processes may be more intense among female teachers. This finding is in line with that of Türkeç Aktaş's (2012) study, which indicates that female teachers may exhibit a more detailed approach to assessment

processes. However, to better understand the effect of gender on assessment processes, it is recommended to conduct qualitative research on this subject.

The finding that variables related to teachers' professional characteristics, such as professional seniority, age, and education level, did not make a significant difference in evaluation attitudes is a striking result. This suggests that teachers may have adopted similar strategies, regardless of their level of experience. However, it should be noted that these findings contradict Bakioğlu's (1996) view that professional seniority can affect different assessment practices. Although more comprehensive strategies can be developed, especially with increasing experience, the lack of a significant difference in this study can be explained by the fact that teachers do not adequately follow the developments in the field after graduation.

In this study, it was observed that observation, portfolio, play-based assessment, and interviews were among the developmental assessment methods frequently preferred by teachers. These results are consistent with the findings of McAfee, Leong and Bodrova (2015) that observational assessment methods are practical and effective for understanding children's natural learning processes. At the same time, it is seen that the use of portfolios is a powerful tool to ensure effective communication with families and make concrete the development process of children. Özkan's (2015) findings on this issue explain the reasons for teachers' widespread adoption of portfolios.

Criteria such as individual differences, family involvement, a child-centered approach, and observations in the natural environment that teachers consider in their assessment processes are other important parts of the findings. These elements are in line with Gullo and Hughes's (2011) view that assessment processes should be understood within the child's own context. Moreover, these findings, which emphasize family involvement, are in line with Taner's (2005) findings on the importance of family teacher collaboration. This should be supported by more comprehensive activities that involve families in schools. Integration with UDL principles is recommended to make the developmental assessment processes inclusive. The UDL recommends providing flexible and individualized instructional materials and assessment tools that are accessible to every child (CAST, 2018; Boysen, 2024). In this study, teachers' sensitivity to individual differences reflected an approach in line with UDL; however, there is a need for systematic implementation.

This study found that teachers actively used data obtained after the assessment of family information, educational planning, and guidance processes. This finding is in line with Gullo's (2005) study, which stated that evaluation serves a critical function in determining individual educational needs as well as guiding children's learning processes. Developmental assessment data constituted the basis for referrals that were made, especially for individuals with special educational needs.

Finally, teachers commented that the strategies they use are appropriate for supporting the main outcomes of the study. In addition to tools such as portfolios and observations being found to be effective, teachers' suggestions for improving strategies can enrich work by Yılmaz Topuz and Erbil Kaya (2016) and guide future practices. For example, suggestions such as reducing the number of forms used and organizing them in a more practical manner may lead to results that favor both teachers and students.

The findings of this study highlight the importance of developmental assessments in preschool education. However, it is also clear that factors such as class size shape assessment processes, and teachers need more support. It should be taken into account that intense workload and crowded classroom environments may affect teachers' individual assessment processes. Therefore, it is important to support teachers, using digital tools and materials,.

Based on this research, a series of recommendations has been developed for teachers to continue their professional development and manage their assessment processes more effectively. These recommendations include developmental assessment in teachers' professional development programs, encouraging practices that increase teacher-parent collaboration in these processes, and supporting teachers with material provision. In addition, the data show that teachers need in-service training to be more effective in assessment processes.

In conclusion, this study has provided us with an understanding of preschool teachers' current practices and attitudes towards developmental assessment, and revealed certain deficiencies observed in the field. New practices and policy recommendations in light of these results can make important contributions to improving the quality of early childhood education.

CONCLUSION AND RECOMMENDATION

This study has provided valuable insights into preschool teachers' developmental assessment practices, emphasizing the approaches, strategies, and challenges encountered in early childhood education. By examining a diverse range of assessment techniques and teacher attitudes through a mixed-method design, this study underscores both the strengths and areas of improvement in current practices. This study is one of the first in Turkey to provide a holistic view of preschool teachers' use of developmental assessment in both quantitative and qualitative terms. It makes a unique contribution to the Turkish context, especially in terms of teachers' understanding of assessment; it focuses on individual differences and their reservations about creative but rarely used methods, such as drama and sociometry.

Key findings suggest that teachers predominantly rely on methods such as observation, portfolios, play-based assessment, and family interviews. While these approaches effectively support child-centered and individualized assessments, less frequent use of methods like drama and sociometry highlights missed opportunities for a more

creative and holistic understanding of child development. Teachers prioritize individual differences, family involvement, and child-centered approaches but place comparatively less emphasis on developmental integrity, objectivity, and confidentiality, signaling a need for greater awareness and training in these areas.

The study also highlights gender differences in teacher attitudes, with female teachers showing more positive perspectives on assessment processes. Variables such as age, professional seniority, and class size showed no statistically significant impact on teachers' attitudes, suggesting potential uniformity in assessment practices across professional demographics. However, this uniformity may also reflect constraints such as limited access to professional development and inadequate resources, as suggested by the study.

Importantly, developmental assessment data were found to play a central role in informing families, planning educational strategies, and referring children to appropriate support services. These findings reflect the pivotal role of assessment in shaping individualized educational pathways and enhancing teacher-parent collaboration. However, practical challenges such as large class sizes, heavy workloads, and limited access to technological tools inhibit the broader application of these practices.

To address these challenges and foster more effective assessment processes, the study outlines several recommendations. These include integrating developmental assessment training into professional development programs, providing teachers with digital tools and resources, and enhancing teacher-parent collaboration through structured, school-wide strategies. In particular, policymakers should ensure that tools such as portfolios, digital observation apps (e.g., Seesaw and ClassDojo), and progress reports are made available to preschool teachers, and that digital competency-based in-service training programs are implemented. Furthermore, reducing teacher workload and ensuring smaller class sizes can enable more time-intensive and child-centered assessments, thereby improving educational outcomes.

In conclusion, this study emphasizes that developmental assessment is a cornerstone for quality education during the early childhood period. However, realizing its full potential requires systemic efforts to address resource and training gaps, alongside greater support for teachers in their multifaceted roles. Given its focus on the Turkish context, future research could broaden the scope by exploring cross-cultural comparisons or longitudinal studies on the impact of improved assessment practices on child development. Such efforts will pave the way toward more inclusive, efficient, and innovative early childhood education systems globally.

Recommendations

Widen the Scope of Future Research

Future studies should aim to include more diverse participant groups from various regions or nations to better contextualize and compare findings across different settings.

Additionally, researchers should explore a wider range of demographic and contextual variables, such as socioeconomic status, school funding levels, and teachers' prior experiences with developmental assessment, to gain a more comprehensive understanding of influencing factors.

Enhanced Professional Development

It is essential to design and implement comprehensive, ongoing professional development programs for educators. These should focus on advanced assessment techniques, such as drama and sociometry, while also incorporating holistic approaches that emphasize developmental integrity and language appropriateness. Reflective practice and critical thinking should be encouraged through peer learning workshops or collaborative communities of practice, fostering a culture of continuous improvement.

Resource and Infrastructure Support

Teachers should be provided with ready-to-use digital tools and user-friendly materials to streamline the assessment process. Centralized platforms should also be developed to give teachers access to valuable resources, such as video tutorials, assessment templates, and data analysis software, ensuring they are well-equipped to perform effective evaluations.

Increased Focus on Family Collaboration

Strategies for strengthening family-teacher partnerships should be embedded into teacher training programs. Family-centered interventions, including awareness programs and joint workshops, should be developed to emphasize the importance of developmental integrity and collaborative efforts between families and educators.

Policy Interventions

Advocacy for reduced teacher workloads is critical to allow educators more time for individualized developmental assessments. Policies that encourage smaller class sizes should also be promoted, as this would enable more personalized and effective evaluations of children's developmental needs.

Evaluation and Technology Integration

New assessment tools and technologies should be piloted in preschool settings, with their impact on teachers' practices and children's outcomes carefully evaluated. Furthermore, it is important to study the digital readiness of schools and develop guidelines for integrating these tools effectively, taking into account local needs and technical constraints.

Promote Cross-Disciplinary Collaborations

Efforts should be made to strengthen partnerships between educators and other professionals, such as psychologists and special educators, to comprehensively address children's developmental needs. Schools should establish protocols for referring students

to relevant units, such as guidance and research centers, when necessary to ensure appropriate support.

Focus on Systemized Holistic Practices

There should be a strong emphasis on maintaining integrity across all developmental domains, including cognitive, emotional, and social aspects. The systematic inclusion of these domains in the design of assessments will ensure a more holistic approach to evaluating and supporting children's development.

REFERENCES

- Al-Mansour, M. A. H. (2022). Culturally responsive education in early childhood. *International Journal of Childhood and Women's Studies*, 2(3), 57–77. <https://doi.org/10.21608/IJCWS.2022.313163>
- Aral, N., Can Yaşar, M. & Kandır, A. (2002). *Okul öncesi eğitim & okul öncesi eğitim programı* (2nd Ed.) [Preschool education & preschool education program (2nd Ed)]. Ya-Pa Yayınları.
- Bakioğlu, A. (1996). *Öğretmenlerin kariyer evreleri (Türkiye'de resmi lise öğretmenleri üzerinde yapılan bir araştırma)* [Career stages of teachers (A study on public high school teachers in Turkey)]. Marmara Üniversitesi Atatürk Eğitim Fakültesi 2. Ulusal Eğitim Sempozyumu Bildirileri 18-20 Eylül 1996. İstanbul, Türkiye.
- Bascopé, M., Perasso, P., & Reiss, K. (2019). Systematic Review of Education for Sustainable Development at an Early Stage: Cornerstones and Pedagogical Approaches for Teacher Professional Development. *Sustainability*, 11(3), 719. <https://doi.org/10.3390/su11030719>
- Bayhan, P. (2017). *Erken çocukluk döneminde değerlendirme [Assessment in early childhood]*. Hedef Yayınları
- Bayraktar, V. (2018). Çocuğu tanıma ve değerlendirme [Recognizing and assessing the child]. O. S. Kesicioğlu & B. Yıldırım Hacııbrahimoğlu (Ed.), *Erken çocuklukta çocuğu tanıma ve değerlendirme* [Recognizing and assessing the child in early childhood]. Eğiten Kitap Yayınları.
- Boysen, G. A. (2024). A critical analysis of the research evidence behind CAST's universal design for learning guidelines. *Policy Futures in Education*, 22(7), 1219–1238. <https://doi.org/10.1177/14782103241255428>
- CAST. (2018) *Universal design for learning guidelines version 2.2*. New York City: CAST. Retrieved from <http://udlguidelines.cast.org>
- Creswell, J., & Plano Clark, V. L. (2018). *Designing and conducting mixed method research* (3rd ed). Thousand Oaks, Sage.
- Darling-Hammond, L., & Oakes, J. (2019). *Preparing teachers for deeper learning*. Harvard Education Press.

- Gómez-Barreto, I. M., Lara, S., & Pinedo-González, R. (2023). Classroom interaction and metacognition by 'enculturation' of thinking in early education. *International Journal of Early Years Education*, 33(2), 325–344. <https://doi.org/10.1080/09669760.2023.2197782>
- Gullo, D. F. (2005). *Understanding assessment and evaluation in early childhood education*. Teaches collage press.
- Gullo, D. F., & Hughes, K. (2011). Reclaiming kindergarten: Part I. Questions about theory and practice. *Early Childhood Education Journal*, 38, 323–328. <https://doi.org/10.1007/s10643-010-0429-6>
- McAfee, O., Leong, D. J. & Bodrova, E. (2015). *Assessing and Guiding Young Children's Development and Learning*. (6th ed). Pearson Education.
- MEB, (2015). *Çocuk gelişimi ve eğitimi: çocukları tanıma/değerlendirme* [Child development and education: recognizing/evaluating children]. Milli Eğitim Basımevi.
- Özkan, F. (2015). *Okul öncesi eğitimde değerlendirme sürecine yönelik aile-öğretmen görüş ve beklentilerinin incelenmesi* (Tez No: 418196) [Examination of parent-teachers' views and expectations on assessment in early childhood education]. [Master Thesis, Hacettepe University-Ankara]. Yükseköğretim Kurulu Başkanlığı Tez Merkezi.
- Su, J., & Yang, W. (2023). Digital competence in early childhood education: A systematic review. *Education and Information Technologies*, 29, 4885–4933. <https://doi.org/10.1007/s10639-023-11972-6>
- Taner, G. (2005). *Bireyi tanıma tekniklerinin okul öncesi eğitim kurumlarında uygulanmasına ilişkin öğretmen görüşlerinin incelenmesi* (Tez No: 190587) [A study about the point of views of the teachers on the issue of the techniques of individual identification and practising it in pre-education classes]. [Master Thesis, Selçuk University-Konya]. Yükseköğretim Kurulu Başkanlığı Tez Merkezi.
- Tashakkori, A. & Creswell, J. W. (2007). The new era of mixed methods. *Journal of Mixed Methods Research*, 1(1), 3-7. <https://doi.org/10.1177/2345678906293042>
- Türkeç Aktaş, Y. (2012). *Okul öncesi öğretmenlerinin yeterlilik düzeyleri* (Tez No: 319824) [Preschool teachers' efficiency levels]. [Master Thesis, Adnan Menderes University-Aydın]. Yükseköğretim Kurulu Başkanlığı Tez Merkezi.
- Ulusoy, N. (2019). *Okul öncesi öğretmenlerinin çocuğu tanıma ve değerlendirme tekniklerine yönelik tutumlarının incelenmesi* (Tez No: 592048) [Attitudes of preschool teachers towards child recognition and evaluation techniques]. [Master Thesis, Gazi University-Ankara]. Yükseköğretim Kurulu Başkanlığı Tez Merkezi.
- Yavuzer, H. (2021). *Çocuk psikolojisi* (45. Baskı) [Child Psychology (45th Ed)]. Remzi Kitabevi.
- Yıldırım, A. & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* (8. Baskı) [Qualitative research methods in social sciences (8th Ed)]. Seçkin Yayıncılık.

Yılmaz Topuz, G., & Erbil Kaya, Ö. M. (2016). Okulöncesi eğitim öğretmenlerinin çocukları tanıma ve değerlendirme amaçlı yapılan çalışmalara ilişkin görüşleri [The opinions of the pre-school teachers about the works conducted for identification and assessment of children]. *Anadolu Journal of Educational Sciences International*, 6(1). <https://doi.org/10.18039/ajesi.11365>

Data Availability Declaration

Data Availability Upon Formal Request:

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

Author Contributions

Author Contributions: All authors, [Gizem Eker], [Yakup Yıldırım], contributed equally to this work. They collaboratively handled the conceptualization, methodology design, data acquisition, and analysis. Each author played a significant role in drafting and revising the manuscript, ensuring its intellectual depth and coherence. All authors have thoroughly reviewed, provided critical feedback, and approved the final version of the manuscript. They jointly take responsibility for the accuracy and integrity of the research.

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The Self-Regulation Skills Usage Scale in EFL Learning: Development and Validation

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Abstract:

Self-regulation skill is the ability of an individual to plan, monitor, evaluate, and modify their learning process when necessary. It is highly important in foreign language learning because learning a language requires long-term motivation, discipline, and a strategic approach. This study aims to determine the level of high school students' use of self-regulation skills in EFL learning. The scale consists of six items with factor loadings ranging from 0.427 to 0.749 in the first factor (self-awareness), five items with factor loadings ranging from 0.490 to 0.857 in the second factor (planning), five items with factor loadings ranging from 0.573 to 0.730 in the third factor (reviewing), six items with factor loadings ranging from 0.514 to 0.783 in the fourth factor (using learning strategies), four items with factor loadings ranging from 0.671 to 0.818 in the fifth factor (self-evaluation), and four items with factor loadings ranging from 0.595 to 0.741 in the sixth factor (organizing the learning environment). The Cronbach's alpha coefficients of the scale were calculated as 0.946. As a result of the research, it can be said that a valid and reliable scale with 30 items, six sub-dimensions, and a five-point Likert type was obtained. This scale for gathering information on the self-regulation skills of high school students may guide English teachers in refocusing their teaching practices.

Keywords:

English as a foreign language (EFL), self-regulated learning skills, high school students, scale development

Citation:

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INTRODUCTION

Learning a foreign language has been an important goal for education and training from the past to the present. In addition to the contributions of foreign language knowledge to academic and professional life, its contribution to students' intellectual, social, and emotional development is also very important. Learning a foreign language is an important process that develops an individual's cognitive, cultural, and communicative skills. According to the renowned linguist Noam Chomsky, "Language is a tool of thought, and learning a new language makes it possible to see the world from a different perspective" (Chomsky, 2006). Additionally, Stephen Krashen, in his hypotheses about language acquisition, states, "Language learning increases an individual's communicative competence, providing significant advantages not only academically but also socially" (Krashen, 1982). Foreign language learning also strengthens an individual's critical thinking, problem-solving, and intercultural understanding skills.

With the advancement of technology, societies need to communicate more, and the use of foreign languages has become mandatory in daily life, work environments, and personal, social, and international relations. English is the most important of these foreign languages. In Turkey, English is taught as a compulsory subject at every level from the 2nd grade to university. However, despite this education starting in the 2nd grade, the expected quality of English education has not been achieved. Undoubtedly, there are many reasons for this. Many reasons can be listed, such as the insufficiency in the number of teachers and the quality of teacher training, the lack of teaching materials, overcrowded classrooms, and inadequate physical conditions (Önal, 2000). One of the important problems is the incorrect practices in language teaching approaches. In Turkey, language teaching methods based on teacher-centered knowledge transfer had been applied for the past years. Still, realizing that this process was incorrect in an interactive field like language learning, there was a transition to student-centered innovative approaches (Alperen & Hertsch, 2013). Nevertheless, it takes time for innovative approaches to take root and become widespread in education. The transition from teacher-centered teaching to student-centered education, where principles such as self-regulation, autonomy, and self-efficacy, referred to as the spirit of learning strategies by Oxford (2016), are applied, holds significant importance in foreign language teaching, as in other fields.

Students who use self-regulated learning skills are effective learners. Using this skill will enable the student to be a successful learner who takes responsibility for their learning (Ulusoy & Karakuş, 2018). Learning a foreign language using self-regulated learning skills is undoubtedly an important strategy for language learning. Because to learn a language, it is necessary to be effective learners who take responsibility and can manage their learning processes. Many researchers have conducted studies on using self-regulated learning in foreign language learning. For example, Ardasheva, et al. (2017) conducted a meta-analysis study examining the effect of self-regulated learning on foreign language proficiency. The

researchers who revealed the studies in this field stated that the results showed that self-regulated learning is an effective strategy that should be used in foreign language learning. According to Ghanizadeh and Mirzaee (2012), foreign language learners achieve higher success the more active they are motivationally, behaviorally, and metacognitively in their learning. Bernaus and Gardner (2008) revealed a clear relationship between student motivation and language learning success. Garrido-Vargas (2012), in his study of students learning English in the USA, concluded that students who used self-regulation skills were more successful in acquiring academic skills such as setting goals, choosing strategies, and monitoring activities to achieve these goals.

The concept of self-regulated learning, which focuses on the student, is an effective method that needs to be used in the education process. The studies of Vygotsky on cognitive learning and Bandura on social learning have revealed that learning is a cognitive process and each individual has a unique learning nature (Bandura, 1982; Schunk, 1989). Following these researchers, Zimmerman and Schunk started working on the concept of self-regulation in the 1980s, and important researchers such as Pintrich, Winnie, and Greene followed them (Ömür & Çubukçu, 2017; Nodoushan, 2012; Öz, 2020). Shunk and Zimmerman (1989) define self-regulation as the process of the student being the master of their learning. In this process, students must activate their cognitive processes, motivation, and behaviors to achieve their goals.

According to Zimmerman (2002), being a self-regulated learner is not about having a mental ability or acquiring an academic skill. Rather, it is a self-directed process that students use to transform their mental abilities into academic skills. In this process, students must develop internal awareness, self-motivation, and behavioral skills to apply their knowledge appropriately. In this process, the learner first sets goals, determines and applies appropriate learning methods, evaluates the results of these methods, and considers it important to support their internal motivation at every stage. At the end of the process, they set new and higher goals for themselves and restart the process. In his "Self-Regulated Learning Model," Zimmerman (1990) divides self-regulation into three main dimensions: the forethought phase, which includes motivation and goal setting; the performance phase, which is monitored through observation and control processes; and the self-reflection phase, where judgments about the process are made (Eryilmaz & Mammadav, 2017).

Another important researcher who has worked on the concept of self-regulation is Pintrich. Pintrich (2004) defines self-regulation as managing one's learning process using the right learning strategies and motivating oneself. In his learning model based on self-regulation, he examines self-regulation in four dimensions: goal setting and planning, cognitive and behavioral motivation, cognitive strategies, and reflection. Shunk and Greene (2017) define self-regulation as the systematic activation and maintenance of students' cognition, motivation, behaviors, and influences to achieve their goals, emphasizing four common characteristics of self-regulation. First, learners who use self-regulation play an active role in learning metacognitively, cognitively, and behaviourally. Second, they set

goals to develop learning skills and competencies, not just complete tasks. Third, they create a dynamic and cyclical process that includes feedback loops in their learning. Finally, learners place importance on sustaining learning efforts and motivation. Winne and Hadwin (Greene & Azevedo, 2007) define self-regulation as the ability to be an active and strategic learner in metacognitive, motivational, and behavioural learning processes. However, the model created by these researchers has a more complex cognitive architecture because they argue that monitoring and control should be included at every stage of learning. They also suggest that task definition and goal-setting processes should be treated as separate phases. This allows learners to interpret their learning levels in more detail and recognize the impact of their tasks on their future goals. Borkowski's "Process-Oriented Metacognitive Model" asserts that self-regulation skills develop by teaching students learning strategies. Learners first learn the characteristics of a learning strategy and become proficient in understanding under which conditions to apply this skill. Accordingly, self-regulation emerges when students select effective learning strategies and monitor their learning. Through this process-oriented model, students learn how strategic behaviour contributes to their academic success (Ömür & Çubukçu, 2017).

Students who use self-regulation strategies have certain key characteristics. These characteristics are defined by many researchers as follows (Zimmerman & Martinez-Pons, 1986; Dembo & Eaton, 2000; Sunger & Gungren, 2009; Pintrich, 2004; Dörnyei, 2003; Butler & Winne, 1995; Garrido-Vargas, 2012):

- These students monitor their learning using different strategies contrary to their goals.
- They organize their time and study environments efficiently.
- They are generally optimistic about their abilities and future success.
- They use self-regulated learning strategies such as reviewing texts, environmental structuring, information seeking, and goal setting.
- They employ various cognitive strategies to reason, solve problems, and think critically.
- They know how to regulate and control their behaviours.
- They seek help to better structure their learning.
- They know ways to motivate themselves for the lesson.
- They set goals for themselves and monitor, record, and evaluate their progress based on these goals.

It is believed that self-regulation is a crucial aspect of learning English as a foreign language, based on the theoretical and research findings. Considering the characteristics of self-regulated learners identified by researchers, self-regulated learning can be examined under the following key concepts: goal setting, use of learning strategies, time and

environment management, self-motivation, self-awareness, self-evaluation, and cognitive and behavioural control.

The use of self-regulation skills in foreign language teaching has been examined using quantitative (Wolters & Hussain, 2015) and qualitative methods (Tsuchiya, 2018). In their experimental study, Vardar and Arsal (2014) aimed to improve students' English attitudes, achievements, and self-regulation skills with the eight-week English course they structured to improve their self-regulation skills. Using two scales, Eken (2017) examined the relationship between English learning strategies and self-regulated learning. Güngör (2022) determined the importance of using self-regulated learning strategies in learning English. Many scale development studies have been conducted on self-regulated learning skills (Weinstein, et al., 1987; Pintrich & De Groot, 1990; Pintrich, et al., 1991; Brown, Miller & Lawendowski, 1999; Aslan & Gelişli, 2015; Kilis & Yıldırım, 2018; Eryılmaz & Mammadov, 2017; Durmaz, 2012; Hong & O'Neil Jr., 2001). The purpose of developing these scales is to measure the level at which primary, secondary school, and college students use self-regulation skills or to what extent they can utilize different dimensions of self-regulation. However, despite studies examining the relationship between English and self-regulation skills, no scale development study has been found that focuses on high school students learning English using self-regulation skills. Zimmerman (1998) noted that self-regulation should be considered context-specific structures deliberately employed to support students' success in a given subject. The development of the "Self-Regulation Skills Usage Scale in EFL Learning" (SRSUS) is expected to fill this gap in the field. This instrument will give English teachers a reliable and practical way to collect data on high school students' self-regulation skills, which will help them direct and focus on their teaching practice in the classroom. Additionally, it can be used to assess how well teaching methods and resources aim to boost students' confidence and control over their English language acquisition. This study is guided by the following research questions.

- What are the sub-factors that constitute the SRSUS?
- What are the item analysis results for the items associated with each sub-factor of SRSUS?
- What are the outcomes of the reliability analyses (e.g., Cronbach's alpha) conducted for each sub-factor of SRSUS?
- What is the validity and reliability of the SRSUS?

METHOD

This study aimed to develop a scale on high school students' ability to use the self-regulated learning method while EFL learning. Exploratory sequential design was used as the method of the research. According to this design, during the scale development process, an item pool was created with qualitative data and supported by quantitative data (Creswell & Plano Clark, 2011). In a qualitative context, a case study was conducted to examine the ability of high school students to use the self-regulation method while learning English. In

the quantitative context, a survey method was conducted in which the created item pool was tested. In the study, convenience sampling was used for different data collection stages. The samples of this study are stated in Table 1. Using the convenience sampling method, researchers included students from accessible schools based on their willingness to participate.

Table 1

Data Collection, Samples, and Sampling Method

Data collection tool	Sampling Method	Sample
Interview form	Convenience sampling	16 high school students
Pre-application (items clarification)	Convenience sampling	10 high school students (11 th Grade) 3 field experts
Trial Application (Exploratory Factor Analysis)	Convenience sampling	263 high school students (9 th , 10 th , 11 th & 12 th Grade)
Confirmatory Factor Analysis	Convenience sampling	200 high school students (9 th , 10 th , 11 th & 12 th Grade)

According to Table 1, sixteen high school students studying at various levels of high school in Afyonkarahisar's Çay district in the 2022-2023 academic year answered the questions on the interview form, which was created to determine the categories related to the use of self-regulation skills while EFL learning. An item pool was created due to the analysis of the data collected with this form. The item pool was cleared of errors by the opinions of three field experts, and the item comprehensibility levels were measured by applying it to ten high school students. The item pool took its final form with the necessary corrections. Examining the scale's face validity was the main purpose of the pre-application, which ensured that students understood the items as the researchers had intended (Cohen, et al., 2000). Munby (1997) thinks asking a representative subsample about their understanding of the items is the most important way to verify face validity. For the trial application, 263 high school students from various high school types determined by convenience sampling method in Afyonkarahisar's Çay district were reached. The data of five high school students who did not answer the scale sincerely and did not follow the instructions were excluded from the study. Thus, the data of 258 high school students were analyzed.

Participants

In scale development studies, it is necessary to reach five times more people than the item pool created for the trial application (Büyüköztürk, 2002). The data from 250-300 participants will suit the 50-item item pool. Within the scope of the research, 258 high school students participated in the data collection phase. The demographic characteristics of these students are shown in Table 2.

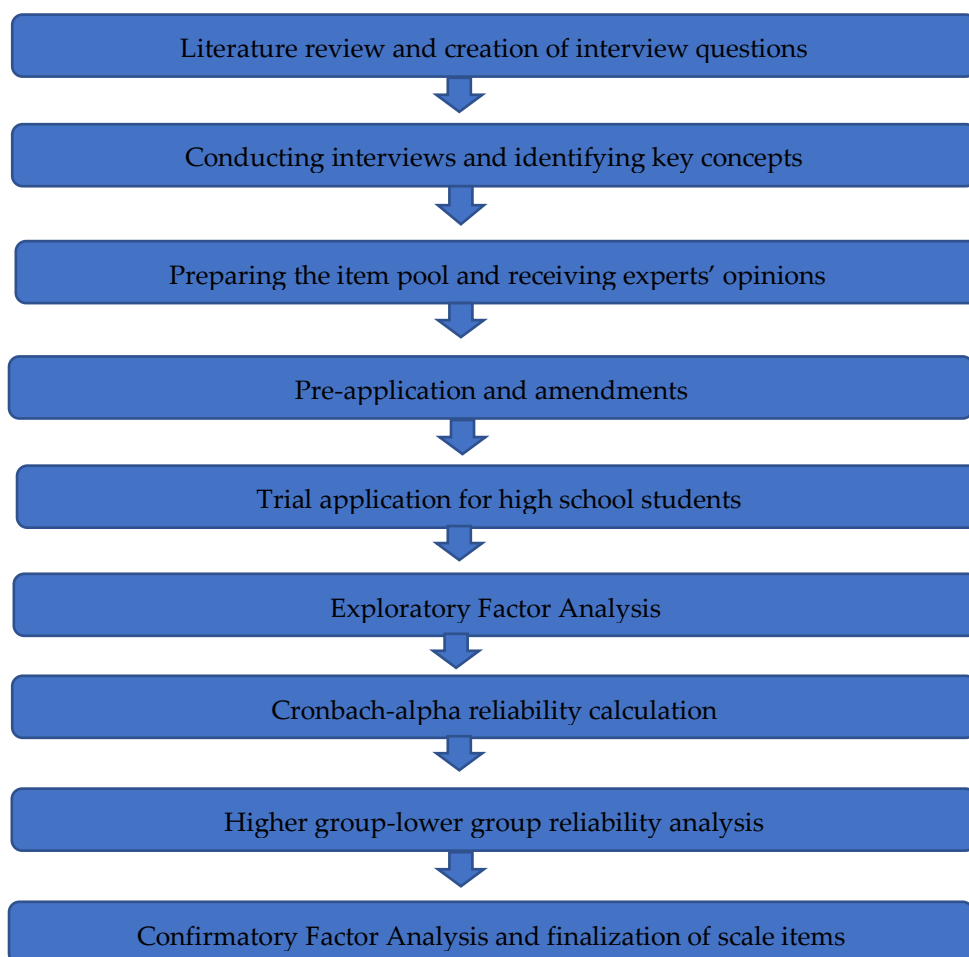
Table 2*Distribution of the Students' Demographic Information*

Demographic Characteristics		N
Grade Level	9 th Grade	76
	10 th Grade	45
	11 th Grade	123
	12 th Grade	14
Total		258

According to Table 2, 76 are 9th-grade students, 45 are 10th-grade students, 123 are 11th-grade students, and 14 are 12th-grade students.

Development of the Scale (SRSUS)

This scale, developed to measure the self-regulation skills of high school students in EFL learning, is a 5-point Likert type. Responses to the items on the scale consist of five options, from strongly disagree to strongly agree. As the score obtained from the scale increases, the degree of use of self-regulation skills in EFL learning increases. The steps taken to develop the SRSUS are outlined below, and the stages are shown in Figure 1.

**Figure 1.** Development Stages of the SRSUS

According to Figure 1, to develop a scale, the first step is to review the literature about the self-regulation skills of high school students in EFL learning and to write down interview questions to elicit the students' ideas. The second step includes conducting interviews with the high school students. Key concepts are identified in light of the information from the literature review and interviews. At the third step, an item pool is prepared and then presented to the experts for their ideas on the clarity of the items. Three specialists in scale development in education sciences were asked to comment on this item pool. In accordance with their suggestions, this assessment instrument was completed. Five items were removed because they were identical to others, and thirteen were changed for lack of clarity. The fourth step includes the pre-application and corrections after the feedback on the pre-application. Ten students participated in this pre-application step to check the items' intelligibility. Four items with language and expression issues were fixed following the pre-application. The next two steps include trial application and exploratory factor analysis. The other two steps include the reliability analysis as the Cronbach-Alpha test and item analysis. The last step includes confirmatory factor analysis and the final version of the SRSUS.

Qualitative Data

The first part of the study, "Interview Form on the Use of Self-Regulation Skills in EFL learning," was prepared by benefiting from the literature to describe the level of use of self-regulation skills by high school students. This form was applied to 16 high school students and the obtained data were converted into codes by performing descriptive content analysis. Descriptive content analysis is a method of creating a code pool and themes/categories following the purpose of the study in qualitative analysis approaches (Ültay, Akyurt, Ültay, 2021). Three experts examined the qualitative data collected in the research, and the inter-coder agreement coefficient of the codes was calculated as 80 % with the formula "Reliability = Consensus / (Agreement + Disagreement) x 100". As a result of the reliability coefficient being over 70 %, it can be said that the key concepts on which the items are based are reliable (Miles & Huberman, 1994).

Quantitative Data

The five key concepts obtained in line with the students' answers to the Interview Form on the Use of Self-Regulation Skills in EFL learning were increased to nine through the support of the literature and the item pool. The item pool was graded on a 5-point Likert type, a preliminary application was made to ten students, and the necessary arrangements were made with the help of three experts. They assisted in deleting poorly phrased items to remove needless uncertainty and rephrasing unclear lines to create concise and simple statements (Barnette, 2000). As a result, a 50-item scale was developed for trial application. During the trial application, the developed scale was applied to 263 students from 9th, 10th, 11th and 12th grades in different public schools in Afyonkarahisar's Çay district. As the analysis of the quantitative data, the answers of 258 students were evaluated. Exploratory

factor analysis (EFA) was used to determine the scale's validity. Kaiser-Mayer-Olkin (KMO) and Bartlett's Test of Sphericity tests were used to determine its suitability for factor analysis. Cronbach's Alpha was used to determine the reliability of the data. To determine the distinctiveness of the data, a 27% t-test was conducted between the lower and higher groups.

Preparing the Item Pool

While examining the research topic, first, the studies on the concept of self-regulation were analyzed through a literature review (Zimmerman ve Martinez-Pons, 1986; Dembo & Eaton, 2000; Sunger & Gungren, 2009; Pintrick, 2004; Dörnyei, 2003; Butler ve Winne, 1995; Garrido – Vargas, 2012). Particularly benefiting from the study of Zimmerman and Martinez-Pons (1990) on student differences in self-regulated learning, the "Interview Form on the Use of Self-Regulation Skills in EFL Learning" was created. These questions, listed in Table 3, were asked of sixteen high school students.

Table 3

The Questions on the Interview Form

Questions
1. Do you have a method to help you learn and remember English topics? If yes, please explain.
2. Do you have a special method to help you plan and do your English homework? If yes, please explain.
3. When completing homework assignments, such as English grammar exercises, do you use a specific method to check them after you're done? If yes, please explain.
4. Do you have a special preparation method for English exams or quizzes? If yes, please explain.
5. Do you have a special motivation method while studying English? If yes, please explain. Do you leave your English studies to the last minute or plan to do them on time?
6. Do you have a special way of organizing your workplace? If yes, please explain. How do you organize the environment if you have difficulty concentrating on English studies?

The responses to the interview form were analyzed and compared with the literature, and nine key concepts were identified. These key concepts are "using learning strategies", "reviewing", "time management", "organizing the learning environment", "self-motivation", "self-awareness", "mental control", "goal setting", and "self-evaluation". A pool of 50 items was created based on these nine key concepts.

Ethical considerations

Ethical requirements throughout this research were followed to guarantee that the study's dependability and integrity were never jeopardized. The information on ethics committee approval is given below:

Ethical Review Board: Social and Human Sciences Scientific Research and Publication Ethics Committee

Date of Ethics Review Decision: 19.03.2025

Ethics Assessment Document Issue Number: 2025/88]

FINDINGS

In this research section, findings regarding the analyses performed are included.

Exploratory Factor Analysis

In scale development studies, the exploratory factor analysis (EFA) technique is used to explain the existing structure more easily. In the study carried out with this analysis method, it was determined which items measured which factors. Items that do not work can thus be recognized and removed from the scale (Orçan, 2018). First of all, to determine the suitability of the data for factor analysis, the KMO (Kaiser-Meyer-Olkin) value was examined and calculated as 0.951. The integrity of the scale was measured with the Bartlett test, and it was found to be significant at $p = 0.000$. According to the EFA results, the same values were re-examined after the items were removed from the scale, and it was determined that the KMO value decreased to .928, given in Table 4.

Table 4

First Analysis and Final Analysis of KMO and Bartlett Test Results

First Analysis Results			Final Analysis Results		
Kaiser–Meyer–Olkin value	0.951		Kaiser–Meyer–Olkin value	0.928	
Barlett Test	sig.	0.000	Barlett Test	sig.	0.000

As a result of preliminary analysis, eight factors were found. These factors explained 64.66 % of the total variance. The scree plot regarding the number of factors of the items is given in Figure 2. The number of factors retained can be assessed using the scree plot (Cattell, 1966).

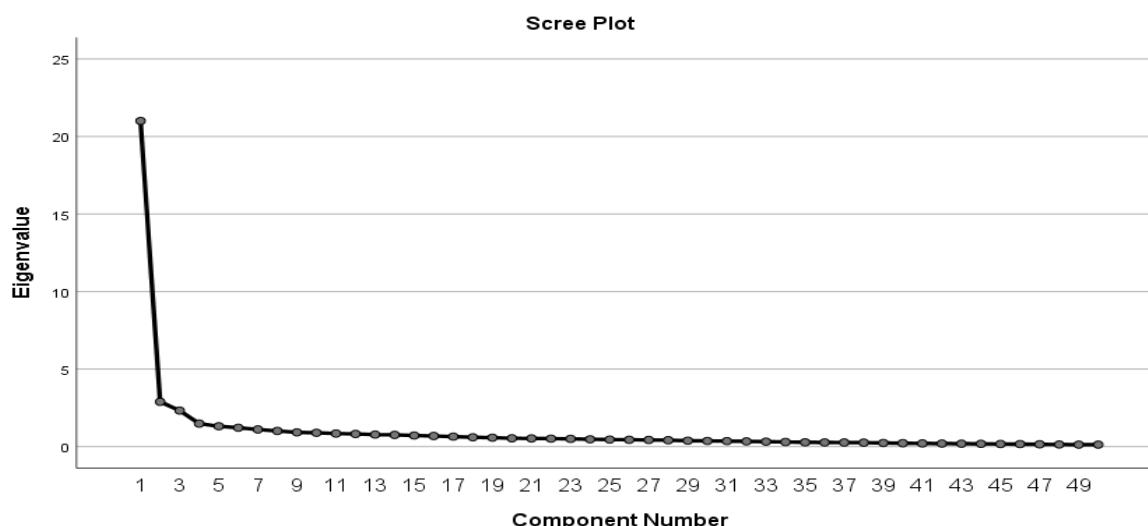


Figure 2. The Scree Plot of the SRSUS

According to Figure 2, the breaking point starts with the 5th component, and from the 6th component, the line becomes straight. To determine the factor loadings more clearly during the analysis process, the varimax rotation process, which is frequently used in social sciences, was used (Büyüköztürk, 2012). 20 items were removed from the initial pool of 50 based on psychometric and statistical criteria derived from exploratory factor analysis. Specifically, items were eliminated due to low factor loadings (below the commonly accepted threshold of 0.40), lack of association with any meaningful factor, or poor alignment with the theoretical structure of the scale. These items—11, 13, 15, 16, 25, 28, 30, 31, 33, 36, 37, 38, 39, 40, 41, 42, 43, 45, 49, and 50 (item number)—either failed to contribute adequately to explained variance, showed low communalities, or weakened internal consistency. Their removal aimed to enhance the scale's construct validity, internal reliability, and conceptual clarity (Costello & Osborne, 2005). The total variance explained by high school students' level of use of self-regulation skills in EFL learning is given in Table 5. The cumulative variance can be used to determine whether a sufficient number of factors have been kept, factor loadings demonstrate how strongly each item is associated with a certain component, and eigenvalues reflect the relative importance of each factor (Field, 2009).

Table 5

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12,068	40,227	40,227	12,068	40,227	40,227	3,612	12,039	12,039
2	2,414	8,047	48,273	2,414	8,047	48,273	3,429	11,429	23,468
3	1,966	6,552	54,825	1,966	6,552	54,825	3,312	11,039	34,507
4	1,182	3,939	58,765	1,182	3,939	58,765	3,268	10,895	45,402
5	1,159	3,864	62,629	1,159	3,864	62,629	3,184	10,612	56,014
6	1,087	3,625	66,254	1,087	3,625	66,254	3,072	10,240	66,254
7	,856	2,853	69,107						
8	,761	2,536	71,643						
9	,725	2,416	74,059						
10	,668	2,227	76,286						
11	,609	2,030	78,316						
12	,580	1,935	80,251						
13	,552	1,840	82,091						
14	,529	1,765	83,855						
15	,496	1,653	85,508						
16	,454	1,514	87,022						
17	,403	1,343	88,364						
18	,398	1,326	89,690						
19	,377	1,255	90,945						
20	,354	1,180	92,126						
21	,327	1,090	93,216						
22	,293	,977	94,192						
23	,272	,907	95,099						
24	,257	,855	95,955						
25	,241	,805	96,760						
26	,234	,781	97,540						
27	,225	,750	98,290						
28	,183	,609	98,899						
29	,178	,592	99,492						
30	,153	,508	100,000						

Descriptive Features of the Total Variance of the SRSUS

According to Table 5, the total variance explanation rate of the items in all sub-factors was 66.25%. In social sciences, it is considered sufficient for the variance explained to be between 40% and 60% (Büyüköztürk, 2012). The rotated components matrix for the SRSUS and the anti-image correlations of the items are shown in Table 6.

Table 6

The Rotated Components for the SRSUS and the values of anti-image correlations

Items	Components						Anti image cor.
A1: I know how to increase my desire to study English.	,749	,012	,104	,242	,217	,174	,932 ^a
A2: I know my strengths in English learning.	,747	,124	,267	,167	,138	,223	,908 ^a
A3: I check my strengths in learning English.	,676	,220	,089	,200	,108	,053	,939 ^a
A4: I try to improve my weaknesses in English learning.	,600	,204	,264	,244	,258	,270	,949 ^a
A5: I set goals for myself in English learning that are difficult to achieve.	,564	,219	,236	,113	,411	,213	,957 ^a
A6: I evaluate my performance in English learning.	,427	,248	,231	,305	-,012	,100	,911 ^a
B1: I regularly review English course topics from various sources.	,099	,857	,102	,134	,073	,154	,870 ^a
B2: I allocate the necessary time to study for English class.	,085	,852	,170	,094	,089	,128	,890 ^a
B3: I arrange regular study hours to study English.	,182	,655	,297	,254	,019	,074	,937 ^a
B4: I make a study plan to study English better.	,292	,574	,224	,100	,169	,408	,929 ^a
B5: I hang English worksheets in the environment where I will study English.	,163	,490	,211	,104	,024	,347	,965 ^a
C1: I use various methods to prepare for English exams or quizzes.	,115	,193	,730	,091	,200	,101	,928 ^a
C2: If I struggle with English course subjects, I get help from different sources (lecture videos, textbooks, etc.).	,122	,125	,710	,157	,091	,238	,929 ^a
C3: I review the mistakes I made in English questions or exercises.	,193	,246	,675	,046	,297	,290	,942 ^a
C4: I use various methods to check my English homework.	,341	,228	,611	,197	,082	,288	,956 ^a
C5: I get help from various sources to correct the mistakes I make in the questions in English exercises.	,260	,280	,573	,151	,148	,275	,958 ^a
D1: I use learning strategies (memorizing words, reading English books, listening to music, using similarities and associations, learning phrases, etc.) that will help me learn English.	,139	,042	,217	,783	,188	,218	,894 ^a

D2: I use online applications that teach English.	,176	,046	,009	,744	,177	,226	,850 ^a
D3: I make friends online who are native speakers of English or with whom I can chat in English.	,144	,238	,052	,727	-,058	-,137	,861 ^a
D4: I watch foreign movies to help me learn English.	,268	,156	,452	,565	,249	-,051	,947 ^a
D5: I use resources such as English movies, music, and books to improve my English.	,244	,265	,112	,554	,097	,145	,952 ^a
D6: I use different methods to help me learn English words.	,403	,114	,162	,514	,308	,267	,952 ^a
E1: Being successful in English class motivates me.	,019	,072	,116	,093	,818	,127	,876 ^a
E2: I know that learning English is necessary for me.	,151	,181	,246	,035	,785	,052	,897 ^a
E3: If I fail in English, I look for the fault in myself.	,263	-,047	,090	,228	,718	,242	,934 ^a
E4: If I fail in English, I question the reasons.	,402	,006	,149	,199	,671	,204	,926 ^a
F1: While doing English homework, I remove objects that will distract me from my study environment.	,174	,219	,258	,075	,141	,741	,946 ^a
F2: I organize my environment to study more easily while studying English.	,202	,191	,239	,129	,234	,722	,942 ^a
F3: I make sure the environment is quiet while studying English.	,223	,130	,187	,240	,311	,681	,934 ^a
F4: I ensure that my working environment is comfortable for studying English.	,160	,453	,266	,049	,064	,595	,921 ^a

After the rotation process was applied, the results in Table 6 are obtained. Accordingly, it can be seen that there are six items in the 1st factor, five items in the 2nd factor, five items in the 3rd factor, six items in the 4th factor, four items in the 5th factor, and four items in the 6th factor. The factor loadings should be at least .40. (Martens & Webber, 2002). According to Table 6, factor load values for the 30 items in the scale vary between 0.857 and 0.427. When the factor loading values on the scale are examined, it can be said that they are high since they generally have values above 0.60. The results of the anti-image correlations of the items are more than 0.5 so none of the items have been deleted (Wu, et al., 2023). The first sub-factor was named “self-awareness”, the second sub-factor was named “planning”, the third sub-factor was named “reviewing”, the fourth sub-factor was named “using learning strategies”, the fifth sub-factor was named “self-evaluation,” and the sixth sub-factor was named “organizing the learning environment”. Detailed information about the naming of the sub-factors is given below:

1. Self-Awareness: The first six items of the scale were related to foreign language learners' awareness of their current state in the learning process, recognizing their strengths and weaknesses. Therefore, this sub-dimension was named self-awareness.

2. Planning: Items 7 to 11 of the scale were related to the students setting short and long-term goals to guide their learning processes. Therefore, this sub-dimension was named planning.
3. Reviewing: Items 12 to 16 focused on students recognizing their learning deficiencies and modifying and improving their learning strategies when necessary. Hence, these items were categorized under the reviewing sub-dimension.
4. Using Learning Strategies: Items 17 to 22 of the scale included questions about foreign language learners applying various learning techniques to understand better and retain information. Therefore, this sub-dimension was named using learning strategies.
5. Self-Evaluation: Items 23 to 26 contained questions about helping foreign language learners identify and assess their progress, motivation levels, and sources of learning deficiencies. Therefore, this sub-dimension was named self-evaluation.
6. Organizing the Learning Environment: Items 27 to 30 included questions about students' optimizing their study environment to make it more efficient while learning a foreign language. Therefore, this sub-dimension was named organizing the learning environment.

In addition, varimax factor loading, common factor variance, item-total correlation coefficient, t scores, and significance values (p) of each sub-factor were also calculated. These values are shown in Table 7.

Table 7

Item Analysis of the SRSUS

	Items	Varimax Factor Load	Common Factor Variance	Item-total correlation coefficient	t	p
Self-awareness	A1	,749	,708	,605	10,017	0,000
	A2	,747	,740	,679	12,101	0,000
	A3	,676	,568	,542	10,924	0,000
	A4	,600	,670	,738	14,341	0,000
	A5	,564	,648	,696	13,703	0,000
	A6	,427	,400	,516	9,723	0,000
Planning	B1	,857	,801	,535	11,184	0,000
	B2	,852	,795	,531	9,840	0,000
	B3	,655	,621	,571	12,661	0,000
	B4	,574	,669	,688	15,410	0,000
	B5	,490	,442	,510	9,040	0,000

Reviewing	C1	,730	,643	,557	10,316	0,000
	C2	,710	,625	,567	9,514	0,000
	C3	,675	,727	,685	14,906	0,000
	C4	,611	,670	,698	15,282	0,000
	C5	,573	,595	,666	13,003	0,000
Using Learning Strategies	D1	,783	,764	,606	11,519	0,000
	D2	,744	,667	,496	8,493	0,000
	D3	,727	,630	,353	6,382	0,000
	D4	,565	,685	,641	11,709	0,000
	D5	,554	,480	,540	8,883	0,000
	D6	,514	,631	,693	13,335	0,000
Self-evaluation	E1	,818	,713	,440	7,327	0,000
	E2	,785	,737	,539	8,288	0,000
	E3	,718	,705	,557	9,308	0,000
	E4	,671	,715	,625	10,391	0,000
Organizing the Learning Environment	F1	,741	,719	,617	12,807	0,000
	F2	,722	,727	,664	13,279	0,000
	F3	,681	,719	,685	13,218	0,000
	F4	,595	,662	,612	13,302	0,000

According to Table 7, it can be seen that the internal consistency coefficients of the factors and their totals are high. The item-total correlation was calculated, and it is recommended that items with a value less than 0.20 shouldn't be included in the scale (Büyüköztürk, 2012, p. 171). The item-total correlation values were between .353 and .738. Therefore, no items were removed from the scale. The data from the scale were summed and ranked, and two groups of 27 % lower and 27 % higher were created. Examining the average scores provided to each item by the end groups is another use for item analysis (lower-higher group) (Tavşancıl, 2010, p. 55). The differences between their item average scores were found to be statistically significant. This demonstrates the internal consistency of the test (Büyüköztürk, 2012, p. 171). The variance and Cronbach alpha coefficients explained by each factor are given in Table 8. The Cronbach alpha coefficient indicated each factor's internal consistency reliability. Exploratory research often uses a loose cut-off of 0.60; an acceptable scale requires an alpha of 0.70 or higher, and a "good" scale requires a cut-off of 0.80 (Cohen et al., 2000).

Table 8*The Number of Items, % of Explained Variance, and Cronbach Alpha Values of the SRSUS*

Sub-factors	Number of Items	% of Explained Variance	Cronbach Alpha
1 st sub-factor	6	12.039	.840
2 nd sub-factor	5	11.429	.862
3 rd sub-factor	5	11.039	.846
4 th sub-factor	6	10.895	.864
5 th sub-factor	4	10.612	.872
6 th sub-factor	4	10.240	.852
Total	30	66.254	.946

According to Table 8, the first sub-factor accounted for 12.039 % of the total variance, followed by the second sub-factor as 11.429 %, the third sub-factor as 11.039 percent, the fourth sub-factor as 10.895 %, the fifth sub-factor as 10.612 %, and the last sub-factor as 10.240 %. The alpha coefficient of the 1st factor (self-awareness) is 0.840, the alpha coefficient of the 2nd factor (planning) is 0.862, the alpha coefficient of the 3rd factor (reviewing) is 0.844, the alpha coefficient of the 4th factor (using learning strategies) is 0.864, the alpha coefficient of the 5th factor (self-evaluation) is 0.872, and the alpha coefficient of the 6th factor (organizing the learning environment) is 0.852. The total alpha value of the scale is 0.946. Since this value needs to be 0.70 or above, it shows that the test results are reliable (Büyüköztürk, 2012, p. 171). In this case, it can be said that the SRSUS has a very high reliability. If only a single test or a single administration is feasible, the test may be randomly divided into two halves, and the equivalence of performance between these two parts can be evaluated using the split-half method (Gipps, 2011). According to the correlation analysis conducted using this method, a correlation coefficient of .813 was found between the two halves of the test, indicating that the test can be considered reliable. The correlation coefficients of the sub-factors are shown in Table 9.

Table 9*The Correlation Coefficients of the Sub-factors*

Factors	N	1 st Factor	2 nd Factor	3 rd Factor	4 th Factor	5 th Factor	6 th Factor
1 st Factor	258	1	.555	.641	.655	.577	.258
2 nd Factor	258	.555	1	.625	.474	.321	.624
3 rd Factor	258	.641	.625	1	.523	.500	.666
4 th Factor	258	.655	.474	.523	1	.471	.467
5 th Factor	258	.577	.321	.500	.471	1	.508
6 th Factor	258	.258	.624	.666	.467	.508	1

According to Table 9, it is seen that there is mostly a significant but moderate relationship between the factors. A high-level relationship is indicated by a correlation coefficient between 0.70 and 1.00, a moderate-level relationship by 0.70 and 0.30, and a low-level relationship by 0.30 and 0.00 (Büyüköztürk 2012, p. 32).

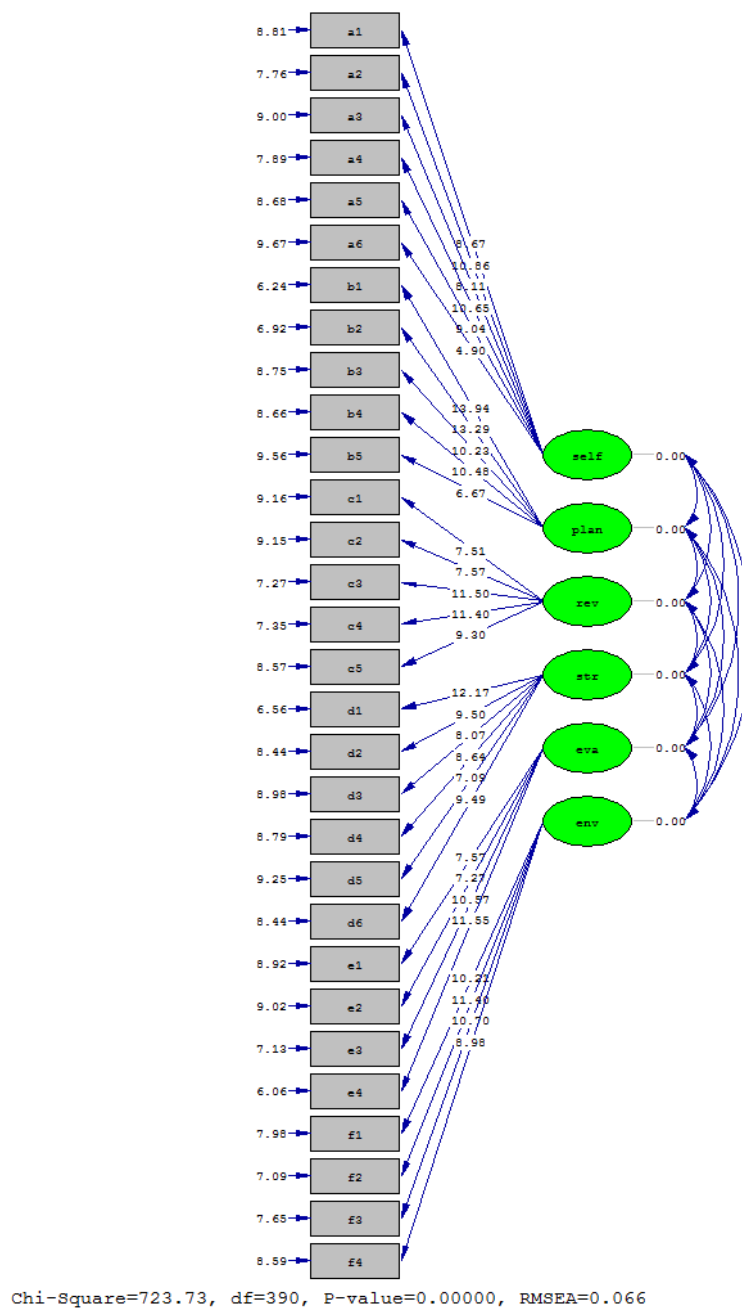
Confirmatory Factor Analysis

It was necessary for CFA to cross-validate the EFA results using a different independent sample (Dimitrov, 2012). The items in the "self-awareness" factor are displayed as a1–a6; the items in the "planning" factor are displayed as b1–b5; the items in the "reviewing" factor are displayed as c1–c5; the items in the "using learning strategies" factor are displayed as d1–d6; the items in the "self-evaluation" factor are shown as e1–e4 and the items in the "organizing the learning environment" are shown as f1–f4. CFA was carried out by taking into account 200 samples' responses. According to Harrington (2009, p. 46), a sample size greater than 200 is a potentially acceptable number for many models. The coefficients of this model tested using CFA were calculated for subscale and composite scale reliability.

CFA First Level

T values for the latent variables that account for the observed variables are indicated by the arrows on the path diagram for the SRSUS, which is displayed in Figure 3.

Figure 3. Significance Levels and t Values of the Explanation Ratios of the Observed Variables of the Latent



Variables for the SRSUS

Schermelleh-Engel, Moosbrugger, & Müller (2003) state that t values greater than 2.58 indicate significance at the 0.1 level. The χ^2 statistic, comparative fit index (CFI; Bentler, 1990), non-normed fit index (NNFI; Bentler & Bonett, 1980), root mean square error of approximation (RMSEA; Steiger, 1990), and standardized root-mean-square residual (SRMR; Hu & Bentler, 1999) were used to evaluate the model fit. According to Figure 3, the SRSUS's parameter estimations are significant at the .01 level. The chi-square value is 723.73, and the df value is 390. Accordingly, χ^2/df is 1.85. Compliance is at its highest level when

this ratio is smaller than 3 in large samples (Kline, 2011). RMSEA value is 0.066. The RMSEA value should be less than 0.07 to indicate a good fit level (Stieger, 2007). Therefore, the RMSEA value is at a good fit level.

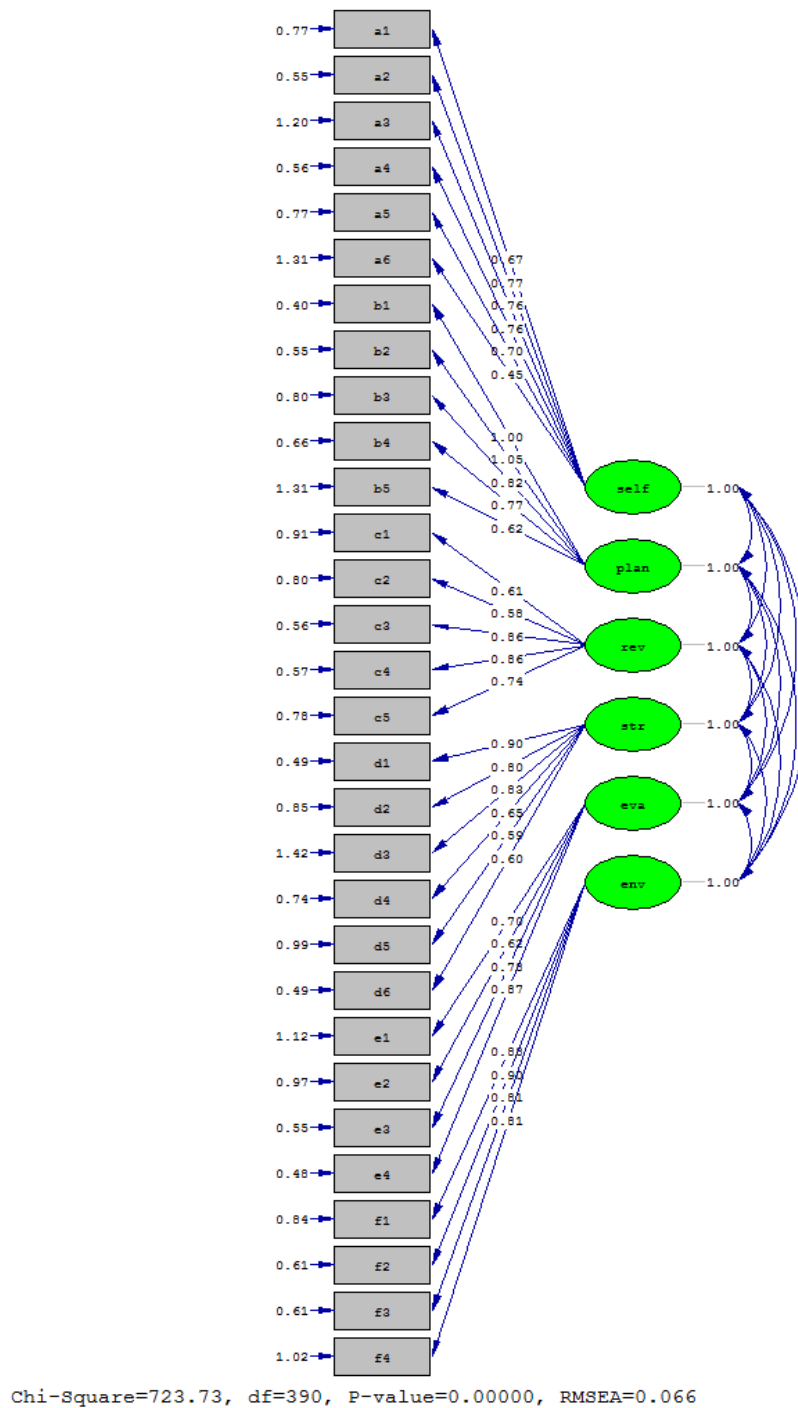


Figure 4. Error Variances in the SRSUS Path Diagram

Following an analysis of the observed variables' error variances in Figure 4, it is discovered that they are within acceptable values. In this case, the analysis included even the items with the largest error variance (1.42) (Kline, 2011).

Table 10

Goodness of Fit Indexes of the SRSUS According to the Structural Model

The goodness of fit indexes	Values of SRSUS	Perfect fit values	Acceptable fit values
χ^2/df	1.85	$0 \leq \chi^2/df \leq 2$	$2 < \chi^2/df \leq 3$
RMSEA	.066	$0 \leq RMSEA \leq .05$	$.05 < RMSEA \leq .08$
Comparative Fit Index (CFI)	.83	$.97 \leq CFI \leq 1.00$	$.95 \leq CFI < .97$
Standardized RMR	.079	$0 \leq SRMR \leq .05$	$.05 < SRMR \leq .10$
Goodness of Fit Index (GFI)	.80	$.95 \leq GFI \leq 1.00$	$.90 \leq GFI < .95$
Adjusted Goodness of Fit Index (AGFI)	.77	$.90 \leq AGFI \leq 1.00$	$.85 \leq AGFI < .90$
NNFI	.82	$.97 \leq NNFI \leq 1.00$	$.95 \leq NNFI < .97$

Source: Schermelleh-Engel, Moosbrugger & Müller (2003)

According to Table 10, χ^2/df ratio is 1.85. This shows the value of perfect fit. RMSEA value is .066. The RMSEA value is, therefore, at an acceptable level. The value of CFI is .83 and is close to the acceptable fit value. According to Hu and Bentler (1999), CFI values above .95 typically indicate "good" fit. There is no clear cutoff point for CFI that would indicate "bad" fit (McDonald & Ho, 2002). The value of SRMR is .079 and it is between the acceptable fit values. The goodness of fit index indicates that the GFI, AGFI, and NNFI values are close to acceptable fit values. Although the CFI value falls below the threshold for good fit, the RMSEA value, SRMR value, and χ^2/df ratio are within acceptable ranges. Therefore, these results support the SRSUS' factor structure. All items on the scale have factor-loading values greater than 0.30. Therefore, it may be said that everything has a purpose (Sardohan Yıldırım, 2023).

CFA Second Level

In Figure 5, the significance levels of the t values of the observed variables are given after performing the second level of confirmatory factor analysis for SRSUS.

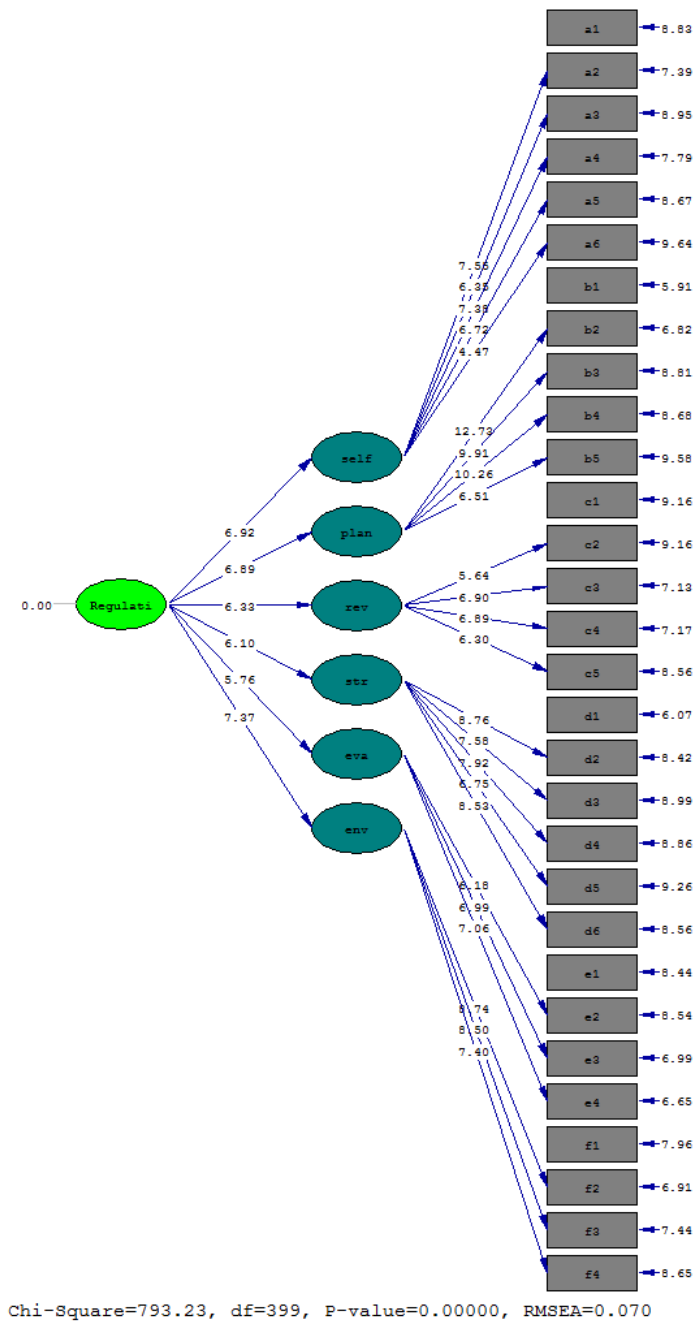


Figure 5. t Values of SRSUS according to 2nd Level of CFA

Figure 5 shows the t values of SRSUS according to 2nd Level of CFA on the arrows. The parameter estimates are significant at the .01 level. The chi-square value is 793.23, and df value is 399 in Figure 5. Accordingly, χ^2/df ratio is 1.98. Kline (2011) states compliance is perfect if the χ^2/df ratio is less than 3. RMSEA value is .070. According to Brown (2015), the RMSEA value must be near or less than 0.06. The value of CFI is .82. The value of SRMR is .089. This value has an acceptable fit, according to Table 10. NNFI value is .80, CFI value is

.82, GFI value is .79, and AGFI value is .76. According to the goodness of fit index, these values are close to acceptable ones. These findings thus support the factor structure of the SRSUS. Error variances of the 2nd level of the SRSUS in the path diagram are shown in Figure 6.

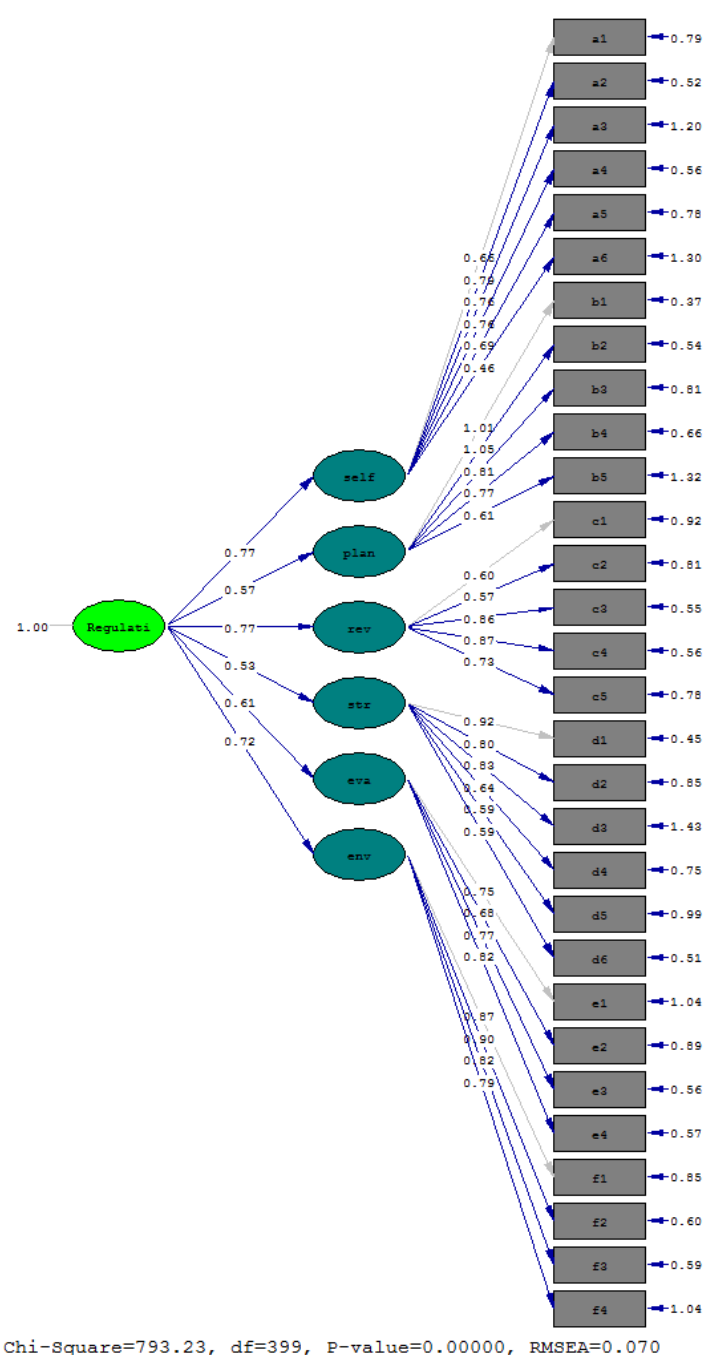


Figure 6. Error Variances in the SRSUS Path Diagram (2nd Level)

It can be seen that the error variances of the observed variables in Figure 6 are within acceptable values. Even the items with the largest error variance (1.43) were considered for the study (Kline, 2011).

DISCUSSION

This study aimed to find out which factors explain self-regulation skills in EFL learning. Therefore, the researchers developed an instrument that focuses on using self-regulation skills in learning English as a foreign language. As a result of the analysis conducted, 20 items were removed from the scale, which initially consisted of 50 items. The scale applied to 258 high school students, consisted of six sub-factors and 30 items. The Cronbach Alpha coefficient for the overall scale of 30 items was calculated as 0.946. As a result of the exploratory and confirmatory factor analysis, the scale includes six sub-factors and they explained 66,25 % of the total variance. Confirmatory factor analysis was used to ensure that the factors identified by the exploratory factor analysis were accurate and the findings of the analysis supported the factor structure. The scale's factors demonstrated internal consistency. The item total and item discrimination indexes were analyzed for each item. For the item discrimination analysis, the independent sample t-test was used to analyze the difference between the item average scores of the lower 27 percent and higher 27 percent groups formed according to the test's total scores. The difference was found to be significant in the item discrimination analysis. Finally, the developed scale, SRSUS (Self-Regulation Skills Usage Scale in EFL Learning), had 30 items. Positive correlations were found among the six factors examined in this study. Especially, "self-awareness" strongly relates to "using learning strategies", and "reviewing," which shows their close connection with each other.

According to the self-regulated learning perspective, students are believed to actively participate in their learning process. Students are expected to create meanings, objectives, and strategies using internal and external knowledge and information. Students are expected to make comparisons of their objective or criterion to determine if the learning process should continue in its form or change. Students can set learning goals, track their progress, and then modify and control their behavior and thought processes to achieve these goals (Sadler, 1989; Pintrich, 2004; Boekaerts & Cascallar, 2006). In this current study, two sub-factors called "self-awareness" and "using learning strategies" include items that emphasize students' desires, goals for learning English and the tactics they use to make learning English easy and fun. According to Pintrich (2004), the self-regulated learning perspective assumes that students can keep an eye on, manage, and control some elements of their motivation, behavior, thought processes, and some parts of their environments. In the present study, there are also items to assess the degree of students' evaluation of their performance and control on the learning environment. The sub-factor named "organizing the learning environment" included items like removing distractful objects, and making the environment quiet and comfortable. One of the key elements of effective self-regulated learning, and one considered essential for implementing learning strategies, is the capacity to self-monitor and self-evaluate the learning process and outcome (Zimmerman, Bonner, & Kovach, 1996). This study's "self-evaluation" sub-factor matched this distinctive self-regulated learning feature. It has been proposed that those good at self-regulation should

plan their approach to a task before they do it. Following the implementation of their plan, they should evaluate the procedure and results (Ertmer & Newby, 1996). In the present study, the “planning” sub-factor consisted of items related to planning study hours and time for studying English, etc.

In Moilanen’s (2007) study, a 36-item adolescent self-regulatory inventory has been developed taking into short-term and long-term regulation account. It focuses on activating, monitoring, maintaining, inhibiting, and adapting adolescents’ emotions, thoughts, attention, and behavior. Tsuchiya (2019) has developed a scale to measure the quality of a learner’s self-regulated learning (SRL) for English as a foreign language in a higher education level. The scale comprises five factors: self-efficacy, planning, effort, self-monitoring, and evaluation/reflection. Toering et al. (2012) developed a 50-item SRL scale for general learning based on the SRL process, adding effort and self-efficacy after initially assuming the four factors of planning, self-monitoring, evaluation, and reflection. Zheng and his friends developed an Online Self-regulated English Learning scale comprising six factors: goal setting, time management, environment structuring, help-seeking, task strategies, and self-evaluation (Zheng, et al., 2018). Tseng, et al., (2017) developed a scale to assess English as a foreign language learners’ self-regulatory capacity and found four factors: emotional control, goal control, awareness control, and boredom control (Tseng, et al., 2017).

In this current study, the first factor (self-awareness) consisted of 6 items; the second factor (planning) consisted of 5 items; the third factor (reviewing) consisted of 5 items; the fourth factor (using learning strategies) consisted of 6 items, the fifth factor (self-evaluation) consisted of 4 items, and the sixth factor (organizing the learning environment) consisted of 4 items. This 30-item scale was developed for high school students and is simpler than the one that Tsuchiya (2019) developed for university students. Tsuchiya (2019) categorizes his scale into three phases: forethought, performance, and self-reflection. However, the factors included in the developed scale are not named under any specific phase and show a close interrelationship. The correlations between the self-awareness factor and the reviewing factor, between the self-awareness factor and the using learning strategies factor, and between the reviewing factor and the organizing the environment factor are higher than with other factors. In fact, the correlation between the reviewing factor and the organizing the environment factor approaches a high level.

The sub-factors of this developed scale mainly parallel with the results of the study by Zheng, et al. (2018), and they have some common features, such as planning and evaluation, put forward by the studies of Tsuchiya (2019) and Toering et al. (2012). The measurement tool that Zheng et al. (2018) developed exhibits certain differences compared to the instrument developed in the present study. Unlike the current tool, it includes four items under the subfactor of goal setting, which appears to carry greater weight relative to the other subfactors. Additionally, it comprises items related to time management, thereby addressing how university students manage their time while learning English. Finally, it is

noteworthy that the instrument contains items that involve seeking assistance from others in the environment as part of efforts to enhance self-regulation skills.

LIMITATIONS AND RECOMMENDATIONS

This study is limited to assess high school students' self-regulation skills in learning English. The following recommendations are offered:

- Thanks to the developed scale, appropriate studies can be conducted to determine high school students' self-regulation skills in learning English as a foreign language.
- As a result of observations and interviews with the students, research can be conducted on the factors that positively or negatively affect self-regulation skills in learning English as a foreign language.
- Changes in students' self-regulation and its impact on many criteria variables, including achievement and attitude, can be investigated through longitudinal studies.
- In this study, convenience sampling was employed as the sampling method for all the stages, limiting the research results. For future research, it is recommended to ensure greater diversity in sample selection by utilizing different types of sampling methods and by including various rural regions of the country to enhance the generalizability of the findings.
- Furthermore, the instrument's validity can be strengthened in subsequent studies by implementing concurrent or predictive validity analyses.

CONCLUSION

This study developed a 5-point Likert-type "Self-Regulation Skills Usage Scale in EFL Learning" to determine high school students' self-regulation skills in learning English as a foreign language. In conclusion, the developed scale can be used in the literature as a valid and reliable scale to measure high school students' self-regulation skills in EFL learning. Although there are many scales and studies on self-regulation in the literature, since there is no study measuring the self-regulation skills of high school students in learning English, the SRSUS was developed. With the total score obtained from this scale, reliable results can be obtained that determine to what extent high school students use their self-regulation skills in learning English.

Future researchers are urged to modify and apply the "Self-Regulation Skills Usage Scale in EFL Learning" (SRSUS) in digital and mixed learning environments in light of the study's findings. It is crucial to assess the validity and reliability of the scale in technology-mediated situations since the nature of self-regulated learning may differ. Comparative research could also examine any variations in students' self-regulation abilities across traditional, digital, and hybrid learning settings. Researchers may also examine how different digital tools and platforms impact the use and development of self-regulation skills

in EFL instruction. Further data on how self-regulation changes in these dynamic learning environments may be obtained through longitudinal studies.

REFERENCES

- Alperen, A. & Hertsch, M. F. (2013). Türkiye’de Yabancı Dil Öğretiminde Yenilikçi Yaklaşımlar [Innovative Approaches in Foreign Language Teaching in Turkey]. *21. Yüzyılda Eğitim ve Toplum Eğitim Bilimleri ve Sosyal Araştırmalar Dergisi*, 2(4), 17-44.
- Ardasheva, Y., Wang, Z., Adesope, O. O. & Valentine, J. C. (2017). Exploring effectiveness and moderators of language learning strategy instruction on second language and self-regulated learning outcomes. *Review of Educational Research*, 87(3), 544–582. <https://doi.org/10.3102/0034654316689135>
- Arslan, S. & Gelişli, Y. (2015). Algılanan Öz-Düzenleme Ölçeği'nin geliştirilmesi geçerlik ve güvenirlik çalışması [Development of the Perceived Self-Regulation Scale: A Study on Validity and Reliability]. *Sakarya University Journal of Education*, 5(3), 67-74. <https://doi.org/10.19126/suje.07146>
- Bandura, A. (1982). Self-Efficacy Mechanism in Human Agency. *American Psychological Association*, 37(2), 122-147.
- Barnette, J. J. (2000). Effects of stem and Likert response option reversals on survey internal consistency: If you feel the need, there is a better alternative to using those negatively worded stems. *Educational and Psychological Measurement*, 60, 361–370. <https://doi.org/10.1177/00131640021970592>
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238–246. <https://doi.org/10.1037/0033-2909.107.2.238>
- Bentler, P. M. & Bonett, D.G. (1980). Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588–606. <https://doi.org/10.1037/0033-2909.88.3.588>
- Bernaus, M. & Gardner, R. (2008). Teacher Motivation Strategies, Student Perceptions, Student Motivation, and English Achievement. *The Modern Language Journal*, 92, 387-401. <https://doi.org/10.1111/j.1540-4781.2008.00753.x>
- Boekaerts, M. & Cascallar, E. (2006). How far have we moved toward the integration of theory and practice in self-regulation? *Educational Psychology Review*, 18, 199–210. <https://doi.org/10.1007/s10648-006-9013-4>
- Brown, J. M., Miller, W. R. & Lawendowski, L. A. (1999). The Self-Regulation Questionnaire. In L. VandeCreek & T. L. Jackson (Eds.), *Innovations in Clinical Practice: A Source Book*. (pp. 281-289). Professional Resource Press.
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd Ed.). The Guilford Press.

- Butler, D. L. & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of educational research*, 65(3), 245-281. <https://doi.org/10.2307/1170684>
- Büyüköztürk, Ş. (2002). Faktör analizi: Temel kavramlar ve ölçek geliştirmede kullanımı [Factor Analysis: Fundamental Concepts and Its Application in Scale Development]. *Kuram ve uygulamada eğitim yönetimi*, 32(32), 470-483.
- Büyüköztürk, Ş. (2012). *Bilimsel araştırma yöntemleri [Scientific Research Methods]*. Pegem Akademi Yayınları.
- Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, 1, 245-276. https://doi.org/10.1207/s15327906mbr0102_10
- Chomsky, N. (2006). *Language and Mind*. Cambridge University Press.
- Cohen, L., Manion, L. & Morrison, K. (2000). *Research methods in education*. Routledge Falmer.
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, 10(7), 1-9. <https://doi.org/10.7275/jyj1-4868>
- Creswell, J. W. & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd Edition). Sage.
- Dembo, M. H. & Eaton, M. J. (2000). Self-regulation of academic learning in middle-level schools. *The elementary school journal*, 100(5), 473-490. <https://doi.org/10.1086/499651>
- Dimitrov, D. M. (2012). *Statistical methods for validation of assessment scale data in counseling and related fields*. American Counseling Association.
- Dörnyei, Z. (2003). Attitudes, orientations, and motivations in language learning: Advances in theory, research, and applications. *Language learning*, 53(S1), 3-32. <https://doi.org/10.1111/1467-9922.53222>
- Durmaz, M. (2012). Ortaöğretim öğrencilerinin (10. sınıf) temel psikolojik ihtiyaçlarının karşılanmışlık düzeyleri, motivasyon ve matematik kaygısı arasındaki ilişkilerin belirlenmesi [Examining the Relationships Between Basic Psychological Needs Satisfaction, Motivation, and Mathematics Anxiety Among 10th Grade Secondary School Students] [Unpublished Master's thesis]. Abant İzzet Baysal University.
- Eken, M. (2017). Üniversite hazırlık sınıf öğrencileri ve özel dil okulu öğrencilerinin yabancı dil öğrenme stratejileri ve öz düzenleme becerileri [Language Learning Strategies and Self-Regulation Skills of University Preparatory Class Students and Private Language School Learners] [Unpublished Master's thesis]. Adnan Menderes University.
- Ertmer, P. A. & Newby, T. J. (1996). The expert learner: Strategic, self-regulated, and reflective. *Instructional Science*, 24, 1-24. <https://doi.org/10.1007/BF00156001>

- Eryılmaz, A. & Mammadov, M. (2017). Zimmerman'in Modeli Temelinde Öz Düzenlemeli Öğrenme Ölçeğinin Geliştirilmesi [Development of a Self-Regulated Learning Scale Based on Zimmerman's Model]. *Uluslararası Eğitim Bilimleri Dergisi*, (10), 79-93.
- Field, A. (2009). *Discovering statistics using SPSS*. Sage.
- Garrido-Vargas, M. (2012). *Relationship of self-regulated learning and academic achievement among English language learners* [Unpublished Doctoral dissertation]. The University of Arizona.
- Ghanizadeh, A. & Mirzaee, S. (2012). EFL learners' self-regulation, critical thinking and language achievement. *International Journal of Linguistics*, 4(3), 451-468. <https://doi.org/10.5296/ijl.v4i3.1979>
- Gipps, C. (2011). *Beyond Testing (Classic Edition): Towards a theory of educational assessment*. Routledge.
- Greene, J. A. & Azevedo, R. (2007). A theoretical review of Winne and Hadwin's model of self-regulated learning: New perspectives and directions. *Review of educational research*, 77(3), 334-372. <https://doi.org/10.3102/003465430303953>
- Gültekin, M. (2017). Sosyal Bilişsel Öğrenme Kuramı [Social Cognitive Learning Theory]. In B. Oral (Ed.), *Öğrenme Öğretme Kuram ve Yaklaşımları*. (pp.113-131). Pegem Akademi.
- Güngör, M. (2022). Öğrencilerin İngilizce Başarıları ile Öz Düzenleme ve Bireysel Yenilikçilik Düzeyleri Arasındaki İlişkinin İncelenmesi [An Investigation of the Relationship Between Students' English Achievement, Self-Regulation, and Individual Innovativeness Levels]. *Uluslararası Sosyal Bilimler Dergisi*, 6(24), 237-258.
- Harrington, D. (2009). *Confirmatory factor analysis*. Oxford university press.
- Hong, E. & O'Neil, Jr. H. F. (2001). Construct validation of a trait self-regulation model. *International Journal of Psychology*, 36, 186-194. <https://doi.org/10.1080/00207590042000146>
- Hu, L. & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55. <https://doi.org/10.1080/10705519909540118>
- Kilis, S. & Yıldırım, Z. (2018). Investigation of community of inquiry framework in regard to self-regulation, metacognition and motivation. *Computers & Education*, 126, 53-64. <https://doi.org/10.1016/j.compedu.2018.06.032>
- Kline, R. B. (2011). *The SAGE handbook of innovation in social research methods*. pp. 562-589. SAGE Publications Ltd.
- Krashen, S. (1982). *Principles and Practice in Second Language Acquisition*. Pergamon Press.
- Martens, M. P. & Webber, S. N. (2002). Psychometric properties of the Sport Motivation Scale: An evaluation with college varsity athletes from the U.S. *Journal of Sport & Exercise Psychology*, 24, 254-270. <https://doi.org/10.1123/jsep.24.3.254>

- McDonald, R. P. & Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7, 64–82.
- Miles, M. & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage.
- Moilanen, K. L. (2007). The adolescent self-regulatory inventory: The development and validation of a questionnaire of short-term and long-term self-regulation. *Journal of youth and adolescence*, 36, 835-848. <https://doi.org/10.1007/s10964-006-9107-9>
- Munby, H. (1997). Issues of validity in science attitude measurement. *Journal of Research in Science Teaching*, 34, 337–341.
- Nodoushan, M. A. S. (2012). Self-regulated learning (SRL): Emergence of the RSRLM model. *Online submission*, 6(3), 1-16.
- Orçan, F. (2018). Açıklayıcı ve doğrulayıcı faktör analizi: İlk hangisi kullanılmalı [Exploratory and Confirmatory Factor Analysis: Which Should Be Used First?]. *Eğitimde ve Psikolojide Ölçme ve Değerlendirme Dergisi*, 9(4), 413-421. <https://doi.org/10.21031/epod.394323>
- Oxford, R. L. (2016). *Teaching and researching language learning strategies: Self-regulation in context*. Routledge.
- Ömür, M. & Çubukçu, F. (2017). Yabancı Dil Öğrencilerinin Öz Düzenleme Stratejileri Kullanımı ile Güdülenme Seviyeleri Arasındaki İlişkinin İncelenmesi [An Examination of the Relationship Between Foreign Language Learners' Use of Self-Regulation Strategies and Their Motivation Levels]. *Uluslararası Güncel Eğitim Araştırmaları Dergisi*, 3(2), 18-33.
- Önal, M. (2000). Yabancı dil eğitimi hususunda felsefi bir yaklaşım [A Philosophical Approach to Foreign Language Education]. *Milli Eğitim Dergisi*, 146, 52-65.
- Öz, E. (2020). *The effect of self-regulated learning on lifelong learning and critical thinking tendencies* [Unpublished Doctoral dissertation]. Gazi University.
- Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16, 385-407.
- Pintrich, P. R. & DeGroot, E. V. (1990). Motivational and Self-Regulated Learning Components of Classroom Academic Performance. *Journal of Educational Psychology*, 82(1), 33-40.
- Pintrich, P. R., Smith, D. A., Garcia, T. & McKeachie W. J. (1991). *A Manual for The Use of The Motivated Strategies for Learning Questionnaire (MSLQ)*. Ann Arbor, MI: National Center for Research to Improve Postsecondary Teaching and Learning, University of Michigan.
- Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional Science*, 18, 119-144.
- Sardohan Yıldırım, A. E. (2023). Adaptation of the Questionnaire on Attitudes toward Disability in Higher Education into Turkish: Validity and Reliability Study. *International Journal of Modern Education Studies*, 7(2), 499-510. <https://doi.org/10.51383/ijonmes.2023.343>

- Schermelleh-Engel, K., Moosbrugger, H. & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, 8(2), 23-74. <https://doi.org/10.23668/psycharchives.12784>
- Schunk, D. H. (2013). *Self-regulated learning and academic achievement*. pp. 119-144. Routledge.
- Schunk, D. H. & Greene, J. A. (2017). *Handbook of self-regulation of learning and performance*. pp. 1-15. Routledge.
- Schunk, D. H. & Zimmerman, B. J. (2013). Self-regulation and learning. In W. M. Reynolds, G. E. Miller, & I. B. Weiner (Eds.), *Handbook of psychology: Educational psychology* (pp. 45-68). John Wiley & Sons, Inc.
- Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25, 173-180. https://doi.org/10.1207/s15327906mbr2502_4
- Steiger, J. H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual Differences*, 42(5), 893-898. <https://doi.org/10.1016/j.paid.2006.09.017>
- Sunger, S. & Gungoren, S. (2009). The Role of Classroom Environment Perceptions in Self Regulated Learning and Science Achievement. *Elementary Education Online*, 8(3).
- Tavşancıl, E. (2010). *Tutumların Ölçülmesi ve SPSS ile Veri Analizi [Measurement of Attitudes and Data Analysis Using SPSS]*. Nobel Yayın Dağıtım.
- Toering, T., Elferink-Gemser, M. T., Jonker, L., van Heuvelen, M. J. G. & Visscher, C. (2012). Measuring self-regulation in a learning context: Reliability and validity of the self-regulation of learning self-report scale (SRL-SRS). *International Journal of Sport and Exercise Psychology*, 10, 24-38. <https://doi.org/10.1080/1612197X.2012.645132>
- Tseng, W. T., Liu, H. & Nix, J. M. L. (2017). Self-regulation in language learning: Scale validation and gender effects. *Perceptual and motor skills*, 124(2), 531-548. <https://doi.org/10.1177/0031512516684293>
- Tsuchiya, M. (2018). The effects of a teacher's formative feedback on the self-regulated learning of lower-proficiency Japanese university learners of English: A qualitative data analysis using TEM. *ARELE*, 29, 97-112. https://doi.org/10.20581/arele.29.0_97
- Tsuchiya, M. (2019). Developing a self-regulated learning scale for learning English as a foreign language. *International Journal of Curriculum Development and Practice*, 21(1), 39-51. https://doi.org/10.18993/jcrdaen.21.1_39
- Ulusoy, B. & Karakuş, F. (2018). Lise öğrencilerinin öz yönetimli öğrenmeye hazırbulunuşlukları ile eleştirel düşünme eğilimlerinin incelenmesi [Examining the Relationship Between High School Students' Readiness for Self-Directed Learning and Their Critical Thinking Tendencies]. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 14(2), 684-699. <https://doi.org/10.17860/mersinefd.390331>

- Ültay, E., Akyurt, H. & Ültay, N. (2021). Sosyal Bilimlerde Betimsel İçerik Analizi [Descriptive Content Analysis in the Social Sciences]. *IBAD Sosyal Bilimler Dergisi*, (10), 188-201. <https://doi.org/10.21733/ibad.871703>
- Weinstein, C. E., Schulte, A. C. & Palmer, D. R. (1987). *The learning and study strategies inventory*. H & H Publishing.
- Wolters, C. A. & Hussain, M. (2015). Investigating grit and its relations with college students' self-regulated learning and academic achievement. *Metacognition and Learning*, 10, 293-311. <https://doi.org/10.1007/s11409-014-9128-9>
- Wu, R. M. X., Zhang, Z., Zhang, H., Wang, Y., Shafiabady, N., Yan, W., Gou, J., Gide, E. & Zhang, S. (2023). An FSV analysis approach to verify the robustness of the triple-correlation analysis theoretical framework. *Scientific reports*, 13(1), 9621. <https://doi.org/10.1038/s41598-023-35900-3>
- Vardar, A. K. & Arsal, Z. (2014). Öz-düzenleme stratejileri öğretiminin öğrencilerin İngilizce başarılarına ve tutumlarına etkisi [The Effect of Teaching Self-Regulation Strategies on Students' English Achievement and Attitudes]. *Ana Dili Eğitimi Dergisi*, 2(3), 32-52. <https://doi.org/10.16916/aded.05845>
- Zheng, C., Liang, J. C., Li, M. & Tsai, C. C. (2018). The relationship between English language learners' motivation and online self-regulation: A structural equation modelling approach. *System*, 76, 144-157. <https://doi.org/10.1016/j.system.2018.05.003>
- Zimmerman, B. J. (1998). Academic studying and the development of personal skill: A self-regulatory perspective. *Educational Psychologist*, 33, 73-86. https://doi.org/10.1207/s15326985ep3302&3_3
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, 41(2), 64-70. https://doi.org/10.1207/s15430421tip4102_2
- Zimmerman, B. J., Bonner, S. & Kovach, R. (1996). *Developing self-regulated learners: Beyond achievement to self-efficacy*. American Psychological Association.
- Zimmerman, B. J. & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of educational Psychology*, 82(1), 51. <https://doi.org/10.1037/0022-0663.82.1.51>
- Zimmerman, B. J. & Schunk, D. H. (Eds.). (1989). *Self-regulated learning and academic achievement: Theory, research, and practice*. Springer-Verlag.

Data Availability Declaration

Data Availability Upon Formal Request:

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the

datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

Author Contributions

All authors, [Gürbüz Ocak], [Neşe Kaya], and [Nilda Hoccoğlu], contributed equally to this work. They collaboratively handled the conceptualization, methodology design, data acquisition, and analysis. Each author played a significant role in drafting and revising the manuscript, ensuring its intellectual depth and coherence. All authors have thoroughly reviewed, provided critical feedback, and approved the final version of the manuscript. They jointly take responsibility for the accuracy and integrity of the research.

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Adolescents' Relative Deprivation and Well-Being in Relation to Parents' Mindfulness and Psychological Resilience: A Dyadic Approach

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Abstract:

Taking into account the individual contributions of family relationships for well-being and resilience is highly important to the development of healthy individuals, families, and society. The aim of this research was to explore the links between parental resilience and awareness, and adolescents' relative deprivation and well-being using the actor-partner interdependence model (APIM). In this model, reciprocal effects between dyadic partners, such as parent-child pairs, could be analyzed. 992 participants, including adolescents and one of their parents, voluntarily participated in the study. The parents were 42.79 (SD = 5.83) years old, while the adolescent participants were 15.04 (SD = 1.21) years old. The results of the analyses indicated that adolescent relative deprivation predicted adolescent well-being, and parental mindfulness predicted parental resilience as actor effects. Adolescent relative deprivation predicted parental resilience, and parental mindfulness predicted adolescent well-being within the parameters of the obtained partner effects. Relative deprivation was identified as a detrimental indicator of both the resilience of parents and the well-being of adolescents. Conversely, the mindfulness of parents was discovered to benefit both their own resilience and the well-being of their adolescents. As a result, parental and child intervention programs should be developed in tandem, and psychological processes within the family should be investigated at the individual and relationship levels.


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INTRODUCTION

Individuals' development and psychological health, resilience, stress tolerance, and quality of life are significantly affected by the basic structure of the family. In recent years, research in sociology and psychology has contributed to a more comprehensive understanding of the intricate nature of family relationships and their impact on the lives of individuals. A theory describing the interaction among the parent subsystem and the parent-child subsystem is used to elucidate the influence of family members on one another. According to this theory, the emotions or behaviors of an individual in a social environment can be transmitted to or influence the emotions or behaviors of another person who is in close proximity to the individual (De Maat et al., 2021). Parents and children may also transmit emotions and behaviors to one another through their daily interactions. Numerous studies have been conducted on parental attitudes. In addition to parental attitudes, parental awareness and well-being are important factors for the well-being of children as family members.

Researchers have conducted a variety of studies in recent years to examine the effects of concepts like mindfulness, resilience, and relative deprivation on individuals' well-being, particularly in the context of familial interactions. Mindfulness, rooted in Eastern meditation traditions, has recently gained recognition in the psychology literature for its role in mental health. Mindfulness refers to the experience of attention and awareness in the present moment. Deniz et al. (2017) define inattention (mindlessness), absent-mindedness, and indifference as the relative absence of mindfulness. The ability to concentrate on one's thoughts, emotions, and behaviors in a deliberate and non-judgmental manner is one way to define mindfulness.

According to Öz and Bahadır Yılmaz (2009), resilience refers to an individual's ability to adapt and overcome difficult circumstances. Ramirez defines psychological resilience as the ability to recover swiftly from disease, depression, changes, or adversity; seamlessly returning to one's previous self after harm or stress; and flexibility. A study looked at the relationship between mindfulness and resilience in university students, focusing on cognitive and emotional empathy characteristics, using structural equation modeling. According to the study's findings, basic empathy played a partial mediating role in the relationship between mindfulness and resilience. More exactly, basic empathy capacities have a considerable impact on the prediction of resilience by mindfulness (Okan et al., 2020). Mindfulness therapies appear to benefit both parents' and children's mental health, as well as family functioning (Xie et al., 2021). Furthermore, conscientious parents promote the formation of

more positive parent-child connections by reducing the instinctive but ineffective strategies they use to evaluate or communicate with their children (Dumas, 2005).

When examining people's levels of mindfulness and resilience, it becomes clear how these factors contribute to the concept of well-being. The idea of well-being has dominated psychological discourse since antiquity. Until recently, modern psychology lacked specialized studies on well-being, instead focusing on pathology and illness. The progress of positive psychology has permitted the expansion of study into well-being, contentment, and meaningful existence. Eryılmaz (2020), a notable researcher in the field of positive psychology, defines key themes in the psychology literature, including subjective well-being, psychological well-being, and well-being. Ryff (1989) claims that "well-being," or psychological well-being, has two dimensions. The first dimension is "eudaimonic," which refers to psychological development, and the second dimension is "hedonic," which refers to the enjoyment of life. According to Kardaş and Yalçın (2018), well-being includes subjective, psychological, and general aspects. Psychological well-being is also characterized as the ability to pursue meaningful goals, live a meaningful life, and reach self-actualization. In this context, one could argue that people's levels of mindfulness can help them feel better in general. Şahin (2019) found a significant positive link between university students' mental well-being scores and mindfulness scores. He concluded that mindfulness is a trustworthy predictor of mental well-being. A further study found that teenagers who experienced family unity and closeness in their family environment had considerably higher subjective well-being (Eryılmaz, 2011).

Children may struggle with adaptation as a result of deprivation or a loss of family connection and unity. Deprivation can also have an impact on a child's overall health. Deprivation occurs when a youngster fails to build a relationship with a parental figure or when this relationship is disrupted due to how they are treated. Children who experience this deprivation may face difficulties in their academic, social, and familial interactions. Relative deprivation refers to feelings of anger caused by the belief that one did not receive a merited outcome in comparison to a reference level (Crosby 1976). Individuals commonly experience relative deprivation, which reduces their subjective well-being. However, the relationship between subjective well-being and deprivation is inconsistent among individuals. Perceptual processes, interpersonal subjective comparisons, and appraisals of the consequences of deprivation all influence the level of deprivation. Özdemir (2019) found that strategies for dealing with deprivation can affect subjective well-being. Relative deprivation is defined as the perception of a gap between one's resources or opportunities and those of others. Low self-esteem, depression, anxiety, and other psychological disorders among teens may come from such a viewpoint.

Identity development, social standards, and social relations grow during adolescence. Social comparisons during adolescence may increase the impression of relative deprivation. Relative deprivation can make teenagers feel inadequate, useless, or excluded due to social

norms. This impression may harm adolescents' mental health and life satisfaction. It's important to identify how adolescents' relative deprivation affects their mental health. Teens with high relative deprivation may experience stress, melancholy, and anxiety. Strong social support and effective coping mechanisms might help. Teens' opinions of social inequality are heavily influenced by their mental and emotional health.

Family situations affect parents' and children's well-being. Parents, children, and society can all contribute to positive or negative conditions. Children's and parents' experiences should be analyzed from this perspective. Understanding the social dimensions of parental well-being is important since it influences parents, the community, infant development, and fertility. We can grasp the relationships between these concepts by analyzing these situations and other literature. The roles of family members in these notions should be studied. To evaluate actor-partner effects (parent-child effects) in variable relationship simultaneously, APIM (actor-partner interdependence model), a dyadic method, was employed in data analysis. Thus, the independent variables of both the parent and the adolescent can be predicted to affect their own dependent variable (actor effect) and each other's dependent variable (partner effect) (Kenny & Cook, 1999). Therefore, the hypotheses examined in the current research are stated below. H1 includes actor effects and H2 includes partner effects.

H1a. Relative deprivation predicts subjective well-being negatively in adolescents.

H1b. Mindfulness predicts resilience positively in parents.

H2a. Relative deprivation of adolescents negatively predicts parental resilience.

H2b. Parents' mindfulness positively predicts adolescents' subjective well-being.

METHOD

Participants

The study involved 992 Turkish participants, including 496 adolescents and 496 parents. By employing the convenience sample method, participants were chosen from public high schools. Parents who gave consent were those of high school kids who volunteered to take part in the study. In this manner, data were gathered from adolescents and their parents. The nicknames on the questionnaires that adolescents and their parents completed, independently, were used to arrive at the final data set. The final three letters of the adolescents' names, along with a number decided upon by the adolescents and the parent, make up these nicknames. As a result, the final data set was obtained by removing the data that did not match between parents and adolescents. The mean age of the adolescent participants was 15.04 years ($SD = 1.21$), while the mean age of the parent participants was 42.79 years ($SD = 5.83$). There were 322 female and 173 male participants among the adolescents. Three hundred eighty mothers and 116 fathers participated in their capacity as caregivers of these adolescents. It is evident that 9.9% of the participants' families had only one child, 45.8%

had two children, and the remainder had three or more children. The study participants participated without receiving any compensation.

Measures

Relative Deprivation Scale. The relative deprivation scale, developed by Duran Mucuk and Şahin (2022), measures unpleasant emotions experienced by adolescents who see themselves as disadvantaged compared to peers. Its Cronbach's alpha internal consistency coefficient is 0.89. The 16-item measure has three dimensions: "school," "family," and "economic". "1" on the seven-point Likert scale means the item is not acceptable for the respondent, and "7" means it is extremely suitable. Scale scores range from 7 to 84. Greater relative deprivation is indicated by higher scores.

Brief Resilience Scale. Smith et al. (2008) created the instrument to test adult psychological resilience. Doğan (2015) conducted the study on the Turkish adaptation research. Turkish internal consistency is .83. The 5-point Likert scale has one dimension and six items. The scale ranges from 1 (not at all appropriate) to 5 (entirely appropriate). Scale scores range from 6 to 30.

Mindful Attention Awareness Scale. Brown and Ryan (2003) developed this mindfulness test for adults. Özyeşil et al. (2011) analyzed the adaptation of this assessment tool in Turkish. The scale is valid and reliable, making it suited for Turkish mindfulness assessments. The Turkish version has a 0.80 Cronbach's alpha. The 15-item scale is one-dimensional. The response options include a six-point Likert scale ("1 = almost always", "6 = almost never"). Its lowest and highest scores are 15 and 90.

Subjective Well-Being Scale. Eryılmaz (2009) developed a scale to measure subjective well-being in adolescents. The scale has 0.86 internal consistency. Both the Spearman-Brown and test-retest reliability values are .83. It measures "satisfaction in family relationships", "satisfaction in relationships with significant others", "life satisfaction", and "positive emotions". It is scored on a four-point Likert scale with "1" indicating strong disagreement, and "4" strong agreement.

Data analysis

This investigation examined the predictability of adolescent subjective well-being, and parental resilience in relation to adolescent relative deprivation and parental mindfulness. A reciprocal-relational paradigm was employed to investigate the effects of adolescent and parent dyads on each other, as well as the effects of actors on themselves.

Initially, the final data set was established by matching the data collected from adolescents and their parents. Data analysis was conducted using IBM SPSS Statistics 23. This program was used to conduct preliminary analyses, which included descriptive, correlational, and reliability analyses (Table 1). A Cronbach's alpha value above 0.70 indicates acceptable reliability. Subsequently, the structural model was evaluated using binary analysis techniques and AMOS software. The analysis for single-factor scales incorporated the item-

parceling technique (Little et al., 2002). To assess the overall fit of the data, a variety of fit indices, including GFI, NFI, RFI, TLI, IFI, CFI, and SRMR, were used (Hu & Bentler, 1999). As critical values, the ratio of χ^2 (chi-square) to degrees of freedom (df) should be less than 5, GFI, NFI, RFI, TLI, IFI, and CFI values should be higher than .90, and SRMR should be lower than .08 (Hu & Bentler 1999; Tabachnick & Fidell, 2001). APIM, which is one of the binary analysis methods, was implemented. In addition to the effect of the independent variable on the dependent variable (actor effect), this method also evaluates the companion's effect on the dependent variable (partner effect) (Kenny, 1996). Finally, the indirect effects of the relationships between the variables were investigated using the bias-corrected bootstrapping procedure in 5000 resamples and a 95% confidence interval.

Ethical considerations

The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its subsequent updates.

Ethical Review Board: [Yıldız Technical University]

Date of Ethics Review Decision: [08.12.2024]

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RESULTS

Preliminary Analyses

Table 1 presents the descriptive statistics (means and standard deviations) and the correlation coefficients among the variables analyzed in the study. The table reveals that adolescent subjective well-being is negatively correlated with adolescent relative deprivation ($r = -0.48, p < 0.01$), highlighting their relationship as interacting variables. Parental resilience was positively correlated with parental mindfulness ($r = 0.32, p < 0.01$). Furthermore, parental resilience, within actor relationships, was negatively correlated with adolescents' relative deprivation ($r = -0.15, p < 0.01$), while parental mindfulness, within actor relationships, was positively correlated with adolescents' subjective well-being ($r = 0.29, p < 0.01$).

Table 1*Descriptive Statistics and Correlation Coefficients of Variables*

Variable	1	2	3	4
1. Relative Deprivation Adolescents	–			
2. Subjective Well-being Adolescents	-.47**	–		
3. Mindfulness Parents	-.30**	.29**	–	
4. Resilience Parents	-.15**	.27**	.32**	–
Mean	29.14	49.90	68.06	21.13
SD	13.19	6.55	12.80	4.44
Skewness	1.03	-.384	-.634	.022
Kurtosis	.123	-.329	.470	-.238
McDonald's omega (ω)	.863	.882	.849	.740
Cronbach alpha (α)	.860	.878	.484	.735
Guttman lambda (λ_6)	.899	.927	.859	.729

Preliminary Analyses

At this point, an initial evaluation of the measurement paradigm took place. Twelve observed variables and four latent variables (relative deprivation, subjective well-being, mindfulness, and resilience) comprise the measurement model. The measurement model that was tested demonstrated a satisfactory fit, as evidenced by the following values: χ^2 (48, $N = 992$) = 122.296; GFI = .96; NFI = .93; RFI = .91; IFI = .95; TLI = .94; CFI = .95; RMSEA = .05; SRMR = .03.

In this stage, the actor-partner interdependence model (APIM) was used to test the prediction of adolescent relative deprivation's effect on parental resilience and the impact of parental mindfulness on adolescent subjective well-being. This proposed model includes actor-partner effects. The model fit indices were found to be acceptable: χ^2 (49, $N = 992$) = 134.099; GFI = .95; NFI = .92; RFI = .90; IFI = .95; TLI = .93; CFI = .95; RMSEA = .05; SRMR = .04. All actors and partner effects tested were significant. The structural model and standardized path coefficients in Figure 1 illustrate the relationship between adolescent relative deprivation and parental mindfulness, as well as adolescent subjective well-being and parental resilience. This model includes actor-partner effects. Actor effects are those where an individual's own characteristics affect their outcomes, whereas partner effects examine how

one individual's characteristics affect another person's outcomes (Kenny & Cook, 1999).

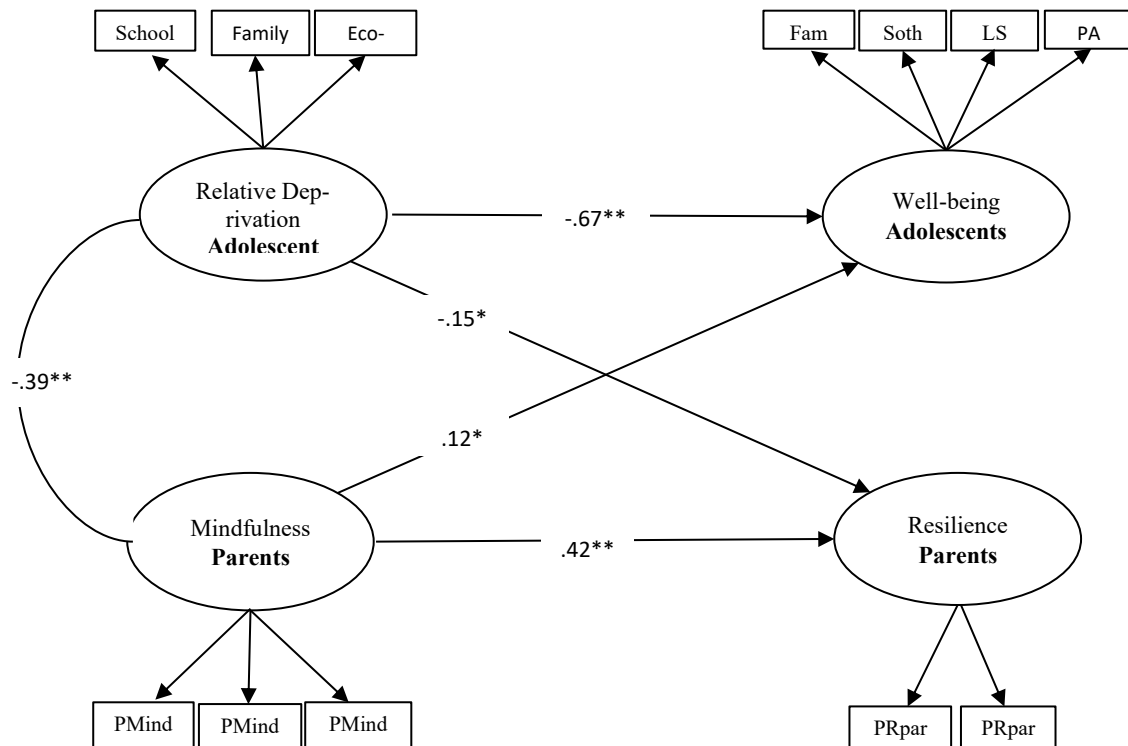


Figure 1. Actor-Partner Independence Mediator Model. Note. $N = 496$; * $p < .05$, ** $p < .01$; ARpar parcels of adolescent's relative deprivation; PMind parcels of parents' mindfulness; Wpar parcels of parents' well-being.

DISCUSSION

Researchers have evaluated the need for a more comprehensive understanding of family relationships, involving spouses, or parents and their children, in addition to the contributions of individual-level research to the field of psychology. The data analysis utilized the dyadic method to investigate the actor-partner effects in the simultaneous relationship between the variables (Kenny & Cook, 1999). Upon reviewing the literature, it was determined that there are studies that address the related concepts, however, they were not examined using a dyadic method. Eliminating this deficiency underscores the significance of the current research.

Initially, researchers tested the hypothesis that adolescents' relative deprivation predicted adolescents' subjective well-being, and the results of the analyses supported the hypothesis. In a study with women, Taymak et al. (2023) found that relative deprivation negatively influenced women's subjective well-being. It seems there might be an inconsistency between the notions of well-being and the perception of group disadvantage. Revisiting the intended meaning or context for accuracy would be recommended. Research on various marginalized groups has revealed that the perception of relative deprivation negatively affects well-being (D'Abrosio and Frick 2007, Abrams et al. 2020). Researchers investigated the

relationship between income inequality and children's subjective well-being in a study involving pre-adolescent children. The results indicated that material deprivation was associated with children's subjective well-being; however, this relationship was only valid for younger children. Relative deprivation and income ranking had no impact on children's subjective well-being. Within the context of pertinent literature, it is evident that the results of the present investigation are viable. Aforementioned evidence clearly demonstrates that individuals cannot improve their well-being when their relative deprivation is high.

Secondly, the analyses corroborated the hypotheses, demonstrating that parents' mindfulness predicted resilience. The relationship between the two concepts is crucial in the context of managing mental and emotional challenges, managing stress, and adapting to the rigors of life. Upon examination of the literature, it is evident that there are numerous studies that investigate the relationship between mindfulness and resilience, and resilience and well-being. An investigation into the correlation between mindfulness and well-being revealed a substantial positive correlation (Brown & Ryan, 2003). An additional investigation (Bowlin & Baer, 2012) observed a positive correlation between resilience and mindfulness. In other words, individuals who possess a high level of mindfulness are more capable of managing adaptation issues following difficult life experiences, which translates to greater psychological resilience. Konan and Yilmaz (2020) concluded that resilience and mindfulness levels are significantly correlated in a separate study of university students. This means that students who demonstrated high levels of mindfulness also effectively coped with negative experiences. Duncan et al. (2009) made significant discoveries regarding the well-being of mothers by investigating the impact of mindfulness on the mother-child relationship. Researchers found that mothers who exhibited higher levels of mindfulness had higher well-being. The investigation's results suggest a close relationship between mindfulness in parenting and resilience, both of which contribute significantly to well-being. Parental self-efficacy, another concept associated with mindfulness in parenting, serves as one of the protective factors of resilience, providing evidence supporting the literature (Polat & Yaman, 2023). Mindfulness may benefit psychological resilience. Mindfulness enhances stress coping skills, supports cognitive flexibility, and increases emotional regulation, facilitating more effective challenge management. This could boost their psychological resilience. Other studies in the literature corroborate the current study's findings, supporting this hypothesis.

Another hypothesis that was examined was that parental resilience is predicted by adolescent relative deprivation. The hypothesis that parental resilience is predicted by adolescent relative deprivation was tested, and the results of the analyses supported the hypothesis. Relative deprivation is the sensation of deficiency that individuals experience when they compare their living standards to those of others with superior standards. When adolescents compare themselves to their peers, the larger community, or others, they may experience feelings of financial and social deficiency or inadequacy. The literature has not explicitly examined relative deprivation and resilience. Researchers conducted a study that fo-

und a high positive correlation between perceived stress and relative deprivation by examining studies related to both concepts. Consequently, the perceived stress levels of individuals increase in tandem with the increase in relative deprivation (Yılmaz, 2021). An investigation into adolescents' perceived stress and resilience revealed that perceived stress significantly predicted resilience. According to Karıcı and Balcı Çelik (2024), adolescents who experience elevated levels of perceived stress exhibit diminished resilience. In a study conducted by Yağmur and Türkmen (2017), it was discovered that resilience decreased as perceived stress increased. Relative deprivation is associated with the concepts of well-being, resilience, and perceived stress, according to the analyzed studies. The relationship between the resilience of parents and the perception of relative deprivation by adolescents is intricate and multifaceted. Parents' resilience may influence the way adolescents manage relative deprivation. At this juncture, it is feasible to assert that the discipline necessitates an investigation of the correlation between resilience and relative deprivation.

Finally, the analysis confirmed the hypothesis that parental mindfulness predicted adolescent subjective well-being. Zümbül (2019) discovered a moderate, positive, and significant correlation between mindfulness and well-being. In a separate investigation, a substantial positive correlation was observed between the well-being scores of university students and their mindfulness scores; mindfulness was found to predict mental well-being (Şahin, 2019). In his research, Özyeşil (2011) demonstrated that mindfulness is a significant predictor of self-awareness. The findings of our investigation were in accordance with those of other studies that have investigated the correlation between mindfulness and well-being. Parents' mindfulness practices may influence adolescents' subjective well-being both directly and indirectly. Parents' mindfulness in areas such as emotional regulation, empathic communication, coping with stress, and resilience may facilitate adolescents' adoption of positive skills and the development of a greater sense of satisfaction in their lives. Consequently, mindfulness has the potential to improve the emotional health of adolescents and their overall well-being, both on an individual and family level.

The findings of the analysis, a result of the literature evaluations, verified the hypotheses established at the outset of the investigation. The mindfulness levels of family members are associated with their resilience, relative deprivation perceptions, and overall well-being. Mindfulness is the act of observing one's emotional and mental experiences without judgment, thereby allowing individuals to embrace the present moment. This process enhances emotional regulation and stress management. High levels of mindfulness among family members may aid in increased resilience. Additionally, mindfulness enables individuals to process the sensation of relative deprivation in a more positive manner. This has the potential to enhance the overall well-being of family members by improving their ability to manage the emotional detriments caused by external comparisons.

LIMITATIONS

Despite the significant contributions this study has made to understanding the well-being of both parents and children in the Turkish family context, it is essential to consider certain limitations. Initially, regarding the generalizability of the research results, similar studies should be conducted in different cultural samples. Such cross-cultural studies are of great importance in terms of evaluating the universality of the findings and developing culture-specific intervention programs. The resilience of parents and the well-being of adolescents were assessed by examining mindfulness in parents and relative deprivation in adolescents. Future research can further corroborate the findings by focusing on mindfulness, resilience, well-being, and relative deprivation as reported by both parents and children. Furthermore, the relationships between these concepts could be analyzed in a dyadic manner by examining other concepts that serve as intermediaries. Subsequently, this investigation prioritized the parent-child bond. Future research could incorporate a variety of concepts to investigate the relationship between parental resilience and child well-being, as there are numerous forms of parent-child interactions, beyond mindfulness and relative deprivation. The use of self-report instruments for data collection is another limitation of this study. In this instance, it is important to consider, that while participants were volunteers, they may have been influenced by social desirability. Furthermore, the collected data suggest that the measurement tools' scope is the only reason for the variables. Future research may incorporate a variety of techniques, including peer assessment, interviewing, and observation, alongside self-report-based measurement instruments. Future studies should include mixed design research in order to avoid this limitation. In addition, the cross-sectional design of the research data requires prudence when establishing cause-and-effect relationships between concepts. To establish a cause-effect relationship, future research must incorporate both longitudinal and dyadic studies, as well as experimental interventions. The study's participants comprised Turkish individuals. To apply the findings to all cultures, it is imperative to consider this circumstance. Conducting cross-cultural comparative studies can circumvent this limitation.

CONCLUSION

The present investigation examines the actor-partner relationship between the concepts of relative deprivation, mindfulness, resilience, and well-being among adolescents and their parents. The relationship between relative deprivation and well-being among adolescents, and that between mindfulness and resilience among parents were both examined in light of the actor effects of these concepts. Actor relationships demonstrated that relative deprivation negatively affected the well-being of adolescents, while their parents' mindfulness positively predicted their resilience. The relationships between the resilience of parents and the well-being of adolescents, and between parents' mindfulness and the relative deprivation of adolescents, were investigated within the context of partner effects. These partner effects negatively predicted the resilience of parents, while their mindfulness positively

predicted the well-being of adolescents. The APIM used in the study provides a more holistic assessment compared to traditional individual analysis. Thus, an important methodological contribution was made in understanding the interaction within the family. According to research findings, intervention programs should be created to raise the psychological resilience and mindfulness levels of parents and adolescents. Psycho-education-based group work, individual psychological assistance, and mindfulness workshops can be particularly used at schools and family counseling centers to improve the well-being of adolescents and their parents.

REFERENCES

- Abrams D, Travaglino GA, Grant PR, Templeton A, Bennett M, Lalot F (2020) Mobilizing IDEAS in the Scottish referendum: Predicting voting intention and well-being with the Identity-Deprivation-Efficacy-Action-Subjective well-being model. *Br J Soc Psychol*, 59:425-446
- Bowlin, S. L., ve Baer, R. A. (2012). Relationships between mindfulness, self-control, and psychological functioning. *Personality and Individual Differences*, 52(3), 411-5.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84, 822-848. <https://doi.org/10.1037/0022-3514.84.4.822>
- Crosby, F. A. (1976). A model of egoistical relative deprivation. *Psychological Review*, 83, 85-113.ayın Dağıtım
- D'Ambrosio, C., & Frick, J. R. (2007). Income satisfaction and relative deprivation: An empirical link. *Social Indicators Research*, 81, 497-519.
- De Maat, D. A., Jansen, P. W., Prinzie, P., Keizer, R., Franken, I. H., & Lucassen, N. (2021). Examining longitudinal relations between mothers' and fathers' parenting stress, parenting behaviors, and adolescents' behavior problems. *Journal of Child and Family Studies*, 30, 771-783. <https://doi.org/10.1007/s10826-020-01885-0>
- Deniz, M. E., Erus, S. M., & Büyükcebeci, A. (2017). Bilinçli farkındalık ile psikolojik iyi oluş ilişkisinde duygusal zekanın aracılık rolü [Relationship between mindfulness and psychological well-being: The mediating role of emotional intelligence]. *Turkish Psychological Counseling and Guidance Journal*, 7(47), 17-31.
- Doğan, T. (2015). Kısa psikolojik sağlamlık ölçeği'nin Türkçe uyarlaması: Geçerlik ve güvenilirlik çalışması [Adaptation of the brief resilience scale into Turkish: A validity and reliability study]. *The Journal of Happiness & Well-Being*, 3(1), 93-102.
- Dumas, J. E. (2005). Mindfulness-based parent training: Strategies to lessen the grip of automaticity in families with disruptive children. *Journal of clinical child and adolescent psychology*, 34(4), 779-791. https://doi.org/10.1207/s15374424jccp3404_20
- Duncan, L. G., Coatsworth, J. D., Gayles, J. G., Geier, M. H., & Greenberg, M. T. (2015). Can mindful parenting be observed? Relations between observational ratings of mother-youth interactions and mothers' self-report of mindful parenting. *Journal of Family Psychology*, 29(2), 276.

- Duran Mucuk M. & Şahin E.S. (2022, 13-15 June). *Görelî yoksunluk ölçeği- ergen formu'nun (GYÖ-EF) geliştirilmesi, geçerliliği ve güvenilirliği [Paper presentation]*. 23. Uluslararası Psikolojik Danışma ve Rehberlik Kongresi – Özet Kitapçığı, İstanbul.
- Eryılmaz, A. (2009). Ergen öznel iyi oluş ölçeğinin geliştirilmesi [Development of adolescent subjective well-being scale]. *Türk Eğitim Bilimleri Dergisi*, 7(4), 975-989.
- Eryılmaz, A. (2011). Ergenlerin öznel iyi oluşlarıyla aile ortamları arasındaki ilişkinin incelenmesi [Examining the relationship between adolescents' subjective well-being and their family environment]. *Sosyal Politika Çalışmaları Dergisi*, 24(24), 93-102.
- Eryılmaz, A. (2020). Herkes için mutluluğun başucu kitabı: Kuramdan uygulamaya pozitif psikoloji [The bedside book of happiness for everyone: Positive psychology from theory to practice]. Ankara, Pegem Yayınevi.
- Karcı, A. & Balcı-Çelik, S. (2024). Ergenlerde algılanan stres, akademik öz yeterlik ve psikolojik sağlamlık arasındaki ilişkinin incelenmesi [Investigation of the relationship among perceived stress, academic self-efficacy and psychological resilience in adolescents]. *Türkiye Eğitim Bilimleri Dergisi*, 22(1), 186-214. <https://doi.org/10.37217/tebd.1324851>
- Kardaş, F., & Yalçın, İ. (2019). Türkiye’de iyi oluş ile ilgili yapılmış araştırmaların sistematik olarak incelenmesi [A systematic investigation of the well-being studies conducted in Turkey]. *Kastamonu Education Journal*, 27(4), 1423-1433. <https://doi.org/10.24106/kef-dergi.2799>
- Kenny, D. A. (1996). Models of non-independence in dyadic research. *Journal of Social and Personal Relationships*, 13(2), 279-294. <https://doi.org/10.1177/0265407596132007>
- Kenny, D. A., & Cook, W. L. (1999). Partner effects in relationship research: Conceptual issues, analytic difficulties, and illustrations. *Personal Relationships*, 6(4), 433-448. <https://doi.org/10.1111/j.1475-6811.1999.tb00202.x>
- Konan, N., & Yılmaz, S. (2020). Üniversite öğrencilerinin bilinçli farkındalık düzeyleri [University students' perceptions regarding the level of mindful attention awareness]. *Mustafa Kemal Üniversitesi Eğitim Fakültesi Dergisi*, 42-50.
- Nomaguchi, K., & Milkie, M. A. (2020). Parenthood and well-being: A decade in review. *Journal of Marriage and Family*, 82(1), 198-223. <https://doi.org/10.1111/jomf.12646>
- Okan, N., Yilmaztürk, M., & Kürüm, B. (2020). Bilinçli farkındalık ve psikolojik sağlamlık arasındaki ilişkide temel empati becerilerinin aracı rol etkisinin incelenmesi [Investigation of the mediator role effect of cognitive empathy and emotional empathy variables in the relationship between mindfulness and resilience]. *IBAD Sosyal Bilimler Dergisi*, (8), 319-335.
- Okuzono, S. S., Fujiwara, T., Gero, K., Shiba, K., & Kawachi, I. (2019). 146. Absolute and relative income deprivation and children's subjective well-being in Japan. *Journal of Adolescent Health*, 64(2), 75-76.
- Öz, F., & Bahadır Yılmaz, E. (2009). Ruh sağlığının korunmasında önemli bir kavram: Psikolojik sağlamlık [A significant concept in protecting mental health: Resilience]. *Hacettepe Üniversitesi Hemşirelik Fakültesi Dergisi*, 16(3), 82-89.

- Özdemir, F. (2019). Farklı görelî yoksunluk seviyelerinde başa çıkma stratejileri ve öznel iyi oluş arasındaki ilişki [Relationship between coping strategies and subjective well-being at different levels of relative deprivation]. *Psikiyatri Güncel Yaklaşımlar*, 11, 234-245.
- Özyeşil, Z., Arslan, C., Kesici, Ş., & Deniz, M. E. (2011). Bilinçli farkındalık ölçeği'ni Türkçeye uyarlama çalışması [Adaptation of the mindful attention awareness scale into Turkish]. *Eğitim ve Bilim*, 36(160).
- Özyeşil, Z. (2011). Üniversite öğrencilerinin öz-anlayış düzeylerinin bilinçli farkındalık kişilik özellikleri ve bazı değişkenler açısından incelenmesi. [Yayınlanmamış Doktora Tezi], Selçuk Üniversitesi.
- Polat, B.N., & Yaman, N. (2023). Annelerin ebeveyn bilinçli farkındalığı, psikolojik sağlamlığı ile çocukların sosyal yetkinlikleri arasındaki ilişkinin incelenmesi. *Humanistic Perspective*, 5 (3), 1119-1147. <https://doi.org/10.47793/hp.1353918>
- Ramirez E. R. (2007). Resilience: A concept analysis. *Nursing Forum*, 42, 73-82.
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of personality and social psychology*, 57(6), 1069.
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *International Journal of Behavioral Medicine*, 15, 194-200. <https://doi.org/10.1080/10705500802222972>
- Şahin, A. (2019). Üniversite öğrencilerinde bilinçli farkındalık ile yaşam doyumu ve iyi oluş arasındaki ilişkiler [The relationship between mindfulness and life satisfaction & well-being among university students]. *Üsküdar Üniversitesi Sosyal Bilimler Dergisi*, (8), 151-176.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th. ed.). Boston: Pearson Education.
- Xie, Q. W., Dai, X., Lyu, R., & Lu, S. (2021). Effects of mindfulness-based parallel-group interventions on family functioning and child and parent mental health: A systematic review and meta-analysis. *Mindfulness*, 12(12), 2843-2864. <https://doi.org/10.1007/s12671-021-01728-z>
- Yağmur, T., & Türkmen, S., N. (2017). Ruhsal hastalığı olan hastalara bakım veren aile üyelerinde algılanan stres ve psikolojik dayanıklılık [Perceived stress and psychological resilience in family members caring for patients with mental illness]. *Celal Bayar Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi*, 4(1), 542-548.
- Yılmaz, N. (2021). Görelî yoksunluk ve algılanan stres arasındaki ilişkinin incelenmesi: akademisyenler üzerine bir inceleme [An Investigation of The Relationship Between Relative Deprivation and Perceived Stress: A Review on Academicians]. *İşletme Araştırmaları Dergisi*, 12(2), 1974-1983.
- Zümbül, S. (2019). Öğretmen adaylarının psikolojik iyi oluş düzeylerinde bilinçli farkındalık ve affetmenin yordayıcı rolleri [Mindfulness and Forgiveness as Predictors of Psychological Well-Being Levels of Teacher Candidates]. *Ege Eğitim Dergisi*, 20(1), 20-36.

Data Availability Declaration

Data Availability Upon Formal Request:

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

Author Contributions

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All authors, Nursenem Sarı, Ozan Çetiner, Ruken Çelik, Beste Erdiñ, Yusuf Akyıl: and Süleyman Akçıl contributed equally to this work. They collaboratively handled the conceptualization, methodology design, data acquisition, and analysis. Each author played a significant role in drafting and revising the manuscript, ensuring its intellectual depth and coherence. All authors have thoroughly reviewed, provided critical feedback, and approved the final version of the manuscript. They jointly take responsibility for the accuracy and integrity of the research.

Author(s)' statements on ethics and conflict of interest

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Abstract:

Recently, it has been seen that rapid changes have started to alter perspectives on education. With the development of information technologies, this change has started to make continuous education compulsory. The paradigm of continuous change and development in education is Lifelong Learning. Raising individuals who are inclined towards lifelong learning (LLL) leads to the development of new human characteristics that this change should produce. This study determines and compares the LL levels of preschool teachers to compare them by demographics. The research was conducted with a descriptive survey model among preschool teachers. In this context, it is understood that their level of LL is generally high, but they consider themselves inadequate in terms of foreign language proficiency. Among the variables examined in the study according to the age variable it is seen that the arithmetic means of the opinions of the age groups is close to each other, and there is no significant difference between the opinions of preschool teachers. However, it was determined that there was a significant difference according to gender, and marital status variables. According to the gender variable, male teachers have a higher tendency towards LL than female teachers. According to the marital status variable, single teachers have a higher tendency towards LL than married teachers, and their opinions differ significantly. Preschool teachers exhibit learning tendencies across all age groups and cultivate a learning culture.

Keywords: Pre-school, education, teachers, lifelong education, tendency

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INTRODUCTION

Our planet will not survive, if it is not a learning planet, and sustainable development will be achieved by learning through (Walters (2010). Constant scientific and technological innovation and change have a profound impact on learning needs and styles. Learning can no longer be divided into the time and place of acquiring knowledge (school) and the time and place of applying the acquired knowledge (workplace) (Fischer, 2000). Education is a comprehensive process that lasts from cradle to grave. It is widely accepted that learning takes place continuously and in a wide variety of contexts, both in the academic and non-academic environments of the university, and beyond in society, the workplace and the family (Kiley & Cannon, 2000). This perspective is conceptualized as "lifelong learning". Lifelong learning refers to intentional and focused learning that occurs throughout a person's life.

In various attempts to produce a clear account of the topic, it may be perceived the presence and operation of a particular preconception. In many scientific works on LLL, there seems to be an implicit acceptance of the notion that it is possible to arrive at some uniform descriptive definition of the term LLL. The common assumption particularly the earlier ones, seems to be that a clear agreement on the meaning and applicability of the term is inconceivable, possible and attainable (Aspin & Chapman, 2007). Lifelong learning is voluntary, and self-motivated pursuit of knowledge for personal or professional reasons. As such, it not only increases social participation, active citizenship, and personal development, but also competitiveness and employability. This approach recognizes that learning is not limited to childhood or the classroom but occurs throughout life and in a variety of situations. Lifelong learning is defined as a continuous process and multi-purpose learning activities carried out to improve one's knowledge, skills and competence (OECD, 2001), and contributes to the economic cohesion of societies, the "personal development and satisfaction" of individuals and "social inclusion and democratic understanding" (Aspin & Chapman, 2000).

The concept of lifelong learning was first used by Grundtvig in the 1800s (Wain, 2000), and until the 1970s, it was shaped within the concept of "adult education" and was considered a process that emphasized the significance of vocational education (cited in Evin Gencel, 2013). Lifelong learning also means providing people with second chances and advanced learning opportunities through the development of basic skills (Soran, Akkoyunlu and Kavak, 2006: 2). It is understood that lifelong learning competencies have become one of the most important topics for study these days (Oral & Yazar, 2015; Yaman & Yazar, 2015; Tunca et al., 2015; Ayaz 2016; Çetinkaya et al., 2016; Pınarcık et al., 2016; Babanlı & Akçay, 2018; Boztepe & Demirtaş, 2018; Yılmaz, 2018; Arslan, 2019; İncik, 2020; Gültekin & Yazar, 2021; Karakış, 2022; Karakış & Demirtaş, 2022; Korucu & Şahan, 2024).

Lifelong learning is a natural tendency to grow, develop, and continue learning. It can emerge by eliminating negative and unsafe thought and belief systems and fostering a

positive learning environment (McCombs, 1991). A tendency springs from a desire or motivation that provides the energy necessary for action (Crick & Yu, 2008). Individuals' willingness shows their tendencies. While skills reflect the cognitive dimension of individuals, tendencies reflect the affective dimension.

The concept of lifelong learning remains unclear despite continuous research and studies, to explain and understand the basic factors and behaviors associated with it (Derrick, 2003; Tough, 1979). As a result, the concept of lifelong learning, particularly examining and assessing the lifelong learning tendencies of teachers, who should exhibit the highest level of such tendencies, has become a crucial area of research for their professional development. Özçiftçi and Çakır (2015) suggested that conducting a study in this field with preschool teachers was of great importance, especially considering that lifelong learning is a process that starts in pre-school. This research is limited to the opinions of preschool teachers working in Sakarya Province and the data of the 2023-2024 academic year. Drawing on these, this study investigates the level of teachers' tendency to engage in lifelong learning. Additionally, the study compares this trend across different demographics. To this end, the study sought answers to the following research questions:

1. What is the level of teachers' tendency to engage in lifelong learning?
2. Does level of teachers' tendency to engage in lifelong learning differ statistically significantly by gender?
3. Does level of teachers' tendency to engage in lifelong learning differ statistically significantly by marital status?
4. Does level of teachers' tendency to engage in lifelong learning differ statistically significantly by age?

METHOD

The current study adopted the descriptive survey model, one of the quantitative research designs. The survey model is used to gain insights into the characteristics, behaviors, or opinions of a specific group (Büyüköztürk, 2012). Thus, in this study, a survey model was preferred to reveal the level of teachers' tendency to engage in lifelong learning.

Sample

There are 450 preschool teachers working in Sakarya Province in the 2023-2024 academic year. Of these teachers, 278 voluntarily participated in this study. They were reached through simple random sampling. To determine which data analysis techniques will be used in the study, the distribution of the data set was examined. To this end, skewness-kurtosis coefficients were computed. Field (2009) suggested skewness-kurtosis coefficients between -1.96 and +1.96 indicate a normal distribution. The coefficients were as follows: skewness=.81 (SE=.15) and kurtosis=5.75 (SE=15), showing that the data did not have a normal distribution. Based on these findings, non-parametric tests (Mann-Whitney

U and Kruskal Wallis H) were employed. On the other hand, descriptive findings included minimum, maximum, values, arithmetic mean and standard deviation.

In this study, the Lifelong Learning Trends Scale developed by Erdoğan and Aarsal (2016) was used. The scale was applied based on all its dimensions, and the current research data were used to analyze whether these dimensions were effective again. The findings of these validity analyses are given in Table 1, Table 2, and Figure 1. This scale was developed based on a 29-item questionnaire, developed by Yaman (2014) and applied to teachers, which has a high level of reliability ($\alpha=.89$).

Validity and Reliability

The validity was evaluated through a confirmatory factor analysis in which goodness of fit indices were calculated. They are presented in Table 1 below. On the other hand, the standardized factor loadings are presented in Table 2, all of which satisfied the cut-off point of .40. Based on these findings, it can be concluded that the factor structure of the scale was confirmed on the current data set (Hair Jr, Black, Babin & Anderson, 2019; Schermelleh-Engel, Moosbrugger, & Müller, 2003; Browne & Cudeck, 1992; Hu & Bentler, 1999; Worthington & Whittaker, 2006). The path diagram for the confirmatory factor analysis of the scale is presented in Figure 1 below.

Table 1. Goodness of fit indices of LLL tendency scale

Indices										
χ^2/df	p	RMSEA	CFI	GFI	AGFI	NNFI	NFI	IFI	RMR	SRMR
2.72	.00	.079	.87	.75	.71	.86	.82	.88	.03	.072

The Root Mean Square Error of Approximation (RMSEA) is used to evaluate the model fit. An RMSEA value of $\leq .05$ indicates a good fit, while a value between .05 and .08 suggests an acceptable fit in the model. In this case, the RMSEA value of .079, with a p-value of .000, indicates an acceptable fit of the model.

Table 2. Standardized regression loadings

Factor	Item	Factor loading
Native language	Natlan1	.757
	Natlan2	.892
	Natlan3	.893

Foreign language	Flan1	.921
	Flan2	.920
	Flan3	.917
	Flan4	.970
	Flan5	.869
	Flan6	.900
Problem solving	Probsol1	.697
	Probsol2	.823
	Probsol3	.861
	Probsol4	.854
	Probsol5	.826
	Probsol6	.707
Digital competencies	Digital1	.880
	Digital2	.892
	Digital3	.579
	Digital4	.846
	Digital5	.720
Learning to learn	Learning1	.738
	Learning 2	.851
	Learning 3	.748
	Learning 4	.798
	Learning 5	.789
Citizenship	Citizen1	.716
	Citizen2	.776
	Citizen 3	.807

	Citizen 4	.785
	Citizen 5	.841
	Citizen 6	.807
Culture	Culture1	.641
	Culture2	.908
	Culture3	.808
	Culture4	.869
Art	Art1	.677
	Art2	.764
	Art3	.681

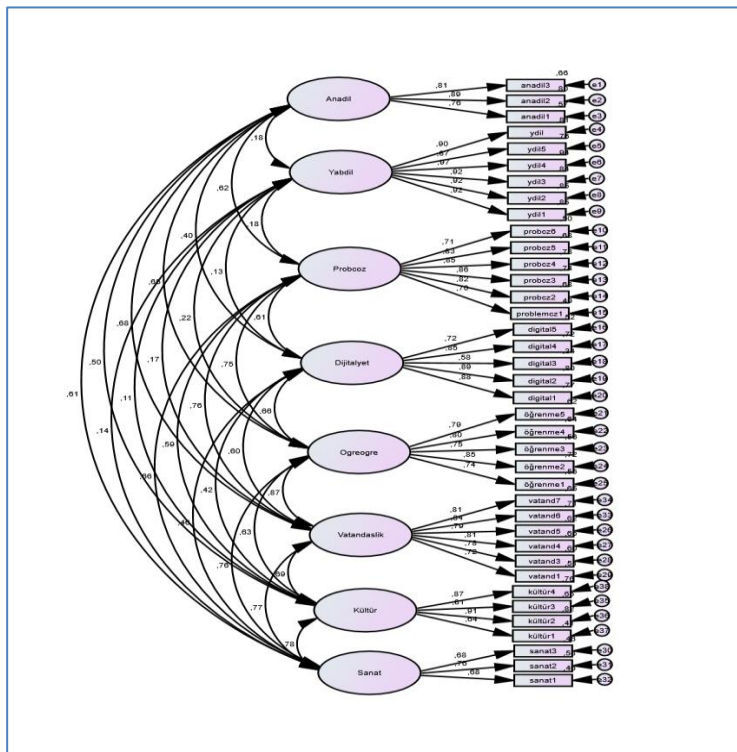


Figure 1. CFA path diagram

As for reliability, Cronbach's Alpha internal consistency coefficient was calculated, which emerged as $\alpha = .95$. This finding shows that the internal consistency of the scale is high. Ho (2006) suggested that $\alpha \geq .80$ was satisfactory.

Table 3. Cronbach's Alpha internal consistency coefficient

Scale	Number of Items	Cronbach's Alpha (α)
Lifelong Learning Scale	38	.95

Research Ethics

This study adhered to the guidelines, including the principles and codes of conduct recommended by the American Psychological Association (APA). The necessary steps suggested by the institutional ethics committee were followed. In order to ensure confidentiality, participants' responses were anonymized to prevent the collection of any potential information that could identify the participants. Permission dated 11.01.2024 and numbered E.324652 was obtained from the Sakarya University Ethics Committee, and the study was conducted with preschool teachers working in Sakarya Province.

Findings

The sample of the study included 278 teachers, and Table 4 presents the demographics of the participant pre-school teachers.

Table 4. Demographics of the sample

Variable	Group	n	%
Gender	Female	262	94.2
	Male	16	5.8
Age	25-30	-	-
	31-35	27	9.7
	36-40	127	45.7
	41-45	95	34.2
	46 and above	29	10.4
Marital status	Married	269	96.8
	Single	9	3.2
Total		278	100

As Table 4 shows, 94.2% (f=262) of the teachers who participated in the research were female and 5.8% (f=16) male. There was no participant who was between the ages of 25 to 30. Of the participants, 9.7% (f=27) were between the ages of 31-35, 45.7% (f=127) between the ages of 36-40, 34.2% (f=95) between the ages of 41-45, and 10.4% (f=29) were 46 and over. Lastly, 96.8% (f=269) were married and 3.2% (f=9) were single.

Table 5. Descriptive findings

Scale/ Dimension	N	Min.	Max.	\bar{x}	SD
LLL Scale	278	38	188	3.91	.44
Native language proficiency	278	3	15	4.38	.57
Foreign language proficiency	278	6	30	1.55	.85
Problem solving	278	6	30	4.40	.53
Digital literacy	278	5	25	4.47	.55
Learning to learn	278	5	25	4.23	.60
Citizenship	278	6	30	4.29	.58
Cultural competence	278	4	20	4.43	.56
Artistic competence	278	3	15	4.24	.66

As Table 5 shows, teachers' mean scores on the LLL scale were (\bar{x} =3.91; SD=.44), which indicated that teachers' tendency to engage in lifelong learning was "high." Teachers' mean scores on native language proficiency were (\bar{x} = 4.38; S.D. =.57) and on foreign language proficiency were (\bar{x} = 1.55; S.D. =.85), suggesting a high level of proficiency in the native language but low in the foreign language. The mean scores of participants on the remaining dimensions suggest that they have a high proficiency in problem solving, digital literacy, learning to learn, citizenship, cultural, and artistic competences.

Table 6. Comparison of teachers' tendency to engage in lifelong learning by gender

Scale	Gender	n	Mean Rank	Sum of Ranks	U	p
LLL	Female	262	137.06	35909	1456	.04*
	Male	16	179.50	2872		

*p<.05

As Table 6 shows, male and female teachers' mean ranks differ significantly by gender ($U=1456.00$; $p<.05$). The mean rank for male teachers ($MR=179.50$) was significantly higher than that of female teachers ($MR=137.06$). Based on this finding, it can be argued that male teachers have a greater tendency to engage in lifelong learning.

Table 7. Comparison of teachers' tendency to engage in lifelong learning by marital status

Scale	Marital status	n	Mean Rank	Sum of Ranks	U	p
LLL	Married	269	139.09	37415	1100	.64
	Single	9	151.78	1366		

Table 7 compares teachers' tendency to engage in lifelong learning by marital status. The findings suggested that marital status did not create a statistically significant difference in teachers' tendency to engage in lifelong learning ($U=1100.00$; $p>.05$). The mean rank for married teachers was $MR=139.09$, while it was $MR=151.78$ for single participants. Drawing on this finding, it can be concluded, married and single teachers' tendency to engage in lifelong learning is similar.

Table 8. Comparison of teachers' tendency to engage in lifelong learning by age

Scale	Age	n	Mean Rank	df	x2	P	Difference
LLL	31-35 years	27	145.35	3	4.87	.18	-
	36-40 years	127	142.98				
	41-45 years	95	142.67				
	≥46 years	29	108.41				

Table 8 compares teachers' tendency to engage in lifelong learning by age. The findings showed that the mean rank for teachers between the ages of 31-35 was $MR=145.35$, for teachers between the ages of 36-40 was $MR=142.98$, for teachers between the ages of 41-45 was $MR=142.67$, and it was $MR=108.41$ for teachers who are 46 and over. The Kruskal-Wallis H test finding, which was conducted to test the significance of the difference between the mean ranks, did not reveal a statistically significant difference in teachers' tendency to engage in lifelong learning ($H_{(3)}=4.87$; $p>.05$).

DISCUSSION AND RESULTS

Lifelong learning has recently emerged as a key paradigm increasingly influencing education system worldwide. Poyraz and Titrek (2013) argued that more importance should be attached to the lifelong learning paradigm in Türkiye. On the other hand, preschool education is a critical level that is constantly and rapidly changing. Thus, it is inevitable for preschool teachers to constantly improve themselves, which emphasizes the significance of investigating their tendency to engage in lifelong learning. Previous research suggested that teachers had a high tendency to engage in lifelong learning (Kavtelek, 2014; Özoğlu, 2019). Consistently, an abundant literature suggested that teachers had a high tendency to engage in lifelong learning (Bilici & Bağcı, 2020; İncik, 2020; Yaman, 2014; Yenice & Tunç, 2019; Yılmaz, 2018; Yılmaz & Başkaya, 2018). However, studies on teacher candidates showed that they had moderate (Arslan, 2019; Gencel, 2013; Güçlü et al., 2013) and low (Tunca et al., 2015) tendencies to engage in lifelong learning.

According to 2021-2022 MoNE teacher statistics, there are 79,952 preschool teachers in preschool education institutions, 74,335 (92.97%) of whom are female and 5,617 (7.03%) of whom are male. The high rate of male teachers' opinions may be related to male teachers in preschool education preferring to be administrators rather than active teachers in the classroom. The demand for postgraduate education in administrative roles can also be considered as a reason for the increase in lifelong learning tendencies. In Yaman and Yazar (2015) and Gültekin & Yazar (2021), it was determined that there was no significant difference between male and female teachers' lifelong learning tendencies. There is also the possibility that female preschool teachers' roles outside their profession (e.g. motherhood) may play an inhibiting role in their lifelong learning tendencies. Moreover, in their research Avcı et al. (2019) argued that the pre-school teaching program is chosen by female students and that male pre-service teachers state that they experience various gender difficulties in their choice of this program, in the education process and in their assignments. According to Koçak and Kaygusuz (2019), although there are varied opinions about the teacher's professional knowledge and skills and their communication with children, the majority of teachers think that women should be teachers in education.

Moreover, the findings also suggested that male teachers' tendency to engage in lifelong learning was higher than that of female teachers, which was consistent with the previous research (İncik, 2020; Karakış, 2022; Karakış & Demirtaş, 2022, Tunca et al., 2015). These findings are similar to the results of the current study. However, other studies showed that female teachers' tendency to engage in lifelong learning was higher than their male counterparts (Bilici & Bağcı, 2020; Bulaç & Kurt, 2019) or there was no difference between males and females (Arslan, 2019; Boztepe & Demirtaş, 2018; Oral & Yazar, 2015; Yılmaz, 2018).

Another finding of the study was that the marital status of teachers did not have a significant influence on their tendency to engage in lifelong learning. This finding is consistent with previous literature (Babanlı & Akçay, 2018; Çetinkaya et al., 2016; Pınarcık et al., 2016). The number of female and married preschool teachers is quite high in the sample, and they have family responsibilities. This association could be due to the fact that their responsibilities at home might be a hindrance to engaging in lifelong learning.

Lastly, the finding suggested that age did not have a statistically significant influence on teachers' tendency to engage in lifelong learning. This finding was consistent with the previous literature showing that different age groups have a similar level of tendency to engage in lifelong learning, (Çetinkaya et al., 2016; Erdener & Gül, 2017; Erten & Kazu, 2016; Kavtelek, 2014).

Providing individuals with a chance for lifelong learning through various courses, activities, and projects, as well as increasing awareness of lifelong learning can mitigate anxiety and hopelessness (Ceviz Kübra, 2022). Such courses can be considered key practices in terms of creating a culture where the LLL tendencies of preschool teachers, as well as all segments of society, can be enhanced. On the other hand, further research should be carried out to reveal factors that hinder the LLL tendencies of married and female teachers. Furthermore, solutions should be developed based on findings.

Various metaphorical studies in the literature on the perception of teachers reveal that teachers are likened to mothers (Aydoğdu, 2008; Çelikten, 2006; Cerit, 2008; De Guerrero & Villamil, 2002; Saban, 2004; Kırıl, Kırıl, & Başdağ, 2013). It is expected that the teacher should take on the role of a mother; therefore, the teacher is often expected to be a woman and fully embody the mother metaphor, especially in the preschool years when the need for a mother is intense. In the study by Topuz and Erkanlı (2016), in which the roles attributed to women and men in the context of gender, were revealed through the metaphor method, the metaphors of mother and friend were reported for women, while the metaphors of manager and head were reported for men. Therefore, it can be stated that both married teachers and female teachers' orientation towards basic roles at home rather than administration also affects their tendency to engage in lifelong learning. The need for continuous self-renewal of male and married teachers who aspire to become administrators explains their high lifelong learning tendency.

LIMITATIONS AND RECOMONDATIONS

The findings of the current study are limited to the perceptions of preschool teachers working in Sakarya Province. There are not enough studies in the literature on preschool education and preschool teachers' lifelong learning tendencies and attitudes. This is the strength and the unique aspect of this research. Therefore, it can be suggested that qualitative and quantitative research related to this topic should be conducted.

In Turkish society, because female teachers often possess nurturing qualities, they can be more patient with children than men, and children can feel more comfortable expressing their needs. However, it is not appropriate for children's caretaking to exclude considerations of their moral development, particularly for the self-care of girls. The majority of teachers believe that more teachers should be women.

While the study successfully identifies patterns in the lifelong learning dispositions of preschool teachers, it does not adequately discuss how these insights can inform educational policy or professional development programs. Expanding the concluding section to include recommendations for teacher training initiatives, institutional support mechanisms or policy changes would make the study more applicable to real-world educational settings.

Furthermore, highlighting how institutions can address barriers to lifelong learning for educators, especially in early childhood education, will increase the impact of the study. It is important that teachers working in the field of preschool education have high lifelong learning tendencies in terms of the development of the early childhood field. This increases the likelihood that both male and female teachers are ready for future innovations, paving the way for the development of this field and the effective implementation of new educational programs and policies. Teachers acquiring learning to learn skills and digital competencies, among other skills, result in the impression that the application of contemporary educational principles and methods in early childhood education, as well as the removal of obstacles to its development, can lead to important opportunities. Undoubtedly, openness to change and development is the key to success in this globalized world.

CONCLUSION

Lifelong learning has started to emerge as a paradigm that is one of the most important reflections of today's social, cultural, and technological developments on education. In particular, pre-school education is the first stage of lifelong learning. Therefore, the level of lifelong learning dispositions of preschool teachers is important for developing the learning disposition of the new generation. Preschool teachers are the first group of teachers who will teach this culture to children. Therefore, this study aims to determine the lifelong learning tendencies and levels of preschool teachers. In this context, one of the specific aims is to determine whether there is a significant difference between the opinions of teachers according to gender, age, and marital status variables. In this context, in addition to determining the general level of lifelong learning dispositions of preschool teachers, it is important to assess their levels in various dimensions.

Native language proficiency, foreign language proficiency, problem-solving, digital literacy, learning to learn, citizenship, cultural competence, and artistic competence are among the key dimensions of lifelong learning dispositions that are specifically addressed as research objectives.

According to the results of this study, it can be argued that preschool teachers generally possess a strong inclination towards lifelong learning and have a culture that is quite open to it, but they perceive their native and especially foreign language proficiency as quite inadequate.

While some studies related to this issue indicate that women are more prone to lifelong learning, others conclude that male teachers are more prone to lifelong learning. The results of this research are also in favor of male teachers. Preschool education is a field with a predominantly female teacher profile. Therefore, male teachers in this field are preparing themselves for managerial positions. He/she has to be open to learning and striving continuously. In this case, male teachers in the field of preschool education are more open to lifelong learning.

It was also found that young and single teachers were more inclined towards lifelong learning than older and married teachers. This is undoubtedly a new culture and a new imperative. Young people can adapt to this culture more quickly. This is also reflected in the results of this research. Acquiring the culture of lifelong learning has become a necessity for all teachers, especially the new generation of preschool teachers, so they can effectively engage in relevant behaviors and practices.

As a result, it can be stated that it has become a necessity to include courses that will teach and promote a culture of lifelong learning in all areas of teacher education, not only in the preschool field.

REFERENCES

- Arslan, A. (2019). Meslek yüksekokulu öğrencilerinin yaşam boyu öğrenme eğilimlerinin incelenmesi [Investigation of lifelong learning tendencies of vocational school students]. *VIII. Eurasian Conference on Language & Social Studies*. October 18-20, Proceedings Book, 337-335. Antalya, Türkiye. <http://dx.doi.org/10.35578/eclss.52775>
- Aspin, D. & Chapman, J. (2000). Lifelong learning: Concepts and conceptions. *International Journal of Lifelong Education*, 19, 2–19. <https://doi.org/10.1080/026013700293421>
- Aspin, D. N. & Chapman, J. D. (2007). Lifelong learning: concepts and conceptions. In Aspin D. (Ed.), *Philosophical Perspectives on Lifelong Learning* (Chapter 1, pp.19-38). Springer Publishing.
- Ayaz, C. (2016). Öğretmenlerin yaşam boyu öğrenme eğilimlerinin bazı değişkenler açısından incelenmesi [Analyzing teachers' lifelong learning dispositions in terms of some variables] (Publication No: 421733) [Master's dissertation, Bartın University] Council of Higher Education Thesis Center.
- Aydoğdu, E. (2008). İlköğretim okullarındaki öğrenci ve öğretmenlerin sahip oldukları okul algıları ile ideal okul algılarının metaforlar (mecazlar) yoluyla analizi [The analyze of perceptions that primary students and teachers have on the school life and ideal school

- life by using metaphors] (Publication No:177265) [Master's Thesis, Eskişehir Osmangazi University] Council of Higher Education Thesis Center. <https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=biL2P3cCsPgUNjVdV2BsGMYqatkK8fDdVJ39cb9ATgDCiR5MJ21OQVooU7NMvQK2>
- Ayra, M. (2015). Öğretmenlerin yaşam boyu öğrenme eğilimlerinin mesleki öz yeterlik inançları ile ilişkisi [The relationship between teachers' lifelong learning dispositions and their professional self-efficacy beliefs] (Publication No: 412297) [Master's Thesis, Amasya University] Council of Higher Education Thesis Center. https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=WY5CM7tPNE2z_YM6pBu0txs6KMK_gA1EFDkE-laq6wVVRT5itgaLlZWgpKfW_vqL
- Babanlı, N., & Akçay, R. C. (2018). Yetişkin eğitimindeki kursiyerlerin yaşam boyu öğrenme yeterlikleri [Lifelong learning competences of trainees in adult education]. *İnönü Üniversitesi Eğitim Bilimleri Enstitüsü Dergisi*, 5(9), 87-104. <https://doi.org/10.29129/inujse.411354>
- Bilici, O., & Bağcı, H. (2020). Öğretmen adaylarının yaşam boyu öğrenme eğilimleri ile e-öğrenmeye hazır bulunuşlukları arasındaki ilişkinin incelenmesi [Analyzing the relationship between pre-service teachers' lifelong learning dispositions and their readiness for e-learning]. *Sakarya Üniversitesi Eğitim Fakültesi Dergisi*, 20(2), 205-219 <https://dergipark.org.tr/tr/pub/sakaefd/issue/57931/801187>
- Boztepe, Ö., & Demirtaş, Z. (2017). Öğretmen adaylarının yaşam boyu öğrenme ve iletişim memnuniyet düzeylerinin incelenmesi [Analyzing the lifelong learning and communication satisfaction levels of pre-service teachers]. *Yükseköğretim ve Bilim Dergisi*, 8(2), 327-335. <https://dergipark.org.tr/tr/pub/higheredusci/issue/61496/918258>
- Büyüköztürk, Ş., Çakmak-Kılıç, E., Akgün, Ö.E., Karadeniz, Ş., & Demirel, F. (2012). *Bilimsel araştırma yöntemleri [Scientific research methods]*. Pegem Akademi.
- Bulaç, E., & Kurt, M. (2019). Öğretmen adaylarının yaşam boyu öğrenme eğilimlerinin incelenmesi [Analyzing the lifelong learning tendencies of pre-service teachers]. *Amasya Üniversitesi Eğitim Fakültesi Dergisi*, 8(1), 125-161. <https://dergipark.org.tr/tr/pub/amauefd/issue/45794/532829>
- Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, 21 (2), 230-258. <https://doi.org/10.1177/00491241920210020>
- Cerit, Y. (2008). Öğretmen kavramı ile ilgili metaforlara ilişkin öğrenci, öğretmen ve yöneticilerin görüşleri [Opinions of students, teachers and administrators on metaphors related to the concept of teacher]. *Türk Eğitim Bilimleri Dergisi*, 6 (4), 693-712. <https://dergipark.org.tr/tr/pub/tebd/issue/26110/275093>
- Ceviz Kübra, H. (2022). Halk eğitim merkezi kursiyerlerinin umutsuzluk ve sürekli kaygı düzeyleri ile hayat boyu öğrenme eğilimleri ilişkisi [The relationship between hopelessness and trait anxiety levels of public education center trainees and their lifelong

- learning tendencies] (Publication No: 715380) [Master's Thesis, Bartın University] Council of Higher Education Thesis Center. https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=5XiSE4yCP_gmnukpMEp65bIDAIupZ2u-hnKvmDYT7UCgtSI4n-IeRuKfe-yOpzi0
- Crick, R. D. and Yu, G. (2008). Assessing learning dispositions: Is the effective lifelong learning inventory valid and reliable as a measurement tool?. *Educational Research*, 50 (4), 387–402. <https://doi.org/10.1080/00131880802499886>
- Çelikten, M. (2005). The women at principals' chair in Turkey. *The Journal of American Academy of Business*, 6, 85-94. <https://www.jaabc.com/jaabcv6n1preview.html>
- Çetinkaya, B., Gülaçtı, F., Çiftçi, Z., & Kağan, M. (2019). Öğretmenlerin yaşam boyu öğrenme eğilimlerinin ve mesleki doyumlarının çeşitli değişkenler açısından incelenmesi [Analyzing teachers' lifelong learning dispositions and professional satisfaction in terms of various variables]. *Trakya Eğitim Dergisi*, 9(4), 809-823. <https://doi.org/10.24315/tred.529759>
- De Guerrero, M. C. M. ve Villamil, O. S. (2002). Metaphorical conceptualizations of ESL teaching and learning, *Language Teaching Research*, 6(2), 95–120. <https://doi.org/10.1191/1362168802lr101>
- Derrick, M. G. (2003). Creating environments conducive for lifelong learning, *New Directions for Adult and Continuing Education*, 100 (Winter). <https://doi.org/10.1002/ace.115>
- Erdener, M. A., & Özlem, G. Ü. L. (2017). İlkokul öğretmenlerinin yaşam boyu öğrenmeye ilişkin görüşlerinin incelenmesi [Analyzing primary school teachers' views on lifelong learning]. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi*, 11(2), 545-563. <https://doi.org/10.17522/balikesirnef.373445>
- Erten, P., & Kuzu, İ. Y. (2016). Öğretmenlerin yaşam boyu öğrenme yeterlikleri [Teachers' lifelong learning competencies]. *İlköğretim Online*, 15(3). <https://doi.org/10.17051/io.2016.07530>
- Evin Gencel, İ. (2013). Öğretmen adaylarının yaşam boyu öğrenme yeterliklerine yönelik algıları [Pre-service teachers' perceptions of lifelong learning competencies]. *Eğitim ve Bilim*, 38 (170), 237-252. <https://eb.ted.org.tr/index.php/EB/article/view/1847>
- Field, A. (2009). *Discovering statistics using Spss*. Sage Publications.
- Fischer, G. (2000). Lifelong learning-More than training. *Journal of Interactive Learning Research*, 11 (3-4), 265-294. <https://l3d.colorado.edu/wp-content/uploads/2021/02/final-lifelonglearnin-more-training-1999.pdf>
- Güçlü, S., Bostan, N., & Tabak, R., S. (2013). Dumlupınar Üniversitesi hemşirelik bölümü son sınıf öğrencilerinin yaşam boyu öğrenme davranışlarının belirlenmesi [Determination of lifelong learning behaviors of senior nursing students of Dumlupınar University]. *Kastamonu Üniversitesi Kastamonu Eğitim Dergisi*, 21(2), 459-468.

<https://acikerisim.kastamonu.edu.tr/entities/trdizin/45cd3a16-48c4-40c9-83ff-f6c8a5a052ae>

- Gültekin, G.S. & Yazar, F. B. (2021). Examining teachers' lifelong learning tendencies. *Pearson Journal of Social Sciences & Humanitie*, 6 (6), 98-106, <http://dx.doi.org/10.46872/pj.227>
- Gür Erdoğan, D. (2014). Öğretmen adaylarının yaşam boyu öğrenme eğilimlerine etki eden faktörler [Factors affecting prospective teachers' lifelong learning tendencies] (Publication No: 384700) [Doctoral dissertation, Abant İzzet Baysal University] Council of Higher Education Thesis Center. https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=sY7m19PfcL6F1NUw-cr80F-bF-nos3KJSAzatGyz_BZniDTITGuo1dLvOvcOKpL
- Gür Erdoğan, D. & Arsal, Z. (2016). The development of lifelong learning trends scale (LLTS). *Sakarya University Journal of Education*, 6/1 (Nisan/Aralık 2016), 114-122. <https://doi.org/10.19126/suje.32361>
- Hair Jr., J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis*. Cengage.
- Haskan Avcı, Ö., Karababa, A., & Zencir, T. (2019). Male pre-school teacher candidates in the context of gender: Perceived challenges and future concerns. *Hacettepe University Journal of Education*, 34(4), 1092-1106. <https://doi.org/10.16986/HUJE.2018046235>
- Ho, R. (2006). *Handbook of univariate and multivariate data analysis and interpretation with SPSS*. Taylor & Francis.
- Hu, L.-t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6 (1), 1-55. <https://doi.org/10.1080/10705519909540118>
- İncik, E. Y. (2020). Öğretmenlerin yaşam boyu öğrenme eğilimleri ve 21. yüzyıl öğretmen becerileri arasındaki ilişkinin incelenmesi [Analyzing the relationship between teachers' lifelong learning dispositions and 21st century teacher skills]. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 20(2), 1099-1112. <https://doi.org/10.17240/aibuefd.2020.-638602>
- Karakış, Ö. (2022). The relation between future time perspective, online learning self-efficacy and lifelong learning tendency: a mediation analysis. *International Journal of Curriculum and Instruction*, 14(1), 404-423. <https://ijci.net/index.php/IJCI/article/view/888>
- Karakış, Ö. & Demirtaş, Z. (2022). Öğretmen adaylarının yaşam boyu öğrenme eğilimleri ve öğretmenlik mesleğini seçimlerinden duydukları memnuniyetin mesleki yönelim ve kariyer geliştirme arzularını yordaması [Prospective teachers' lifelong learning dispositions and satisfaction with their choice of teaching profession predict their professional orientation and career development aspirations]. *E-Uluslararası Eğitim Araştırmaları Dergisi*, 13(5), 77-92. <https://doi.org/10.19160/e-ijer.1121973>

- Kavtelek, C., & Doğan, S. (2014). Hayat boyu öğrenme kurum yöneticilerinin hayat boyu öğrenmeye ilişkin algıları ve görüşleri [Perceptions and opinions of lifelong learning institution managers about lifelong learning] (Publication No: 372234) [Master's thesis, Cumhuriyet University]. Council of Higher Education Thesis Center. <https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=48XPj7KKQhKUgntkUiKO3ImF2eahkWmV2o-CHbRGze-fBgnTyBHBXSV7ls9jbPQp>
- Kıral B., Kıral E. ve Başdağ, S. (2013). İlkokul öğrencilerinin algılarına göre sınıf öğretmeni metaforları [Classroom teacher metaphors according to primary school students' perceptions.]. XII. Ulusal Sınıf Öğretmenliği Sempozyumu, Sözlü Bildiri, 22 Mayıs, Aydın. https://www.researchgate.net/publication/357511331_Ilkokul_ogrencilerinin_algilarina_gore_sinif_ogretmeni_metaforu
- Kiley, M. & Cannon, R. (2000). *Leap into lifelong learning*. Centre for Learning and Professional Development (CLPD), The University of Adelaide.
- Koçak, D. & Kaygusuz H. (2019). Preschool teacher candidates' opinions on teacher gender in preschool education. *Adnan Menderes Üniversitesi Eğitim Fakültesi Eğitim Bilimleri Dergisi*, 10 (1), 20-36. <https://dergipark.org.tr/tr/pub/aduefebder/issue/46411/521092>
- Korucu, M., & Sahan, H.H. (2024). The relationship between teachers' lifelong learning tendencies and their curriculum fidelity levels. *Educational Policy Analysis and Strategic Research*, 19(1), 66-89. <https://doi.org/10.29329/epasr.2024.655.4>
- McCombs, B. L. (1991). Motivation and lifelong learning. *Educational Psychologist*, 26 (2), 117-127. https://doi.org/10.1207/s15326985ep2602_4
- Oral, B., & Yazar, T. (2015). Öğretmen Adaylarının Yaşam Boyu Öğrenmeye İlişkin Algılarının Çeşitli Değişkenlere Göre İncelenmesi [Analyzing Prospective Teachers' Perceptions of Lifelong Learning According to Various Variables]. *Elektronik Sosyal Bilimler Dergisi*, 14(52), 1-11. <https://doi.org/10.17755/esosder.72011>
- Özçiftçi, M., Özçiftçi, M., & Çakır, R. (2015). Öğretmenlerin Yaşam Boyu Öğrenme Eğilimleri ve Eğitim Teknolojisi Standartları Özyeterliklerinin İncelenmesi [Analyzing Teachers' Lifelong Learning Dispositions and Educational Technology Standards Self-Efficacy]. *Eğitim Teknolojisi Kuram Ve Uygulama*, 5(1), 1-19. <https://doi.org/10.17943/etku.57410>
- Özoğlu, C. (2019). Öğretmen adaylarının yaşam boyu öğrenme eğilimlerinin dijital okuryazarlıkları ile ilişkisi (Anadolu Üniversitesi Eğitim Fakültesi Örneği) [The relationship between pre-service teachers' lifelong learning dispositions and their digital literacy (The Case of Anadolu University Faculty of Education)] (Publication No: 607777) [Master's thesis, Anadolu University] Council of Higher Education Thesis Center. https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=aEzj_IdWAsjiSAfK3qwrBt0K4tAPAcyC6ot0wDus4IprLmJHdVrUQM-G2Sc3uQoO
- Pınarcık, Ö., Danacı, M. Ö., Deniz, M. E., & Nuray, E. (2016). Okul öncesi öğretmenlerinin yaşam boyu öğrenme yeterliklerine yönelik algıları [Preschool teachers' perceptions of lifelong

- learning competencies]. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 16(4), 1966-1983. <https://dergipark.org.tr/tr/pub/aibuefd/issue/28550/304606>
- Poyraz, H. & Titrek, O. (2013). Development of lifelong learning in Turkey. *Abant İzzet Baysal Üniversitesi Dergisi*, 13(1). <https://dergipark.org.tr/tr/pub/aibuefd/issue/1500/18154>
- Saban, A. (2004). Giriş düzeyindeki sınıf öğretmeni adaylarının öğretmen kavramına ilişkin ileri sürdükleri metaforlar [The metaphors that pre-service primary school teachers put forward about the concept of teacher]. *Türk Eğitim Bilimleri Dergisi*, 2(2), 131-155. <https://dergipark.org.tr/tr/pub/tebd/issue/26128/275216>
- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, 8(2), 23-74. <https://doi.org/10.23668/psycharchives.12784>
- Soran, H. Akkoyunlu, B. ve Kavak, Y. (2008). Yaşam Boyu Öğrenme Becerileri ve Eğiticilerin Eğitim Programı. Hacettepe Üniversitesi Örneği [Lifelong Learning Skills and Training of Trainers Program. Hacettepe University Case]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 30, 201-210. <https://dergipark.org.tr/tr/pub/hunefd/issue/7806/102381>
- Topuz S. K. & Erkanlı H. (2016). Toplumsal cinsiyet bağlamında kadın ve erkeğe atfedilen anlamların metafor yöntemiyle analizi [Analysis of the meanings attributed to men and women in the context of gender through metaphor method]. *Alternatif Politika*, 8(2), 300-321. <https://alternatifpolitika.com/site/dosyalar/arsiv/Nisan2016-sayi2/4.pdf>
- Tough, A. (1979). *The Adult's Learning Project*. University Associates.
- Tunca, N., Alkın Şahin, S., & Aydın, Ö. (2015). Öğretmen adaylarının yaşam boyu öğrenme eğilimleri [Prospective teachers' lifelong learning tendencies]. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 11(2), 433-446. <https://doi.org/10.17860/efd.92694>
- Yaman, F. (2014). Öğretmenlerin yaşam boyu öğrenme eğilimlerinin incelenmesi (Diyarbakır il örneği) [Investigating of life long learning tendency of teachers (The example of Diyarbakır)] (Publication No: 357629) [Master's thesis , Dicle Üniversitesi]. Council of Higher Education Thesis Center. https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=1zw6GvYMe-q3Hf6HR-3USxdG1nMuWy_nQIYb9YbB_b6pnfmNtAtBAqRh2UV5ggZv
- Yaman, F. & Yazar, T. (2015). Investigating of life long learning tendency of teachers (The Example of Diyarbakır). *Kastamonu Üniversitesi Kastamonu Eğitim Dergisi*, 23 (4), 1553-1566. <https://dergipark.org.tr/en/pub/kefdergi/issue/22597/241367>
- Yenice, N., & Tunç, G. A. (2019). Öğretmen adaylarının yaşam boyu öğrenme eğilimleri ile bireysel yenilikçilik düzeylerinin incelenmesi [Analyzing lifelong learning dispositions and individual innovativeness levels of pre-service teachers]. *Kastamonu Üniversitesi Kastamonu Eğitim Dergisi*, 27(2), 753-765. <https://doi.org/10.24106/kefdergi.2716>

- Yılmaz, M. (2016). Öğretmenlerin yaşam boyu öğrenme eğilimlerinin incelenmesi [Analyzing teachers' lifelong learning tendencies]. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 13 (35) : 253-262. <https://dergipark.org.tr/tr/download/article-file/226478>
- Yılmaz, M. (2018). Lifelong learning tendencies of prospective teachers receiving pedagogical formation education. *Universal Journal of Educational Research* 6(8), 1684-1691. <http://dx.doi.org/10.13189/ujer.2018.060808>
- Yılmaz, R., & Beşkaya, Y. M. (2018). Eğitim yöneticilerinin yaşam boyu öğrenme eğilimleri ile bireysel yenilikçilik düzeylerinin incelenmesi [Analyzing lifelong learning tendencies and individual innovativeness levels of educational administrators]. *Ankara University Journal of Faculty of Educational Sciences (JFES)*, 51(1), 159-181. <https://doi.org/10.30964/auebfd.406246>
- Wain, K. (2000). The learning society: postmodern politics. *International Journal of Lifelong Education*, 19 (1), 36-53. <https://doi.org/10.1080/026013700293449>
- Walters S. (2010). The planet will not survive if it's not a learning planet: sustainable development within learning through life. *International Journal of Lifelong Education*, 29(4), 427-436. <https://doi.org/10.1080/02601370.2010.488807>
- Worthington, R. L., & Whittaker, T. A. (2006). Scale development research a content analysis and recommendations for best practices. *The Counseling Psychologist*, 34(6), 806-838. <https://doi.org/10.1177/0011000006288127>

Data Availability Declaration

The data can be shared upon request.

Author Contributions

Author Contributions:

The sole author of this research, Turan Çakır, was responsible for the conceptualization, methodology formulation, data collection, analysis, and interpretation. Furthermore, [Turan Çakır] took charge of drafting the initial manuscript, revising it critically for vital intellectual content, and finalizing it for publication. The author has read and approved the final manuscript and takes full accountability for the accuracy and integrity of the work presented.

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Exploring the Role of Educational Technology in Multigrade Classrooms: Focusing on Artificial Intelligence

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Abstract:

This study investigates the role of educational technology, including artificial intelligence (AI), in improving learning outcomes and addressing the complexities of multi-grade classrooms. A qualitative research method based on the analysis of scientific papers was employed. The findings of the study include an examination of the role of AI in multi-grade classrooms, personalized learning with AI, and the challenges it faces, such as data privacy and security, addressing bias and ensuring fairness, as well as equity and accessibility, co-developing guidelines, and enhancing AI literacy. This study also explores the application of AI in assessment and feedback, AI-enhanced classrooms, challenges and future directions, and ethical considerations associated with AI. The reviewed literature demonstrates the impact of AI-based educational technology in improving teaching and learning in multi-grade classrooms. The findings emphasize the necessity of a thorough examination of ethical implications and potential issues in the use of AI and suggest that future studies should carefully address the ethical considerations and challenges related to the implementation of AI in multi-grade classrooms.

Keywords: Education, multi-grade classroom, educational technology, artificial intelligence

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INTRODUCTION

Multi-grade classrooms are educational settings where students of different grades are taught together by a single teacher. This approach is often found in rural areas and developing countries, where small schools typically lack the financial resources to operate separate classes for each grade level. In these environments, students work independently or in groups on their academic objectives while learning in a shared space (Recla & Potane, 2023).

One of the defining characteristics of multi-grade classrooms is the diversity of students, often encompassing various ages within a single educational level. This diversity poses unique pedagogical challenges for teachers, such as difficulties in classroom management, time constraints, insufficient training, lack of resources, the management of diverse educational needs, curriculum planning, and classroom organization (Bharti et al., 2024). Teachers must implement innovative instructional strategies to effectively engage students and facilitate group learning, while also addressing individual learning needs of each student. The inherent complexities of managing multi-grade environments can lead to unfavorable educational outcomes if not appropriately addressed (Alhajeri & Safian, 2023).

Despite these challenges, multi-grade classrooms offer opportunities for group learning and the development of mentoring relationships among students. These classrooms can foster the socio-emotional development of older students by providing opportunities for supporting their younger peers (Fatima et al., 2024). Furthermore, the integration of technology into classrooms can enhance instructional methods, increase student engagement, and make education more relevant and accessible in today's digital age (Mirjat et al., 2024). In this regard, it has been indicated that teachers see the inclusion of AI as an opportunity to personalize learning, reduce workload, and facilitate teaching in multigrade classrooms, without perceiving it as a job threat. At the same time, they emphasize the need for technological and didactic resources aligned with the specific characteristics of their contexts, such as offline resources and adaptable AI curricula to address the prevalent issue of limited or absent internet connectivity in many rural schools (Castro et al., 2025).

The integration of technology into multi-grade classes allows the personalization of learning experiences. Adaptive learning platforms can assess each student's strengths and weaknesses, enabling teachers to tailor instruction to meet their specific needs. For instance, younger learners can engage with interactive educational games that strengthen foundational skills such as literacy and mathematics, while older students can utilize online resources to explore more complex topics in greater depth (Recla & Potane, 2023). Additionally, technology facilitates group learning by allowing students to share ideas and resources across different age groups. This interaction enhances motivation and promotes peer mentoring. The use of technology in multi-grade classrooms also fosters students' essential digital literacy skills. By working with various digital tools, learners develop the

ability to manage information, critically evaluate sources, and communicate effectively in digital environments. These skills are becoming increasingly vital in today's technology-driven world, preparing students for future academic and professional success (Taole, 2024).

A wide range of web-based educational technologies can be used in multi-grade classrooms. Learning management systems (LMS) such as Google Classroom and Moodle provide platforms for resource sharing and effective communication, while interactive tools like Edmodo are powerful aids for student collaboration and assignment feedback. Other technologies, such as gamification, videoconferencing for virtual field trips, and educational apps, cater to diverse learning styles and enrich educational experiences (Magallanes et al., 2024). Teachers in multi-grade classrooms play a pivotal role in the effective use of technology. Students must engage responsibly with digital tools and develop essential information literacy skills. By integrating technology into curricula and assessments, teachers can create a dynamic and interactive learning environment that not only aligns with educational goals but also prepares students for an evolving digital landscape (Fatima et al., 2024).

Furthermore, research has shown that the effective integration of educational technology, including artificial intelligence (AI), plays a significant role in addressing some of the challenges faced by teachers in multi-grade classrooms. For instance, the introduction of learning management systems (LMS) has demonstrated potential for improving student progress despite challenges related to user acceptance and engagement. These systems facilitate multi-directional communication, resource sharing, tracking, and feedback (Chounta et al., 2022). The application of AI in educational settings is recognized as a promising avenue for enhancing teaching methods and personalizing learning experiences, which can help alleviate the burdens faced by teachers in multi-grade classrooms (Imasiku et al., 2022).

Despite these numerous advantages, teachers in multi-grade classrooms face several challenges. The successful integration of technology and AI can help mitigate these challenges; however, it also raises ethical considerations related to data privacy, equitable access, and potential biases. Addressing these issues is crucial for ensuring the growth and success of all students in these digital learning environments (Rana et al., 2024).

As the educational landscape evolves, the role of AI in multi-grade classrooms is expected to grow, offering opportunities to enhance teaching methods and student engagement. However, it is essential to carefully examine ethical implications and commit to equitable access to fully leverage AI's potential while safeguarding the rights and needs of all learners. Overall, diverse learning needs in multi-grade classrooms require innovative teaching strategies and effective use of educational technologies. This study explores the role of educational technology, with a particular focus on AI, in improving learning outcomes and addressing the complexities of multi-grade classrooms.

METHOD

This study employs a qualitative research method based on the analysis and review of academic papers. Initially, a comprehensive search was conducted across academic databases such as Google Scholar, Science Direct, Semantic Scholar, SAGE, ProQuest, Scopus, and Springer to gather relevant literature. Keywords such as "educational technology," "artificial intelligence," "multi-grade classrooms," "AI in education," and "advanced learning technologies" were used for this search. The inclusion criteria for the papers focused on those that were published between 2020 and 2023, were written in English, and directly addressed the intersection of AI, educational technology, and learning environments. A total of 52 articles were reviewed, and ultimately, the findings of 26 articles were used in this study. These papers were categorized based on themes such as the applications of AI in education, challenges in multi-grade classrooms, benefits of educational technology, and future research directions. Finally, the key findings of the study were extracted and organized as presented in the following sections.

DISCUSSION

In multi-grade classrooms, where students of varying ages and abilities learn together, the integration of educational technology plays a crucial role in creating engaging and personalized learning environments. This approach not only enhances instructional strategies but also supports students' diverse needs by offering tailored educational experiences (Naparan & Alinsug, 2021). The integration of educational technology, particularly AI, is crucial for improving the effectiveness of multi-grade classrooms. AI provides personalized learning experiences and enables teachers to address students' diverse needs through adaptive learning platforms and interactive tools. These digital resources not only cater to different learning styles but also create opportunities for peer mentoring, where older students assist younger ones, thus enriching the learning environment (Fatima et al., 2024). Subsequent sections explore topics such as personalized learning with AI and its challenges, the application of AI in assessment, grading, and feedback, AI-enhanced classroom environments, future challenges and directions, and the ethical considerations associated with AI integration.

1.1. Personalized Learning with AI in Multi-Grade Classrooms

AI is playing an increasingly transformative role in education, particularly in multi-grade classrooms. Through the implementation of intelligent tutoring systems, AI can provide personalized instruction tailored to individual student needs. These systems can dynamically adjust the content and difficulty level of assignments based on the learner's performance, making them particularly effective for subjects such as mathematics, language learning, and science. The use of intelligent tutoring systems ensures that students can progress at their own pace while receiving immediate feedback and support. This approach

helps bridge gaps among struggling learners and challenges advanced students with more complex materials (Walter, 2024).

AI-based tools enable remarkable personalization in learning environments. By leveraging machine learning algorithms, teachers can create personalized learning profiles for students that consider each learner's preferences, abilities, and prior knowledge. This personalization not only enhances student engagement but also improves academic performance because learners are presented with tasks tailored to their individual capabilities and interests (Aldosari, 2020).

Therefore, one of the most significant advantages of AI in education is its ability to personalize learning experiences. Personalized learning is particularly important in multi-grade classrooms, where students have varying skill levels and learning styles. AI-based intelligent tutoring systems can address individual student needs and provide tailored instruction and feedback (Mehnen & Pohn, 2024). These systems can identify knowledge gaps, adjust task difficulty levels, and offer targeted support to help students progress (Mallik & Gangopadhyay, 2023). For example, the "LearnStreamAI" project at the Vienna Institute of Technology integrates an AI-powered chatbot into the Moodle learning environment. This chatbot leverages advanced technologies, such as ChatGPT and Gemini, to deliver personalized feedback aligned with each student's individual knowledge level (Mehnen & Pohn, 2024). This personalized approach can significantly address students' diverse learning needs in multi-grade classrooms. The potential of AI to create personalized learning pathways was further supported by Mallik and Gangopadhyay (2023), who highlighted AI's role in proactive educational planning to manage varied educational requirements effectively.

Moreover, AI-based tools, such as chatbots, provide immediate feedback and support, which makes the learning environment more interactive and engaging. Multilingual support enabled by AI technologies also enhances accessibility for students from diverse linguistic backgrounds, a feature particularly valuable in multi-grade classrooms where students speak various languages. Additionally, the use of AI technologies can save teachers' time by automating the creation of educational content, streamlining lesson planning, and allowing educators to focus more on addressing individual student needs. Early feedback from pilot studies indicated that AI-generated content aligns well with educational objectives and enhances the quality of teaching resources (Ma, 2024).

1.2. Challenges in Implementing AI-Powered Personalized Learning

1.3. Data Privacy and Security

One of the primary ethical concerns associated with AI in education is data management. AI systems often require large volumes of data to function effectively, which raises critical questions about privacy and security. It is essential for educators to comply with legal frameworks, such as the Family Educational Rights and Privacy Act (FERPA) and the General Data Protection Regulation (GDPR), to protect student information from

privacy breaches and unauthorized access. Regular security audits and a clear understanding of data management policies are crucial for maintaining the integrity and reliability of educational practices. Furthermore, educators must ensure that no sensitive student information is uploaded to AI systems without appropriate protective measures in place (Akgun & Greenhow, 2022).

1.4. Addressing Bias and Ensuring Fairness

AI systems may unintentionally reflect and perpetuate biases in their training data. If the data used to train these models contain specific biases, the recommendations and content generated by AI could mirror and amplify those biases, leading to unfair or discriminatory practices in educational settings (Holmes et al., 2022). To mitigate this risk, educators should participate in professional development programs focused on identifying and addressing bias in AI tools. Incorporating diverse and inclusive educational datasets is essential for producing equitable outcomes for all students, particularly marginalized learners (Khreisat et al., 2024).

1.5. Equity and Accessibility

Ensuring equitable access to AI tools is critical for addressing the digital divide, which can intensify educational inequality. Not all students and schools have equal access to the necessary technologies, potentially preventing some learners from fully benefiting from AI resources. Addressing this disparity requires thoughtful planning and the proper distribution of resources to ensure equal chances for every student (Mallik & Gangopadhyay, 2023). Educators and policymakers should advocate for policies that ensure access to AI technologies for all students and prioritize investments in infrastructure, particularly in underserved areas. Moreover, AI tools should be designed to accommodate diverse learning needs and styles, including those of students with disabilities (Kazim & Koshiyama, 2021).

1.6. Collaborative Development of Guidelines

To promote the responsible use of AI, teachers should involve students in the process of creating ethical guidelines for AI tools. This collaborative approach not only fosters a sense of ownership among students but also enriches guidelines with diverse perspectives. Schools and educational districts should provide opportunities for discussions and workshops where students can voice their concerns and suggestions, thereby cultivating a culture of ethical awareness and accountability (Kamalov et al., 2023).

1.7. Enhancing AI Literacy

Improving AI literacy among teachers and students is essential for understanding the complexities of AI in education. Teachers require adequate training and support to effectively integrate AI tools into their teaching practices (Mehnen & Pohn, 2024). Without proper training, educators may face challenges when using AI tools, thus limiting their impact on student learning. Teachers should also provide explicit instruction on the ethical

implications of AI, emphasizing transparency and the responsible use of these tools. Additionally, educational support strategies can help students develop critical thinking skills that are necessary for effectively engaging with AI technologies. By prioritizing these ethical considerations and adopting best practices, educators can harness AI's potential to enhance learning experiences while safeguarding students' rights (Chen et al., 2020).

1.8. Application of AI in Assessment, Grading, and Feedback

Beyond educational support, AI is transforming assessment and grading processes. AI systems automate administrative tasks, such as graded assignments, enabling teachers to dedicate more time to student interactions and personalized support. Furthermore, AI's ability to analyze data and provide immediate feedback helps educators gain deeper insights into student progress and identify areas that require additional attention. This, in turn, facilitates more informed educational decision-making (Shi et al., 2024).

AI revolutionizes assessment and feedback mechanisms in education. In multi-grade classrooms, accurate and efficient assessment is crucial for monitoring student progress and providing timely interventions (Ma, 2024). AI-based automated grading systems can effectively evaluate student writing, deliver instant feedback, and free teachers' time for personalized instruction (Zhang et al., 2024). These systems analyze various aspects of writing, including grammar, style, and organization, and offer precise feedback on students' strengths and weaknesses. In addition, AI algorithms can compare machine learning models, highlighting their adaptability and accuracy for educational assessments. For instance, the LSTM RNN-RF model has demonstrated high consistency and accuracy in estimating student performance, making it a valuable tool for educational interventions (Ma, 2024).

The application of AI in assessment extends beyond graded assignments. Intelligent systems can analyze student performance data to identify patterns and trends, inform educational decision-making, and provide insights into areas that require additional support. AI can also facilitate proactive planning in education by predicting student performance and identifying at-risk learners, thus allowing teachers to intervene early and prevent academic difficulties (Mallik & Gangopadhyay, 2023). However, it is important to recognize that the use of AI in assessment and feedback is not without challenges. Teachers must have a comprehensive understanding of the potential issues associated with implementing AI in classrooms to ensure its effective and responsible use.

1.9. AI-Enhanced Classroom

Beyond personalized learning and assessment, AI plays a significant role in enhancing engagement and classroom participation (Agasi, 2024). Sensor technologies integrated with AI can monitor student behavior and physiological data to inform personalized learning strategies. These insights can be used to adjust the pace of instruction, provide targeted support, and create responsive and engaging learning environments (Zhang et al., 2024). AI can also be used to develop interactive educational objects and simulations, making learning

more engaging and effective. For instance, the use of tools like ChatGPT, Canva, and Renderforest to create multimodal educational content has received positive feedback from students, demonstrating its effectiveness in raising awareness about water pollution (Alfiani & Sulisworo, 2023).

The integration of AI tools in classroom environments can also enhance collaborative learning (Wang & Liu, 2021). AI-based platforms can facilitate communication and collaboration among students, providing opportunities for peer learning and knowledge sharing (Agasi, 2024). Additionally, AI can help teachers analyze student interactions during collaborative problem-solving, offering insights into areas of conflict and identifying opportunities for intervention. Visual analysis of cognitive conflict during collaborative problem-solving can inform AI-driven instructional strategies, enabling teachers to provide timely feedback and support (Lu et al., 2023). However, the implementation of AI-enhanced classroom environments also presents challenges. Data privacy and security are critical concerns that require robust measures to protect student data and prevent misuse. The cost of implementing AI technologies in classrooms, particularly in resource-constrained settings, can also be a significant barrier (Zhang et al., 2024).

1.10. Challenges and Future Directions

The integration of AI into multi-grade classrooms not only enhances the learning experience but also prepares students for a future dominated by technology. By fostering critical thinking, problem-solving, and collaboration skills, AI-equipped educational environments prepare students for success in the digital era. However, the successful implementation of AI tools requires careful planning, training, and commitment to equitable access to ensure that all students thrive in these settings (Shi et al., 2024).

Although AI has significant potential in transforming multi-grade classrooms, several challenges remain. The digital divide, teacher readiness, ethical considerations, and implementation costs are major barriers to widespread adoption (Yu & Guo, 2023). Addressing these challenges requires a multifaceted approach that includes investing in infrastructure to ensure equitable access to technology, providing comprehensive teacher training programs, developing ethical guidelines for AI use in education, and exploring cost-effective solutions for AI technology implementation. The need for complementary research initiatives to effectively integrate AI tools into educational settings was highlighted in Chichekian and Benteux's (2022) study, which emphasized the importance of teacher involvement in the learning process and the necessity of establishing theoretical foundations in the development of AI-based tools.

Accordingly, future research should focus on several key areas. First, further studies are required to assess the long-term impact of AI on student learning outcomes in multigrade environments. Longitudinal studies are essential to track student progress over time and evaluate the effectiveness of AI-based interventions. Second, more research is required on the development and implementation of effective training programs for

teachers (Schina et al., 2021). These programs should address not only the technical aspects of using AI tools but also the pedagogical approaches necessary for effectively integrating AI into teaching. Third, further investigation into ethical considerations, including data privacy and AI's potential to intensify existing inequalities, is critical (Yu & Guo, 2023). Developing ethical guidelines and best practices for the use of AI in education is vital for ensuring responsible and equitable implementation. Finally, future research should explore the use of AI to support collaboration and communication in multi-grade classrooms. AI-based platforms can facilitate interactions between students and teachers and promote peer learning and knowledge sharing (Agasi, 2024).

1.11. *Ethical Considerations*

As educational technologies, particularly AI, continue to evolve, educators must be aware of the ethical implications of their use in classrooms. Issues such as data privacy, equitable access to technology, challenges related to data collection, limitations in data availability, bias and representation, data ownership and control, data autonomy, and the authenticity of learning experiences must be addressed in order to ensure that all students benefit from AI integration. The Digital Education Action Plan 2021-2027 emphasizes the importance of developing ethical guidelines for AI in education and highlights the need for teachers to be aware of and manage these complexities (Akgun & Greenhow, 2022; Miao et al., 2021; Nguyen et al., 2023). Therefore, a comprehensive understanding of these values and principles is critical before making ethical and accountable decisions, and being aware of even the potential unforeseen implications in education.

CONCLUSION

Traditional teaching methods may no longer be sufficient to address the diverse learning styles and paces in multigrade classrooms (Bharti et al., 2024). In this context, educational technologies, particularly AI, can transform multigrade classrooms through personalized learning, improved assessment, and enhanced classroom environments. However, realizing this potential requires addressing several challenges related to access, teacher training, ethics, and cost. By investing in infrastructure, providing comprehensive teacher training, developing ethical guidelines, and conducting further research, the power of AI can be harnessed to create effective, equitable, and engaging learning experiences for all students in multigrade classrooms. The integration of AI into educational technology requires ongoing research and development to fully understand and address the potential benefits and challenges of AI in diverse educational settings.

AI-based educational technology promises significant improvements in teaching and learning in multigrade classrooms. AI can facilitate personalized learning, automate tasks, and provide data-driven insights and recommendations on student progress. Thus, the integration of AI must always prioritize student well-being and equitable access to high-quality education (Mustafa et al., 2024). However, while the potential benefits of this

technology are substantial, a thorough examination of its ethical implications and possible biases is crucial for its responsible and effective implementation. Ethical considerations and challenges related to AI deployment require careful scrutiny (Farahani & Ghasmi, 2024; Rana et al., 2024).

Recent advancements in AI are poised to significantly transform educational practices within multi-grade classrooms across the globe. The core potential of AI lies in its capacity to facilitate personalized learning and differentiated instruction at scale, which are the cornerstones of effective teaching in these unique environments. AI-driven tools can create individualized learning pathways by dynamically assessing each student's knowledge, offering various educational resources tailored to different ability levels. By automating assessment processes and providing immediate feedback, this technology frees up valuable teacher time to enable more direct student interaction while simultaneously functioning as an intelligent tutoring assistant to answer student queries. Furthermore, AI can streamline administrative duties such as lesson planning and reporting, enabling educators to transition from being mere purveyors of information to facilitators of the learning process. Despite challenges such as the digital divide, AI holds the potential to effectively address the complex needs of multi-grade settings by delivering personalized support and fostering a more efficient learning experience for every child (Miao et al., 2021).

Therefore, implementing AI in multigrade classrooms, while promising, presents unique challenges that warrant careful consideration in our conclusions. A primary concern revolves around equitable access and infrastructure. Many multigrade schools, particularly in rural or underserved areas, may lack the necessary high-speed internet, reliable power, and up-to-date devices to effectively support AI-driven tools. This digital divide could exacerbate existing educational inequalities, making it crucial to explore strategies for inclusive implementation. Furthermore, the training and professional development of teachers are paramount. Educators in multigrade settings often manage diverse learning needs and a broad curriculum, integrating AI effectively requires specialized training not only in operating these technologies but also in adapting them to the specific pedagogical demands of a multigrade environment. Without adequate support, teachers may struggle to leverage AI's full potential. Finally, curriculum integration and content relevance pose a challenge. AI tools must be carefully selected and adapted to align with the varied learning objectives across multiple grade levels within a single classroom. Developing or curating AI-powered content that is simultaneously engaging and appropriate for a wide age range is complex, requiring significant foresight and collaboration between educators and technology developers. Addressing these challenges through targeted policy, infrastructure development, and teacher empowerment will be critical for the successful and impactful adoption of AI in multigrade settings (Ng et al., 2025; Walter, 2024).

Addressing the challenges associated with AI integration, including the digital divide and the need for comprehensive teacher training, requires a multifaceted approach. This requires collaborative efforts from researchers, educators, and policymakers to navigate the

complexities of AI integration in diverse educational environments. Additionally, further research should consider the specific needs of diverse learners and learning environments (Lin et al., 2024). The role of teachers remains essential, with AI serving as a supportive tool rather than a replacement for human interaction and teacher expertise. Ongoing research is necessary to fully understand the long-term impact of AI on student learning and teacher performance, ensuring that AI can be used to promote educational equity and enhance learning outcomes for all students.

With a focus on equitable access, responsible development, and effective implementation strategies, AI can be used to create more inclusive and efficient learning environments for all students in multi-grade classrooms. Future research should therefore focus on the long-term impacts of AI on student learning, the development of ethical guidelines, and the support for teachers in effectively integrating AI into classrooms. Regardless of students' age, learning style, or background, the ultimate goal should be to harness the power of AI to create fairer and more effective learning environments. This requires a continuous process of evaluation, adaptation, and improvement to ensure that AI continues to be a tool for positive transformation in education.

REFERENCES

- Agasi, K. (2024). Improving Critical Thinking by Using Technology in the Learning Process. *Interdisciplinary Journal of Research and Development*, 11(1 S1), 76-76. <https://doi.org/10.56345/ijrdv11n1s112>
- Akgun, S., & Greenhow, C. (2022). Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI and Ethics*, 2(3), 431-440. <https://doi.org/10.1007/s43681-021-00096-7>
- Aldosari, S. A. M. (2020). The future of higher education in the light of artificial intelligence transformations. *International Journal of Higher Education*, 9(3), 145-151. <https://doi.org/10.5430/ijhe.v9n3p145>
- Alfiani, R., & Sulisworo, D. (2023). Leveraging ChatGPT for Developing Learning Object Material: A Multi-representation Approach to Teaching Water Pollution. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, 13(2), 167-178. <https://doi.org/10.30998/formatif.v13i2.19472>
- Alhajeri, A. A. A. M. A., & Safian, E. E. M. (2023). Mediating Role of Organizational Learning in the Relationship between Use of Artificial Intelligence Security Technology and Community Security. *International Journal of Sustainable Construction Engineering and Technology*, 14(3), 137-153. <https://doi.org/10.30880/ijscet.2023.14.03.012>
- Bharti, R., Pomal, K., Ahmed, M., & Singh, C. B. (2024). Transformative Impact of ICT on Education: Leveraging Technology and Communication to Enhance Teaching and

- Learning. *Feedback International Journal of Communication*, 1(3), 131-141.
<https://doi.org/10.62569/fijc.v1i3.39>
- Castro, A., Díaz, B., Aguilera, C., Prat, M., & Chávez-Herting, D. (2025). Identifying rural elementary teachers' perception challenges and opportunities in integrating artificial intelligence in teaching practices. *Sustainability*, 17(6), 2748.
<https://doi.org/10.3390/su17062748>
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *Ieee Access*, 8, 75264-75278. <https://doi.org/10.1109/ACCESS.2020.2988510>
- Chichekian, T., & Benteux, B. (2022). The potential of learning with (and not from) artificial intelligence in education. *Frontiers in artificial intelligence*, 5, 903051.
<https://doi.org/10.3389/frai.2022.903051>
- Chounta, I.-A., Bardone, E., Raudsep, A., & Pedaste, M. (2022). Exploring teachers' perceptions of artificial intelligence as a tool to support their practice in Estonian K-12 education. *International Journal of Artificial Intelligence in Education*, 32(3), 725-755.
<https://doi.org/10.1007/s40593-021-00243-5>
- Farahani, M. S., & Ghasmi, G. (2024). Artificial Intelligence in education: A comprehensive study. *Forum for Education Studies*, 2(3), 1397. <https://doi.org/10.59400/fes.v2i3.1379>
- Fatima, N., Mahmood, S., & Noor, A. (2024). Impact of Multi-Grade Teaching on Student Learning. *Journal of Educational Research and Social Sciences Review (JERSSR)*, 4(2), 48-55. <https://ojs.jerssr.org.pk/index.php/jerssr/article/view/265/148>
- Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Shum, S. B., Santos, O. C., Rodrigo, M. T., Cukurova, M., & Bittencourt, I. I. (2022). Ethics of AI in education: Towards a community-wide framework. *International Journal of Artificial Intelligence in Education*, 32, 504-526. <https://doi.org/10.1007/s40593-021-00239-1>
- Imasiku, L., Gayle, M., Bacchiocchi, M., & Kartik, M. (2022). Using online education to address the challenges of small, multigrade schools. *The Journal of Adventist Education*, 84(3), 19-25. <https://doi.org/10.55668/DDFP4991>
- Kamalov, F., Santandreu Calonge, D., & Gurrib, I. (2023). New era of artificial intelligence in education: Towards a sustainable multifaceted revolution. *Sustainability*, 15(16), 12451.
<https://doi.org/10.3390/su151612451>
- Kazim, E., & Koshiyama, A. S. (2021). A high-level overview of AI ethics. *Patterns*, 2(9).
<https://doi.org/10.1016/j.patter.2021.100314>
- Khreisat, M. N., Khilani, D., Rusho, M. A., Karkkulainen, E. A., Tabuena, A. C., & Uberas, A. D. (2024). Ethical Implications of AI Integration in Educational Decision Making: Systematic Review. *Educational Administration: Theory and Practice*, 30(5), 8521-8527.
<https://doi.org/10.53555/kuey.v30i5.4406>

- Lin, M. P.-C., Liu, A. L., Poitras, E., Chang, M., & Chang, D. H. (2024). An Exploratory Study on the Efficacy and Inclusivity of AI Technologies in Diverse Learning Environments. *Sustainability*, 16(20), 8992. <https://doi.org/10.3390/su16208992>
- Lu, J., Zhang, Y., & Li, Y. (2023). Visual analysis of commognitive conflict in collaborative problem solving in classrooms. *Frontiers in psychology*, 14, 1-11, Article 1216652. <https://doi.org/10.3389/fpsyg.2023.1216652>
- Ma, X. (2024). Artificial intelligence-driven education evaluation and scoring: Comparative exploration of machine learning algorithms. *Journal of Intelligent Systems*, 33(1), 1-19. <https://doi.org/10.1515/jisys-2023-0319>
- Magallanes, M. L. P., Magadan, A. G. A., Absin, J. M. V., PaÑa, V. G. R., Salarda, I. B., & Pagara, C. R. A. (2024). Enhancing Student Engagement through Gamification Strategies in Multi-Grade Classroom. *International Journal of Research and Innovation in Social Science*, 8(8), 2387-2393. <https://doi.org/10.47772/ijriss.2024.8080180>
- Mallik, S., & Gangopadhyay, A. (2023). Proactive and reactive engagement of artificial intelligence methods for education: a review. *Frontiers in artificial intelligence*, 6, 1-24. <https://doi.org/doi.org/10.3389/frai.2023.1151391>
- Mehnen, L., & Pohn, B. (2024). Supporting Academic Teaching with Integrating AI in Learning Management Systems: Introducing a Toolchain for Students and Lecturers 2024 International Conference on Software, Telecommunications and Computer Networks (SoftCOM) (pp. 1-6). IEEE.,
- Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). AI and education: A guidance for policymakers. Unesco Publishing. <https://unesdoc.unesco.org/ark:/48223/pf0000376709>
- Mirjat, M. A., Mahar, S. S., & Butt, A. (2024). Impact of Information Communication Technology Tools on Teaching and Learning of Secondary School Learners. *Journal of Asian Development Studies*, 13(3), 1151-1159. <https://doi.org/10.62345/jads.2024.13.3.93>
- Mustafa, G., Urooj, T., & Aslam, M. (2024). Role of artificial intelligence for adaptive learning environments in higher education by 2030. *Journal of Social Research Development*, 5(3), 12-22. <https://doi.org/10.53664/jsrd/05-03-2024-02-12-22>
- Naparan, G. B., & Alinsug, V. G. (2021). Classroom strategies of multigrade teachers. *Social Sciences & Humanities Open*, 3(1), 100109. <https://doi.org/10.1016/j.ssaho.2021.100109>
- Ng, D. T. K., Chan, E. K. C., & Lo, C. K. (2025). Opportunities, Challenges and School Strategies for Integrating Generative AI in Education. *Computers and Education: Artificial Intelligence*, 100373. <https://doi.org/10.1016/j.caeai.2025.100373>
- Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B.-P. T. (2023). Ethical principles for artificial intelligence in education. *Education and Information Technologies*, 28(4), 4221-4241. <https://doi.org/10.1007/s10639-022-11316-w>

- Rana, M. M., Siddiquee, M. S., Sakib, M. N., & Ahamed, M. R. (2024). Assessing AI adoption in developing country academia: A trust and privacy-augmented UTAUT framework. *Heliyon*, 10(18), e37569. <https://doi.org/10.1016/j.heliyon.2024.e37569>
- Recla, L. C. B., & Potane, J. D. (2023). Teachers' Challenges and Practices in Handling Multigrade Classes: A Systematic Review. *ASEAN J. Open Distance Learn*, 15(1), 73-87. <https://myjurnal.mohe.gov.my/public/article-view.php?id=207036>
- Schina, D., Esteve-González, V., & Usart, M. (2021). An overview of teacher training programs in educational robotics: characteristics, best practices and recommendations. *Education and Information Technologies*, 26(3), 2831-2852. <https://doi.org/10.1007/s10639-020-10377-z>
- Shi, L., Ding, A.-C., & Choi, I. (2024). Investigating Teachers' Use of an AI-Enabled System and Their Perceptions of AI Integration in Science Classrooms: A Case Study. *Education Sciences*, 14(11), 1187. <https://doi.org/10.3390/educsci14111187>
- Taole, M. J. (2024). ICT integration in a multigrade context: Exploring primary school teachers experiences. *Research in Social Sciences and Technology*, 9(1), 232-252. <https://doi.org/10.46303/ressat.2024.13>
- Walter, Y. (2024). Embracing the future of Artificial Intelligence in the classroom: the relevance of AI literacy, prompt engineering, and critical thinking in modern education. *International Journal of Educational Technology in Higher Education*, 21, 15. <https://doi.org/10.1186/s41239-024-00448-3>
- Wang, W., & Liu, Z. (2021). Using artificial intelligence-based collaborative teaching in media learning. *Frontiers in psychology*, 12, 713943, Article 713943. <https://doi.org/10.3389/fpsyg.2021.713943>
- Yu, H., & Guo, Y. (2023). Generative artificial intelligence empowers educational reform: current status, issues, and prospects. *Frontiers in Education*, 8, 1-10. <https://doi.org/10.3389/educ.2023.1183162>
- Zhang, X., Ding, Y., Huang, X., Li, W., Long, L., & Ding, S. (2024). Smart classrooms: How sensors and ai are shaping educational paradigms. *Sensors (Basel, Switzerland)*, 24(17), 5487. <https://doi.org/10.3390/s24175487>

Data Availability Declaration

While the primary datasets utilized in this study are not publicly accessible due to certain constraints, they are available to researchers upon a formal request. The authors have emphasized maintaining the integrity of the data and its analytical rigor. To access the datasets or seek further clarifications, kindly reach out to the corresponding author. Our aim is to foster collaborative academic efforts while upholding the highest standards of research integrity.

Author Contributions

The sole author of this research, Abbas Poursalim, was responsible for the conceptualization, methodology formulation, data collection, analysis, and interpretation. Furthermore, Abbas Poursalim took charge of drafting the initial manuscript, revising it critically for vital intellectual content, and finalizing it for publication. The author has read and approved the final manuscript and takes full accountability for the accuracy and integrity of the work presented.

Author(s)' statements on ethics and conflict of interest

Ethics statement: I hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. I take full responsibility for the content of the paper in case of dispute.

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