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Research Article

# Differences in Male and Female Texas Community College First-Time-in-College Part-Time Students Over Time: A Multiyear, Statewide Analysis

**John P. Maynard II[1] John R. Slate[2]**

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**Abstract:**

*In this multiyear, statewide investigation, the extent to which enrollment rates of male and female, part-time, first-time-in-college students enrolled in Texas community colleges differed from the 2003-2004 academic year to the 2018-2019 academic year was determined. From the 2003-2004 academic year to the 2011-2012 academic year, statistically significant differences were identified in the enrollment rates of both male and female, part-time, first-time-in-college students. Cohen's d effect sizes, calculated for both male and female, part-time students, were small (0.22). Enrollment rates for male and female, part-time, first-time-in-college students from the 2011-2012 academic year to the 2018-2019 academic year and from the 2003-2004 academic year to the 2018-2019 academic year were similar. Enrollment rates for male and female, part-time, first-time-in-college students enrolled in Texas community colleges remained consistently around 45% and 55%, respectively, during the 16 academic year span. Recommendations for future research as well as implications for policy were discussed.*

**Keywords:** Part-time, First-time-in-college students, Enrollment rates, Texas community colleges, Male, Female

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## INTRODUCTION

Community colleges perform a key role in providing students with opportunities to earn postsecondary credentials, such as a certificate or associate degree. Open admission policies, lower tuition and fees, and the close proximity of community colleges to students' homes and work places have resulted in increased accessibility to postsecondary education (Boggs, 2011; Cohen, Brawer, & Kisker, 2014; Ma & Baum, 2016). In particular, students who have historically encountered barriers to higher education, such as students who are from low-income backgrounds, racial/ethnic minorities, first-generation, and academically underprepared, have benefitted from the presence and growth of community colleges (Boggs, 2011; Cohen et al., 2014; Jabbar, Sánchez, & Epstein, 2017). Given the many characteristics of community colleges that have opened higher education to all students, geographic proximity might be the most crucial factor in school selection. Cohen et al. (2014) reported that the proximity of community colleges to students homes was more important to increasing accessibility than open admissions. Moreover, Jabbar et al. (2017) documented that institutional location was more important for students when examining institutional options and that certain groups of students, such as first-generation and racial/ethnic minorities, often were more constrained by financial and geographical concerns.

Geography is important to students and to the mission and function of community colleges. According to Boggs (2011), community colleges have a "responsibility for the economic development of the communities surrounding the colleges" (p. 3). Additionally, Cohen et al. (2014) described that community college curriculum was developed to support and to assist the needs of the surrounding community. Community colleges often achieve this responsibility to the community by offering a wide range of educational opportunities. Such services include (a) non-credit courses for certifications and personal development, (b) developmental courses to increase mathematic and writing skills, (c) pathways for transferring to a 4-year college, and (d) associate and bachelor's degrees (Boggs, 2011; Cohen et al., 2014; Nuñez et al., 2011; Sanchez & Smith, 2017).

Associated with this mission to the local community, community colleges often enroll students from diverse demographic and educational backgrounds. According to the American Association of Community Colleges (2018), of the students who enrolled in community colleges in the fall 2016 semester, more than one half were a racial/ethnic minority, more than one third were first-generation, more than one third over the age of 25, and more than one half were female. Specifically, 63% of students who enrolled in community colleges enrolled part-time, and 59% of students enrolled in credit-level courses. In Texas, the diversity of students who enrolled in community colleges reflected the national data. In the fall 2015 semester, approximately 66% of students were an ethnic/racial minority, nearly 30% were over the age of 25, 57% of students were female, and 76% of students were enrolled part-time (Texas Higher Education Coordinating Board, 2018).

Given these trends in student enrollment, both nationally and in Texas, examining the characteristics of students might provide a better understanding of the community college population and how those characteristics are related to enrollment and persistence. As previously mentioned, more than one-third of students who enrolled in community college were first-generation students. Some attributes associated with first-generation students when compared to non-first-generation students were (a) racial/ethnic minority, (b) more dependent on financial aid, (c) more likely to have additional responsibilities (e.g., familial dependents, employment), (d) more likely from a low socioeconomic status, and (e) more likely to not be college ready in mathematics, reading, and writing (Ampaw, Partlo, Hullender, & Wagner, 2015; Atherton, 2014; Fike & Fike, 2008; Harlow & Bowman, 2016; Lee, 2017; Ma & Baum, 2016). Further, first-generation students often perceive more barriers in higher education than non-first-generation students. Some perceived barriers included lack of faculty support, difficulty integrating into the college setting, and lack of understanding the cultural and academic norms of a college (Ampaw et al., 2015; Harlow & Bowman, 2016; Longwell-Grice, Adsitt, Mullins, & Serrata, 2016).

In particular, the challenges associated with financial aid and the affordability of college encountered by many first-generation students is worth examining. As previously mentioned, community colleges often attract students from low-income backgrounds because of lower tuition and fees when compared to 4-year institutions. Ma and Baum (2016) reviewed national data and determined that public, community college tuition and fees were approximately $6,000 lower than in-state, public 4-year college tuition and fees. Although community colleges represent a cheaper alternative to higher education, many students, including first-generation students, still struggle with managing the cost of college. Longwell-Grice et al. (2016) examined the perceptions of first-generation students toward college enrollment and their first-year experience and documented that money was commonly viewed by students as a barrier. Often, first-generation students qualify for various forms of financial aid to assist with financial difficulties but encounter other problems. McKinney and Novak (2015) indicated that many first-year students do not submit or submit late the free application for federal student aid, resulting in the loss or lowering of federal financial aid. Longwell-Grice et al. (2015) noted that financial aid, when present, frequently was not sufficient to cover all expenses, especially non-academically-related expenses, such as transportation, food, and rent. Associated with these financial issues, first-generation students were more likely to enroll in community colleges on a part-time basis (Ampaw et al., 2015).

Considering the financial difficulties many students, such as first-generation students, encounter and the lack or insufficiency of financial aid, many students work while enrolled in community colleges. The need to work while enrolled in community college might be a substantial reason why part-time student enrollment is high. Part-time enrollment of community colleges students has increased over the past few decades due, in

part, to more students working while enrolled in college (Cohen et al., 2014; Fike & Fike, 2008). According to the American Association of Community Colleges (2018), 63% of students who enrolled in community colleges during the fall 2016 semester were enrolled as part-time students. Moreover, Ma and Baum (2016) determined that 71% of part-time students who were enrolled in public, 2-year institutions were employed, with 38% of these students working full-time. The large number of students who worked while enrolled in college often resulted in increased difficulties balancing personal and academic responsibilities (Harlow & Bowman, 2016). Lee (2017) discussed that students prioritized work duties over academic duties and that students were not willing to decrease their income to enroll or to remain in college. These financial and work-school balance difficulties might influence community college student enrollment, persistence, and completion rates. Part-time students exhibited lower persistence rates and higher dropout rates when compared to full-time students (Ampaw et al., 2015; Harlow & Bowman, 2016; Klempin, 2014; Lee, 2017; Sanchez, Lowman, & Hill, 2018).

Financially-related and work-related issues might not be the only reasons why part-time student enrollment has increased and continues to be high in community colleges. In addition to work-related concerns, many students who enroll in community colleges experience other obligations, such as familial dependents, lack of academic skills (e.g., time management, lack of confidence), and lack of academic expectations (Ampaw et al., 2015; Lee, 2017). In a recent investigation, Lee (2017) analyzed specific challenges and barriers that part-time students perceived when enrolled in community colleges. Lee documented that in addition to financial barriers, part-time students often experienced academic and personal challenges. Such academic and personal barriers expressed by the part-time students included a decreased sense of belonging on campus, conflicts between work schedule and limited course offerings, unfamiliarity with academic policies, and difficulties with time management. Specifically, Lee (2017) established that 83% of part-time students identified the inability to balance personal responsibilities and academic responsibilities as a major challenge when enrolled in community college.

Another potential factor that has resulted in the increase in part-time student enrollment at community colleges is gender. Cohen et al. (2014) determined that female student enrollment has increased and this increase in female enrollment, in part, has led to an increase in part-time enrollment. From 2000 to 2016, female student enrollment in community colleges increased by 30% (National Center for Education Statistics, 2017) and in the fall 2016 semester, female students represented more than one half of the student population in both national and Texas community colleges (American Association of Community Colleges, 2018; Texas Higher Education Coordinating Board, 2017). Academically, female students often exhibit higher GPAs, higher completion and graduation rates, and greater coping skills when compared to males enrolled in community colleges (Heller & Cassady, 2017; Juszkiewicz, 2017). However, female students tend to

have more factors unrelated to academic variables that force them to enroll part-time. Heller and Cassady (2017) addressed the perceived challenges and barriers of first-year male and female community college students. They established that females identified higher levels of academic anxiety and perceived barriers compared to males and that females identified family concerns as their primary concern whereas males indicated work was their primary barrier. In their study, females described increased barriers involving family issues, such as health of dependents, childcare, and family responsibilities than was described by males (Heller & Cassady, 2017).

In an effort to ameliorate some of the difficulties these first-time-in-college, part-time students encounter and to support these students, Texas enacted two educational programs. Closing the Gaps by 2015: The Texas Higher Education Strategic Plan (Closing the Gaps), an educational initiative between the 2000 and 2015 academic years, sought to enhance student participation rates and to improve student completion rates in Texas higher education institutions (Texas Higher Education Coordinating Board, 2005). One aspect of this initiative was focused on ensuring the affordability of higher education in Texas by providing more grants and scholarships based on financial need and by monitoring tuition and fees at postsecondary institutions to avoid deterring student enrollment. Building on Closing the Gaps, Texas Higher Education Strategic Plan: 2015–2030: 60x30TX (60x30) is a Texas educational initiative to increase student completion rates in postsecondary institutions to 60% by 2030 (Texas Higher Education Coordinating Board, 2015). Although the primary goal of 60x30 is to increase student completion, another important aspect of this program is to limit student loan debt. Considering the financial instability that many students encounter, particularly first-time-in-college and part-time students, these educational approaches might have improved student completion.

### *Statement of the Problem*

As previously discussed, part-time students comprise a substantial portion of students who enroll in community colleges and a considerable percentage of these part-time students are employed because of issues surrounding the affordability of college. Often, low-income students enroll in community colleges due to lower tuition and fees compared to 4-year institutions, yet these students still struggle to afford both college and personal expenses, requiring these students to work (Ma & Baum, 2016). As Lee (2017) mentioned, for part-time students, the income provided by their employment was more important and took precedence over enrolling and persisting in community college. Given these financial difficulties, financial aid could play a major role in facilitating part-time student enrollment and assisting their success once enrolled. However, many part-time, community college students encounter difficulties associated with financial aid, in particular, applying for financial aid and receiving enough financial aid. McKinney and Novak (2014) discussed that many low-income students who qualified for financial aid did not complete the free application for federal student aid. Ma and Baum (2016) indicated that community college students who had the greatest financial need, often, were less likely to apply for financial aid. Even when part-time students apply for financial aid, frequently the financial aid is

unavailable or insufficient to support all costs associated with an individual student. As part-time students enroll in fewer credit hours, often, they do not qualify for the full amount of federal financial aid, which requires a student be enrolled for 12 credit hours per semester (Klempin, 2014). Therefore, the amount of financial aid available for part-time students is limited. Moreover, even if part-time students receive enough financial aid to cover all academically-related expenses, this financial aid, often, does not completely cover personal expenses, causing the student to work. As Longwell-Grice et al. (2016) affirmed, financial aid often did not cover expenses associated with college, such as transportation and rent.

The lack of applying for financial aid, the lack of sufficient financial aid to cover all expenses, and the need to work by part-time students might influence their enrollment and completion rates. Part-time students have exhibited higher rates of attrition and lower rates of graduation compared to full-time students often due to multiple conflicting obligations, such as work and family (Ampaw et al., 2015; Natale & Jones, 2017). Further, Juszkiewicz (2017) reported that part-time students enrolled in community colleges had a completion rate of 20.4% and first-time-in-college, part-time students had an even lower completion rate of 17.0%. She further determined that part-time students who did not complete were likely to re-enroll but at a different institution. Therefore, by analyzing the enrollment trends of first-time-in-college, part-time students, educational administrators and policymakers could establish the effectiveness of current educational measures to assist and promote student completion at community colleges and to provide an affordable education at community colleges.

### *Purpose of the Study*

The purpose of this investigation was to determine the percentages of male and female first-time-in-college students who were enrolled part-time in Texas community colleges. Specifically, the changes among male and female first-time-in-college, part-time students who were enrolled in Texas community colleges in the 2003-2004 academic year through the 2018-2019 academic year were identified. Analyses were performed to ascertain the extent to which the enrollment percentages of female and male Texas community college first-time-in-college, part-time in college students had changed between the 2003-2004 and the 2018-2019 academic years.

### *Significance of the Study*

Given the substantial number of part-time students who enroll in community colleges and the poor completion rates among these students, particularly first-time-in-college, part-time students, examining the effectiveness of educational policies that guide community college practices toward first-time-in-college, part-time students should be investigated. Texas policies, such as Closing the Gaps and 60x30, were designed to increase student enrollment and completion, yet community college completion rates continue to be low, especially among part-time students. McKinney and Hagedorn (2017) indicated that the success of these educational initiatives will rely heavily on the improvement of student success at community colleges because more than one half of students enrolled Texas postsecondary institutions are attending community colleges. Therefore, the thorough

examination of these programs might identify effective practices to increase student enrollment and completion as well as ineffective strategies that might hinder student enrollment and completion in Texas community colleges. Through the identification of successful measures and practices, community college administrators and state legislators can design and implement new educational initiatives to support and improve student success further.

Moreover, community colleges are under additional pressure to increase student success rates because of recent legislation that ties state funding to student success (Natale & Jones, 2018). In 2013, Texas endorsed a performance-based funding model for postsecondary institutions, including community colleges, which apportioned 10% of funding on the outcomes of certain student performance metrics (McKinney & Hagedorn, 2017; Natale & Jones, 2018). Some of the metrics that determine institutional funding are: completing developmental courses, achieving semester hour benchmarks (e.g., 15 hours, 30 hours), and attaining a degree or certificate (McKinney & Hagedorn, 2017). Considering the consequence of student performance on funding and the importance to demonstrate to lawmakers and the general public the validity and worth of community colleges, administrators should identify and implement effectual strategies to assist student enrollment, persistence, and graduation rates.

### *Research Questions*

The research questions addressed in this investigation were (a) What is the gender diversity of Texas community college first-time-in-college, part-time students?; (b) What is the difference in the enrollment percentages of Texas female community college first-time-in-college, part-time students between the 2003-2004 and the 2011-2012 academic years, between the 2011-2012 and the 2018-2019 academic years, and between the 2003-2004 and the 2018-2019 academic years?; (c) What is the difference in the enrollment percentages of Texas male community college first-time-in-college, part-time students between the 2003-2004 and the 2011-2012 academic years, between the 2011-2012 and the 2018-2019 academic years, and between the 2003-2004 and the 2018-2019 academic years?; (d) What trends were present in the gender diversity of first-time in college part-time students enrolled in Texas community college first-time-in-college, full-time students in the 2003-2004 through the 2018-2019 academic years?; and (e) Which community colleges exhibited the greatest percent differences in first-time-in-college, part-time students between the 2003-2004 academic year and the 2018-2019 academic year? The first research question was repeated for the 2003-2004 through the 2018-2019 academic years whereas the remaining research questions, with the exception of the trends questions, were addressed for three academic year comparisons. The trend questions involved all 16 academic years of data.

# METHOD

## *Research Design*

A non-experimental, causal-comparative research design was used for this empirical investigation (Creswell & Creswell, 2018; Johnson & Christensen, 2017). An archival dataset was examined to ascertain the degree to which differences might be present in the percentages of male and female, first-time-in-college, part-time students at Texas community colleges. Because both the independent variable and the dependent variables had occurred previously, other variables that might have been present and that might have influenced the dependent variable could not be examined in this study (Creswell & Creswell, 2018).

The particular academic years in which male and female students were enrolled in Texas community colleges were the independent variable in this empirical study. Data were analyzed for the 2003-2004 through the 2018-2019 academic years. In this investigation, the dependent variables were the percentages of student enrollment who were male and the percentages of student enrollment who were female students and who were enrolled in Texas community colleges during this period. Only data on students who were first-time-in-college, part-time students enrolled in Texas community colleges were analyzed from the 2003-2004 through the 2018-2019 academic years.

## *Participants and Instrumentation*

Participants in this study were first-time-in-college, part-time students who enrolled in a Texas community college between the 2003-2004 and the 2018-2019 academic years. Archival data for all Texas community colleges were acquired from the Texas Higher Education Coordinating Board Interactive Accountability System for these academic years. Individual community colleges report all data, such as student enrollment numbers, student enrollment status (i.e., full-time, part-time, and both) and student demographic information, obtained from the Texas Higher Education Coordinating Board. These data compiled by the Texas Higher Education Coordinating Board were publicly available through the Texas Higher Education Coordinating Board Interactive Accountability System. A total of 16 years of data were examined for this study.

## *Data Analysis*

The Texas Higher Education Coordinating Board links gender and enrollment status of students with the academic year and with first-time-in-college status, therefore paired samples t-tests were used in this study. Parametric paired sample t-tests were determined to be appropriate because the majority of the underlying assumptions for this inferential statistical procedure were met (Slate & Rojas-LeBouef, 2011). Results will now be reported by research question.

## RESULTS

### *Results for Research Question One*

To answer the first research question, "What are the enrollment percentages of male and female first-time-in-college, part-time students in Texas community colleges from the 2003-2004 academic year through the 2018-2019 academic year?" descriptive statistics were calculated. As revealed in Tables 1 and 2, part-time male and female enrollment percentages over this 16-year period were quite consistent. The part-time, male, first-time-in-college Texas community college enrollment rates ranged from a low of 42.51% in the 2003-2004 academic year to a high of 46.48% in the 2009-2010 academic year. Accordingly, the part-time, male enrollment of first-time-in-college Texas community college students varied by only 3.97 percentage points in this 16-year period. The part-time, female, first-time-in-college Texas community college enrollment rates ranged from a low of 53.52% in the 2009-2010 academic year to a high of 57.49% in the 2003-2004 academic year. As such, the part-time, female enrollment of first-time-in-college Texas community college students varied by only 3.97 percentage points in this 16-year period.

Table 1

*Descriptive Statistics for Texas Male, Part-time, First-Time-in-College Students Community College Students Between the 2003-2004 and 2018-2019 Academic Years*

| Academic Year | *n* of community colleges | *M*% | *SD*% |
|---|---|---|---|
| 2003-2004 | 69 | 42.51 | 6.32 |
| 2004-2005 | 69 | 44.93 | 7.03 |
| 2005-2006 | 69 | 44.26 | 5.84 |
| 2006-2007 | 69 | 45.21 | 6.44 |
| 2007-2008 | 70 | 44.78 | 7.94 |
| 2008-2009 | 70 | 45.40 | 8.60 |
| 2009-2010 | 71 | 46.48 | 8.42 |
| 2010-2011 | 71 | 45.81 | 6.96 |
| 2011-2012 | 71 | 44.12 | 7.85 |
| 2012-2013 | 72 | 44.15 | 6.58 |
| 2013-2014 | 72 | 45.12 | 6.17 |
| 2014-2015 | 72 | 44.87 | 7.02 |
| 2015-2016 | 72 | 45.74 | 6.15 |

| | | | |
|---|---|---|---|
| 2016-2017 | 72 | 46.26 | 7.66 |
| 2017-2018 | 72 | 44.13 | 7.56 |
| 2018-2019 | 72 | 43.42 | 7.50 |

Table 2

*Descriptive Statistics for Texas Female, Part-time, First-Time-in-College Students Community College Students Between the 2003-2004 and 2018-2019 Academic Years*

| Academic Year | *n* of community colleges | *M%* | *SD%* |
|---|---|---|---|
| 2003-2004 | 69 | 57.49 | 6.32 |
| 2004-2005 | 69 | 55.07 | 7.03 |
| 2005-2006 | 69 | 55.74 | 5.84 |
| 2006-2007 | 69 | 54.79 | 6.44 |
| 2007-2008 | 70 | 55.22 | 7.94 |
| 2008-2009 | 70 | 54.60 | 8.60 |
| 2009-2010 | 71 | 53.52 | 8.42 |
| 2010-2011 | 71 | 54.19 | 6.96 |
| 2011-2012 | 71 | 55.88 | 7.85 |
| 2012-2013 | 72 | 55.85 | 6.58 |
| 2013-2014 | 72 | 54.88 | 6.17 |
| 2014-2015 | 72 | 55.13 | 7.02 |
| 2015-2016 | 72 | 54.26 | 6.15 |
| 2016-2017 | 72 | 53.74 | 7.66 |
| 2017-2018 | 72 | 55.87 | 7.56 |
| 2018-2019 | 72 | 56.58 | 7.50 |

### *Results for Research Question Two*

To answer the second research question, "What is the difference in the enrollment percentages of Texas female community college first-time-in-college, part-time students between the 2003-2004 and the 2011-2012 academic years, between the 2011-2012 and the

2018-2019 academic years, and between the 2003-2004 and the 2018-2019 academic years?", three paired samples t-tests were calculated. For the 2003-2004 and 2011-2012 academic year comparisons, a statistically significant difference was revealed in part-time, female enrollment percentages, t(68) = 1.97, p = .05. The difference represented a small effect size (Cohen's d) of 0.22 (Cohen, 1988). A statistically significantly lower enrollment rate was present for Texas part-time, female, first-time-in-college students in the 2003-2004 academic year, 57.49%, than in the 2011-2012 academic year, 55.93%, a difference of 1.56%. Between the 2011-2012 and 2018-2019 academic years, a statistically significant difference in part-time, female enrollment percentages, t(69) = -0.70, p = .49, was not present. In the 2011-2012 and the 2018-2019 academic years, the enrollment rates of Texas part-time, female, first-time-in-college students were 55.94% and 56.73%, respectively. Lastly, between the 2003-2004 and 2018-2019 academic years, a statistically significant difference was not present in Texas part-time, female enrollment percentages, t(67) = 0.90, p = .37. Part-time, female enrollment percentages were 57.64% and 56.70% in the 2003-2004 and 2018-2019 academic years, respectively. Table 3 contains the descriptive statistics for these analyses.

Table 3

*Descriptive Statistics for Texas Female, Part-time, First-Time-in-College Students Community College Students for the Beginning Point, Midpoint, and Ending Points*

| Academic Year | *n* of community colleges | *M%* | *SD%* |
|---|---|---|---|
| 2003-2004 | 69 | 57.49 | 6.32 |
| 2011-2012 | 70 | 55.94 | 7.88 |
| 2018-2019 | 68 | 56.70 | 7.52 |

### *Results for Research Question Three*

Regarding the third research question, "What is the difference in the enrollment percentages of Texas male community college first-time-in-college, part-time students between the 2003-2004 and the 2011-2012 academic years, between the 2011-2012 and the 2018-2019 academic years, and between the 2003-2004 and the 2018-2019 academic years?", three paired samples t-tests were calculated. For the 2003-2004 and 2011-2012 academic year comparisons, a statistically significant difference was yielded in part-time, male enrollment percentages, t(68) = -1.97, p = .05. The effect size (Cohen's d) was small, 0.22 (Cohen, 1988). A statistically significantly higher enrollment rate was present for Texas part-time, male, first-time-in-college students, 42.51%, in the 2003-2004 academic year than in the 2011-2012 academic year, 44.07%, a difference of 1.56 percentage points. Between the 2011-2012 and 2018-2019 academic years, a statistically significant difference in part-time, male enrollment percentages, t(69) = 0.70, p = .49, was not present. In the 2011-2012 and the 2018-2019 academic years, the enrollment rates of Texas full-time, male, first-time-in-college students were 44.06% and 43.27%, respectively. Lastly, between the 2003-2004 and 2018-2019 academic years, a statistically significant difference was not present in Texas part-time, male enrollment percentages, t(67) = -0.90, p = .37. Part-time, male enrollment percentages were

42.36% and 43.30% in the 2003-2004 and 2018-2019 academic years, respectively. Revealed in Table 4 are the descriptive statistics for these analyses.

Table 4

*Descriptive Statistics for Texas Male, Part-time, First-Time-in-College Students Community College Students for the Beginning Point, Midpoint, and Ending Points*

| Academic Year | *n* of community colleges | *M%* | *SD%* |
|---|---|---|---|
| 2003-2004 | 69 | 42.51 | 6.32 |
| 2011-2012 | 70 | 44.06 | 7.88 |
| 2018-2019 | 68 | 43.30 | 7.52 |

### *Results for Research Question Four*

In reference to the fourth research question, "What trends were present in the gender diversity of first-time-in-college, part-time students enrolled in Texas community college first-time full-time students in the 2003-2004 through the 2018-2019 academic years?", descriptive statistics were calculated. Depicted in Figure 1 are the enrollment trends over time of male and female, part-time, first-time-in-college Texas community college students for the 2003-2004 academic year through the 2018-2019 academic year. Part-time, first-time-in-college, female enrollment rates were slightly higher than part-time, first-time-in-college, male enrollment rates for every academic year. Both male and female enrollment rates over time remained relatively consistent over the 16-year span.

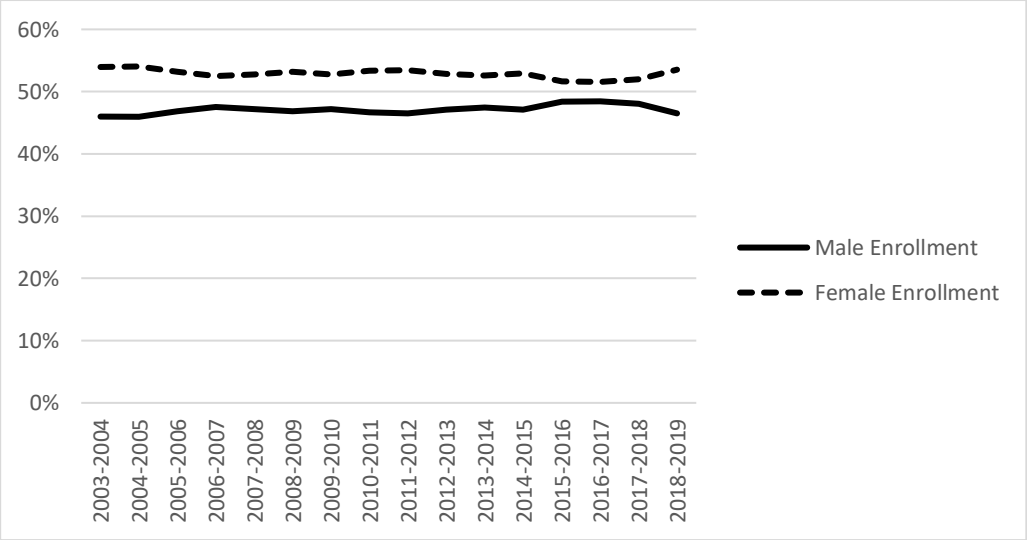


Figure 1.

*Total enrollment rates of male and female, part-time, first-time-in-college Texas community college students for the 2003-2004 academic year through the 2018-2019 academic year.*

### *Results for Research Question Five*

To answer the fifth research question, "Which community colleges exhibited the greatest percent differences in first-time-in-college, part-time students between the 2003-2004 academic year and the 2018-2019 academic year?", descriptive statistics were calculated separately for male and female students. As revealed in Table 5, Southwest Collegiate Institute for the Deaf had the greatest percent increase of 44% for male, first-time-in-college, part-time enrollment in Texas community colleges, between the 2003-2004 academic year and the 2018-2019 academic year. Following Southwest Collegiate Institute for the Deaf were Trinity Valley Community College (15%) and Southwest Texas Junior College (14%).

Table 5

*Descriptive Statistics of the Top Ten Texas Community Colleges with the Greatest Increase in Texas Male, Part-time, First-Time-in-College Students Between the 2003-2004 and 2018-2019 Academic Years*

| Texas Community College | *M*% Change |
|---|---|
| Southwest Collegiate Institute for the Deaf | 44.0 |
| Trinity Valley Community College | 15.0 |
| Southwest Texas Junior College | 14.0 |
| Alvin Community College | 10.0 |
| Texas Southmost College | 10.0 |
| Dallas County Community College-Cedar Valley College | 9.0 |
| Blinn College District | 9.0 |
| Ranger College | 8.0 |
| San Jacinto College–North Campus | 7.0 |
| Navarro College | 7.0 |

For female, first-time-in-college, part-time enrollment in Texas community colleges, Western Texas College had the greatest percent increase of 22% from the 2003-2004 academic year to the 2018-2019 academic year. Coastal Bend College (16%) and Victoria College (14%) were second and third respectively. Table 6 contains the descriptive statistics.

Table 6

*Descriptive Statistics of the Top Ten Texas Community Colleges with the Greatest Increase in Texas Female, Part-time, First-Time-in-College Students Between the 2003-2004 and 2018-2019 Academic Years*

| Texas Community College | *M*% Change |
|---|---|
| Western Texas College | 22.0 |
| Coastal Bend College | 16.0 |
| Victoria College | 14.0 |
| Panola College | 13.0 |
| Angelina College | 12.0 |
| Northeast Texas Community College | 9.0 |
| South Plains College | 8.0 |
| Del Mar College | 8.0 |
| Weatherford College | 8.0 |
| Tyler Junior College | 8.0 |

## DISCUSSION

In this multiyear statewide study, enrollment rates for male and female, first-time-in-college students enrolled part-time in Texas community colleges from the 2003-2004 academic year through the 2018-2019 academic year were reviewed. For 16 academic years, the enrollment rates for both male and female, part-time, first-time-in-college students changed by 3.97 percentage points. In the 2003-2004 academic year, part-time male, first-time-in-college students enrollment rates reached a low of 42.51% and in the 2009-2010 academic year a high of 46.48%. Enrollment rates for part-time female, first-time-in-college students in Texas community college were lowest in the 2009-2010 academic year (53.52%) and highest in the 2003-2004 academic year (57.49%). Overall, enrollment rates were relatively unchanged for both male and female, part-time, first-time-in-college students enrolled in Texas community colleges.

A statistically significant difference ($p = .05$) was determined for the enrollment rates of both male and female, part-time, first-time-in-college students enrolled in Texas community colleges between the 2003-2004 academic year and the 2011-2012 academic year. However, enrollment rates for all other years were quite consistent and did not result in any statistically significant differences. Over the 16 academic years, enrollment rates increased by 0.91 percentage points for part-time male, first-time-in-college students at Texas community colleges. During the same timeframe, enrollment rates decreased by 0.91 percentage points for part-time female, first-time-in-college students at Texas community

colleges. Enrollment rates for part-time male, first-time-in-college students at Texas community colleges averaged 44.82% over the 16 academic years and for part-time female, first-time-in-college students at Texas community colleges averaged 55.18% over the 16 academic years.

### *Connections with Existing Literature*

Enrollment rates for part-time, male and female, first-time-in-college students were fairly consistent between the 2003-2004 academic year and the 2018-2019 academic year, as revealed by the findings of this multiyear, statewide investigation. Part-time female, first-time-in-college enrollment rates were higher than part-time male, first-time-in-college students who enrolled in Texas community colleges and these results were congruent with the findings of other researchers (American Association of Community Colleges, 2018; Ampaw et al., 2015; Cohen et al., 2014; Texas Higher Education Coordinating Board, 2017). According to Ampaw et al. (2015) observed that male, first-time-in-college students exhibited lower enrollment rates in community colleges than female, first-time-in-college students. Additionally, Cohen et al. (2014) noted that female students who enrolled in community colleges were more likely to enroll part-time than full-time when compared to male students. Heller and Cassady (2017) reported that first-year, female students frequently perceived more barriers than male first-year students enrolled in community colleges leading to higher part-time enrollment by female students. Lastly, the Texas Higher Education Coordinating Board (2017) determined that more than half of part-time student enrollment in Texas community colleges were female students. As revealed by the findings of this study, the enrollment rates of part-time female students in Texas community colleges averaged 55.18%.

### *Implications for Policy and for Practice*

Several implications for policy and practice can be made based upon the findings of this multiyear, statewide investigation, in which the enrollment rates of part-time male and female, first-time-in-college students in Texas community colleges were determined. From the 2003-2004 academic year to the 2018-2019 academic year, part-time, male and female, first-time-in-college student enrollment rates over remained mostly unchanged. First, community colleges should examine current strategies for the recruitment and enrollment of part-time, first-time-in-college students. Lee (2017) noted that part-time students often experienced greater difficulty transitioning into community college than full-time students. Therefore, community colleges should provide additional support and resources to part-time students to help ease this transition and provide professional development and training to college employees in departments, such as advising, financial aid, and faculty, who frequently interact with part-time students. Second, community colleges should work to ameliorate the effects of non-academic barriers, such as childcare, food insecurity, and transportation difficulties, as these barriers often prevent students from enrolling in community colleges or remaining enrolled in community colleges (Heller & Cassady, 2017; Lee, 2017).

Third, given that part-time enrollment is associated with lower success and persistence rates (Juszkiewicz, 2017; Klempin, 2014), policymakers and community college administrators need to identify meaningful and specific interventions to support and retain part-time students. Fourth, community colleges should determine methods to increase the engagement and integration of part-time students into the academic environment. Lee (2017) reported that part-time, community college students identified a lack of connection and belonging as a serious challenge to their education. Therefore, measures should be developed and implemented to better incorporate part-time students into the community college environment, as well as encourage a sense of belonging within in the community college. Finally, community colleges should work to develop degree plans and course schedules that accommodate part-time student schedules. Part-time community college students reported a lack of options, regarding courses and degree plans (Lee, 2017) and community college administrators should be cognizant of part-time student availability when building course schedules.

### *Recommendations for Future Research*

Based upon the findings of this Texas, statewide investigation, various recommendations for future research can be made regarding the enrollment rates of part-time, male and female, first-time-in-college students. First, given that only data from Texas community colleges were examined for this investigation, researchers should determine if other states have similar enrollment rates. Due to this study being based solely on Texas community college, part-time, first-time-in-college students, the degree to which the findings would be generalizable to part-time, first-time-in-college students in other states is unclear. Second, further investigation is needed in regard to the enrollment rates of part-time, first-time-in-college students at 4-year postsecondary institutions. In this study, only community college enrollment rates of part-time male and female, first-time-in-college students were determined. Therefore, the extent to which the findings would be generalizable to 4-year institutions is unknown. Third, researchers are encouraged to examine the enrollment rates of part-time male and female students who are not first-time-in-college students to determine if any connections exist between these two groups. Fourth, further research is recommended into the influence of other factors, such as race/ethnicity, age, and employment status, on part-time male and female, first-time-in-college enrollment rates. Given that in this investigation, only the influence of gender on the enrollment rates of part-time, first-time-in-college students were examined, the degree to which these other characteristics might affect enrollment rates in Texas community colleges is unknown. Finally, investigators should conduct studies using mixed methods and/or qualitative research to ascertain underlying causes for the enrollment rates of part-time, first-time-in-college students and to provide further information to aid policymakers in future decisions.

## CONCLUSION

In this multiyear, statewide analysis, Texas community college enrollment rates were analyzed for the 2003-2004 academic year through the 2018-2019 academic years for part-time, male and female, first-time-in-college students. Inferential statistical analyses

revealed a statistically significant increase for part-time male, first-time-in-college students between the 2003-2004 academic year and the 2011-2012 academic year. Furthermore, a statistically significant decrease was revealed in the enrollment rates of part-time female, first-time-in-college students between the 2003-2004 academic year and the 2011-2012 academic year. However, other than these two academic years, no statistically significant difference occurred. Part-time male, first-time-in-college students had enrollment rates consistently around 43.29% during the 16 academic years whereas part-time female, first-time-in-college students at Texas community colleges remained fairly constant around 56.71%. Also identified in this article were the Texas community colleges that exhibited the greatest increase in enrollment rates for male and female, part-time, first-time-in-college students over the 16-year period. Southwest Collegiate Institute for the Deaf had the greatest increase in enrollment rates of part-time male, first-time-in-college students, increasing by 44.0% between the 2003-2004 academic year and the 2018-2019 academic year. Western Texas College had the greatest increase in enrollment rates of female, part-time, first-time-in-college students, increasing by 22.0% between the 2003-2004 academic year and the 2018-2019 academic year.

In examining the enrollment rates of part-time, male and female, first-time-in-college students in Texas community colleges over time, the effectiveness of Texas educational policies remains unclear. Statewide educational initiatives, such as Closing the Gaps and 60x30, were designed, at least in part, to increase enrollment rates of first-time-in-college students. Further investigation is needed to determine which approaches were successful in supporting part-time, first-time-in-college student enrollment and which methods were ineffectual in increasing part-time, first-time-in-college student enrollment.

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Research Article

# The COVID-19 Pandemic, its Consequences, and the Recovery: Implementation of Disaster Education and Management is Key to the Schooling of Children with Disabilities

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**Abstract:**

*COVID-19 pandemic has eroded gains towards Kenya Vision 2030's poverty eradication goal by denying Kenyan children and youth with disabilities access to (quality) education. Situational analysis on the impact of COVID-19 pandemic on education of primary and secondary school-age individuals from March 2020 to December 2020 reveal that the education opportunities for learners with disabilities remained unpredictable as the disease ravaged communities to the end of the year. Learners with disabilities fell behind academically after school closure and COVID-19 related biases predisposed them to academic failure and failed adulthood. Then, the implementation of disaster education and recovery plans are overdue and must intentionally target education of children and youth with disabilities.*

**Keywords:** Disasters, pandemics, COVID-19, Kenya, Africa, disability, education, infrastructure

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## INTRODUCTION

In 2000 the United Nations (UN) set eight Millennium Development Goals (MDGs) to be achieved by 2015 and then on September 25, 2015 MDGs were replaced by seventeen Sustainable Development Goals (SDGs) to be achieved by the year 2030. SDGs include Goal 1 End Poverty and Goal 4 Quality Education. The SDGs align with the 2008 Kenya Vision 2030 poverty eradication and universal education goals (KNBS, 2019; Mulinya & Orodho, 2015). Driven by MDGs and now SDGs (United Nations Educational, Scientific and Cultural Organization [UNESCO], n.d.b), Kenya has heavily invested in education since 2003 to improve the literacy rates and quality of life of her citizens, including those with disabilities (Kiru, 2019; Leonard Chesire, 2019). The 2030 SDGs require countries to commit to the inclusion of people with disabilities to achieve the "world's globally agreed plan for peace and prosperity for all on a healthy planet" (UN, 2019, p.i.). However, the COVID-19 pandemic and the resultant nationwide lockdown, school closures, economic recession (IMF, 2020b), and the prevalent stigma (Malplat, 2020) are quickly eroding these gains and potentially condemning children and youth with disabilities (hereby referred to as children with disabilities unless otherwise stated) to failed adulthood.

For decades, children with disabilities have experienced harm due to barriers related to biased cultural practices (Kiru, 2019; Ohba & Malenya, 2020), mismanagement of limited resources (Transparency International, 2020; Winters et al., 2017), and disasters such as droughts and floods (Ayugi et al., 2020; Willett & Sears, 2018), infectious diseases such as cholera (Okaka & Odhiambo, 2018), and terrorism (Krause & Otenyo, 2006). Considering present and future damages to the wellbeing of learners with disabilities, this paper examines the consequences of the COVID-19-induced school closures (March-December 2020) on the wellbeing of Kenyan children with disabilities. The purpose of this research is to identify the impact of COVID-19 on the schooling of learners with disabilities by examining the interactions of micro and macro factors that influence the education of children with disabilities. The aim is to delineate factors responsible for the inaccessibility of education in the COVID-19 era, and to support the development of disaster education and intervention and recovery programs that will facilitate quality schooling of learners with disabilities and successful life in adulthood.

This article is guided by the question: How has school closure between March 2020 and December 2020 impacted schooling of children with disabilities in Kenya?

### *Literature Review*

#### Population of Students with Special Needs in Kenya

The introduction of universal primary and secondary education and the emphasis on quality accessible tertiary education have led to increased school enrollment (Kiru, 2019; Ngugi et al., 2015; Ohba & Malenya, 2020). Still, that population remain erratic as shown in Table 1. Kenya's population was 48 million as per the 2019 census data (Kenya National

Bureau of Statistics [KNBS], 2019), which translates to 7.2 million Kenyans with disabilities (based on the 15% population estimate designated by the World Health Organization [WHO], n.d.a). As of 2019 there were 3.3 million children in pre-primary school, 10 million in primary school, 3.4 million in secondary school, 500,000 youth in middle-level colleges, and 471,000 pursuing university education. The 2014 survey by the Ministry of Education, Science and Technology (MoEST) in partnership with Volunteer Service Overseas (VSO) and Department for International Development (DFID) that covered 22 counties of the 47 showed the prevalence of disability among children ages 3–24 as 13.5%. Then MoEST through the Kenya Institute of Special Education conducted a national survey on children with disabilities and special needs in education from September 2016 to June 2017. The survey findings showed 11.4% disability prevalence of children with special needs ages 3-21 (Kenya Institute of Special Education [KISE] 2018).

Table 1.

*Disability Prevalence in Kenya*

| Items | 2019 Census Total Kenya Population in millions | Total Disabled Population in millions, based on 15% WHO Estimate | Total Disabled Population ages 3-24 in millions, based on 13.5% MoEST&VSO Estimate | Total Disabled Population ages 3-24 in millions, based on 11.4% MoEST Estimate |
|---|---|---|---|---|
| Kenya total population | 48 | 7.2 | -- | -- |
| Total Student Population in pre-primary school through high school | 18 | 2.7 | 2.43 | 2.05 |
| a) Pre-primary school | 3.3 | 0.5 | 0.45 | 0.38 |
| b) Primary school | 10 | 1.5 | 1.35 | 1.14 |
| c) Secondary school | 3.4 | 0.5 | 0.46 | 0.39 |
| d) Middle-level colleges | 0.5 | 0.08 | 0.07 | 0.06 |
| e) University education | 0.47 | 0.07 | 0.06 | 0.05 |

Even though there was about 2.4 m children with disabilities in pre-primary school through secondary school (depending on the disability prevalence rate calculator), in reality, however, less than 5% of school age children with disabilities access school or receive quality

education according to the VSO and MoEST Report of 2014 and KISE Report of 2018. This is happening at a time when the Persons with Disabilities Act of Kenya 2003, the 2010 Constitution of Kenya the Convention on the Rights of the Child (CRC 1989), the UN Convention on the Rights of Persons with Disabilities (UNCRPD, 2006), and the Basic Education Act 2013 prohibit disability-based discrimination and guarantee citizens with disabilities the right to education (Republic of Kenya, 2010). Unfortunately, this is also happening when there is increased prevalence of disasters. Sadly, most children with disabilities have limited access to basic needs and efficient infrastructure (KNBS, 2019; Leonard Chesire, 2019) to endure disasters.

**Impact of Infectious Diseases on Communities**

In comparison to 30 years ago, the number of global disasters has increased, mostly due to climate change, and the list includes infectious diseases such as Ebola and Middle East respiratory syndrome (Braden et al., 2013; Chan, 2014; Okaka & Odhiambo, 2018) and drought, famine, plague, hurricanes, earthquakes, wildfires (Field et al., 2012). Other challenges include displacements due to wars and terrorism (Krause & Otenyo, 2005). Unfortunately, disasters have serious economic, political, social, cultural, and linguistic impacts on the communities affected, and so they cost countries billions of dollars in damages of infrastructure and expenditures to treat injuries and deaths (Field et al., 2012; Heymann et al., 2015; Shreve & Kelman, 2014; van der Keur et al., 2016). In 2019 and 2020, Kenya dealt with various disasters—including floods, a locust plague, and the coronavirus pandemic—that caused injuries, deaths, destruction of property, an economic recession, and the closure of schools (IMF, 2020b). However, the nationwide impact of the COVID-19 pandemic on education of school-age Kenyans with disabilities remains unknown.

Infectious diseases spread very rapidly among individuals when vectors either intentionally or unintentionally carry the disease from the epicenter to other regions of the world, often aided by the improved infrastructure, including transportation systems, that facilitates the increased mobility of people, thereby making it easier for infectious diseases to spread (Chan, 2014; Heymann et al., 2015). The rapidity by which infectious diseases spread across borders means that management requires both individual and collective health security protocols (Heymann et al., 2015). Individual health security measures involve personal initiatives to protect oneself from infectious diseases by moving to safe areas and using appropriate medical materials (where available, e.g., wearing masks) to protect oneself and one's neighbors. In contrast, collective health security involves a concerted approach aimed at addressing the global spread of infectious diseases, bringing together various national and international actors in designing and implementing prevention, treatment, and recovery plans. Individual and collective health security measures ensure the rapid detection of outbreaks and an equally rapid response for effective management of the disease (GHSA Preparation Task Force Team, 2015; Heymann et al., 2015).

Infectious diseases such as that caused by Ebola virus can be devastating to communities, including the medical community in a country with an inefficient healthcare system (Chan, 2014). The Ebola virus, which is found in animals, was first identified in humans in the Democratic Republic of Congo in 1976. Since then, there have been 11 sporadic outbreaks that have killed people mainly in Central Africa and West Africa. The most devastating outbreaks occurred in 2014 and 2016, which killed 11,000 people in Guinea, Sierra Leone, and Liberia (Chan, 2014). This attracted aid from across the globe after WHO declared Ebola to be a global pandemic. Besides affecting ordinary citizens, the disease also negatively impacted the medical community. Most medics from the global north who had contracted the Ebola virus while working in West Africa were repatriated to their home countries, where they received appropriate medical interventions in well-equipped hospitals with the necessary medication. Most recovered from the infection. In contrast, most West African medics who contracted the virus did not survive because many hospitals had a shortage of staff or equipment, including limited personal protective equipment (PPE), medication, electricity, and even water (Heymann et al., 2015). Thus, infectious diseases always have a devastating effect, particularly in low-income countries with less resourced healthcare systems (Heymann et al., 2015).

The outbreak of the bubonic plague, cholera, smallpox, and yellow fever in the 20th century encouraged the international community to come up with regulations to promote a global response capable of preventing the cross-border spread of infectious diseases (Centers for Disease Control and Prevention, n.d.; WHO, 1983). However, the outbreak of severe acute respiratory syndrome (SARS) in 2003 proved to the world that strong border control is not sufficient to tame infectious diseases that do not respect the border rules (Heymann et al., 2015). Current measures therefore require governments to share information immediately when an infectious disease arises to prevent its spread globally (WHO, 2005). However, this global health management framework has not been fully or equally implemented across all countries, thus predisposing other global communities to infectious diseases that occur in a specific region, as happened with the 2007 avian influenza virus outbreak in Indonesia (Braden et al., 2013; WHO, 2011) and the COVID-19 outbreak in Wuhan, China in 2019/2020. The collective approach may fail when, as in these cases, unwilling global partners do not share information, resulting in the spread of the infectious disease to other regions that are not at the epicenter. Previous failures by governments in sharing critical information about infectious diseases (e.g., in the case of avian influenza virus) have led to development of another health framework—equal sharing equal benefit—aimed at strengthening individual health and collective health security (WHO, 2011). Countries agreed on sharing information about the composition of diseases and available medication, including vaccines (Heymann et al., 2015). Nonetheless, the outbreak of the COVID-19 has revealed the shortcomings of these frameworks and the need for governments to iron out their differences and work on building trust to improve international response mechanisms to infectious diseases.

Despite the prevalence of disasters in Kenya, there is dearth of literature on disaster education geared towards children with disabilities and their families. Given that most Kenyans with disabilities live in poverty due to biased systems including education system (KISE, 2018; KNBS, 2019), the aim here is at understanding the impact of school closures on learners with disabilities to determine how best to improve their post-COVID-19 pandemic education and adult life.

## METHOD

This paper employs a situational analysis framework (Annan, 2005) to understand the Kenyan education system in the era of disasters. Situational analysis focuses on the style, ideology, and structure of an organization or system. To understand education situation of children with disabilities in Kenya, a comprehensive literature search was conducted using Elsevier, Google Scholar, and Springer Online Journals using a combination of keywords relating to disasters, plagues, floods, and pandemics in Kenya (e.g., cholera, delude). See Table 2. I narrowed down the search using the following sentences:

- 2019-2020 journal articles related to disasters, plagues, floods, and pandemics in Kenya
- 2019-2020 journal articles related to disasters, plagues, floods, and pandemics affecting Kenyans with disabilities
- 2019-2020 peer-reviewed journal articles related to pandemics affecting Kenya students with disabilities
- 2019-2020 peer-reviewed journal articles related to COVID-19 pandemic affecting Kenya students with disabilities

Studies that did not focus on the impacts of disasters in Kenya during 2019-2020 time frame were eliminated. This led to 14 relevant studies. Some of the gray literature that met specific inclusion criteria were included, such as that focused on disasters in Kenya.

Table 2

*Extant literature*

| Sources:<br><br>Using a combination of keywords relating to disasters, plagues, floods, and pandemics in Kenya | 2019-2020 journal articles related to disasters, plagues, floods, and pandemics in Kenya | 2019-2020 journal articles related to disasters, plagues, floods, and pandemics affecting Kenyans with disabilities | 2019-2020 journal articles related to disasters, plagues, floods, and pandemics affecting Kenya students with disabilities | 2019-2020 relevant journal articles related to disasters, plagues, floods, and pandemics and the impact on the education of learners with disabilities |
|---|---|---|---|---|
| Elsevier Online Journals | 685 | 178 | 67 | 6 |
| Google Scholar | 581 | 164 | 135 | 5 |
| Springer Online Journals | 630 | 146 | 94 | 3 |
| Total | 1,896 | 488 | 296 | 14 |

In addition to the desk-based review, virtual field research was performed (e.g., observations of teachers as they created virtual fieldwork experiences) (Cliffe, 2017) and data were collected from key informants through online and remote interactive interviews and focus group discussions with representatives of the disabled people's organizations (DPOs; ten people), government representatives from the Ministry of Education (two people), Ministry of Health (two people), and Ministry of Labour and Social Protection (one person), and representatives from non-governmental organizations (NGOs; three people) via zoom (Zoom Video Communications, Inc.), WebEx (Cisco Webex), and WhatsApp Messenger (depending on the interviewee application). See Table 3.

Table 3

*Virtual field research*

| Key informants: | |
|---|---|
| a) Disabled people's organizations | 10 |
| b) Ministry of Education | 2 |
| c) Ministry of Health | 2 |
| d) Ministry of Labour and Social Protection | 1 |
| e) Non-governmental organizations | 3 |
| Total | 18 |

Also, data collection involved document analyses (including big data reports from KNBS, International Telecommunication Union (ITU), National Council for Persons with Disabilities (NCPWD), UNESCO, United Nations Children's Fund [UNICEF], WHO, World Bank; a review of previous studies; and national and international e-media reports about Kenya published on social media—Facebook, and through national and international digital media organizations including radio (e.g., National Public Radio of America, Kenya Broadcasting Cooperation [KBC]), e-newspapers such as *Daily Nation, The Standards, the EastAfrican Standards*; observations of the evolving situations in Kenya, and personal experiences as a result of my schooling in Kenya (Ressa, 2009). As shown in Table 4. analysis of collected information revealed an array of difficulties which were categorized into two major barrier topics.

Table 4

*Mega effects of COVID-19 pandemic on education*

| Difficulties linked to: | Mega Learning Barriers |
|---|---|
| • Different systems of education<br>• inadequate infrastructure (e.g., internet, electricity)<br>• geographical challenges<br>• time differences | • Challenges in public and low-cost schools |
| • difficulty to teach STEM content online<br>• different curricula<br>• many subjects | • Challenges with the curricula and digital infrastructure<br>• |
| • lack of resources—computers<br>• different stakeholders with different interests<br>• lack of political will; | • Poverty in households with children with disabilities |
| • computer illiteracy/lack/limited skills<br>• home challenges<br>• limited/lack of motivation | • Unfavorable home environment |
| • teachers, parents, and students fear, panic | • Fears and Uncertainties about the Future |

## FINDINGS

The study revealed that the COVID-19 pandemic has created a humanitarian crisis in Kenya that has significantly affected education of children with disabilities.

**Challenges in Public and Low-Cost Schools**

The unfortunate school closures on March 16, 2020, to contain the COVID-19 pandemic left millions of learners including those with disabilities at a disadvantage, and by December 31, 2020, it remained unclear when public schools will resume normal school calendar (Daily Nation Group, 2020; Waita & Njehia, 2020). The experiences of learners in public and low-cost private schools that mostly serve low-income families remained

unknown throughout the year. Analysis of e-newspapers (e.g., Daily Nation Group, 2020; The Standard) revealed that low-cost private schools such as Bridge International Academies that operated in 40 of the 47 Kenyan counties closed on the eve of the COVID-19 outbreak, and staff and teachers were placed on temporary compulsory leave without pay, eliminating their obligations to their learners. This is contrary to the happenings in high cost private schools. Interviews with ten representatives of the DPOs and analyses of documents (from various organizations such as UNESCO, UNICEF, WHO, World Bank, and media organizations including social media—Facebook, e-newspapers—Daily Nation, The Standards, the EastAfrican Standards) revealed that although learning was suspended in public schools, virtual learning at a number of upscale private schools went on. High-cost schools have international affiliations that make it easy to adopt curricula from other countries. They also do not need their online learning programs to be licensed by the Kenyan government, as is the case with public education. For instance, Brookhouse Schools offers the International General Certificate of Secondary Education, which is an English language-based examination similar to the General Certificate of Secondary Education in the United Kingdom. Even though some families questioned the quality and cost of online learning in these upscale private schools (Muthoni, 2020), students experienced an academic atmosphere that helped maintain their learning tempo. This trend caused panic among families who felt that children who attended public schools were being left behind by the education system, which has for a long time inadequately prioritized their needs.

**Challenges with the Curricula and Digital Infrastructure**

Interviews with representatives of DPOs and NGOs and Media reports (Peralta, 2020) revealed that public schools indicated that learners with and without disabilities spent most of their time on non-academic and unproductive and hurtful activities (e.g., teenage sex). Idling of learners prompted the government to take drastic measures to support virtual learning as it contemplated opening schools in 2021. On March 23, 2020, the Ministry of Education started broadcasting primary and secondary school lessons via the radio, television, and the Kenya Education Cloud throughout weekdays through the Kenya Institute of Curriculum Development (KICD, n.d.). KICD's EduTV Kenya, a production of Edu Channel TV, was available as a live stream and on-demand content on YouTube channels and covered classes in early childhood through high school. The KBC English Service radio program targeted learners in primary schools and covered multiple subjects, including English, Kiswahili and Fasihi, mathematics, science, hygiene and nutrition, Christian religious education, social studies, life skills, civic education, business studies, geography, biology, and agriculture. KICD also partnered with the Kenya Publishers Association to provide learners with free electronic copies of textbooks on the Kenya Education Cloud. In addition to the government's effort, some individuals and organizations based locally and abroad banded together to provide learners with education opportunities via online platforms such as Facebook and WhatsApp. This allowed some students from public schools to participate in online learning offered by companies in the

U.S., such as EduMonitor, which had free programs, e-books, worksheets, and games for children in pre-kindergarten through to the fifth grade (EduMonitor, n.d.).

Moreover, inadequate infrastructure (e.g., internet, electricity) made it difficult to support universal virtual learning. To boost internet access for students and families in less served regions, the Kenya Civil Aviation Authority collaborated with Telkom Kenya and Alphabet Inc. to float Google's Loon Balloons, carrying 4G base stations, over Kenyan airspace (Etherington, 2020; World Bank, n.d.b). Also, other local private mobile providers such as Safaricom partnered with Longhorn Publishers, Eneza Education, and Viusasa to provide free access to educational e-content for primary and secondary school students. Despite these innovative and noble ideas, virtual learning remained inefficient and inaccessible for most children with disabilities because little effort went into tailoring digital lessons to individual learners in different parts of Kenya (e.g., Turkana has inefficient infrastructure and a harsher climate than the highlands of Kericho or Nairobi City).

The problem with the learning material, content, and time remained because it was not easy to virtually teach certain subjects at a certain grade level at a certain.. For instance, it was difficult to effectively teach virtual science, technology, engineering, and mathematics (STEM) lessons, including science laboratory work, because few schools or families could afford computers or the apps, and few teachers were competent in modeling. Also, Kenya has two public education systems running concurrently—the new 2-6-3-3-3 education system that was introduced in 2017 to replace the 8-4-4 education system. This made re-structuring the content of varied subjects difficult especially for foreign-based educators. Besides, the time difference, for example, between Kenya and the U.S. (an average of eight-hour difference—East Standard Time) complicated remote teaching and learning since afternoon in the U.S. would be late night in Kenya, the time most families are asleep.

Challenges with the curriculum, geography, and time made it difficult to support universal virtual learning. So, online learning only served a small population that have electricity, internet, and computers and can access the required media (e.g., Edu TV Channel on YouTube), and according to a KNBS survey, less than 40% of students accessed digitally delivered content (i.e., via television and radio and mobile phones—which is discomforting) (World Bank, n.d.b). E-learning requires utilities, technology, and experienced educators who are computer literate and competent in online pedagogical practices (Mutisya & Makokha, 2016). …

**Poverty in Households with Children with Disabilities**

Document analyses (e.g., from the ITU; World Bank, n.d.b) and interviews with representatives of DPOs, NGOs, and MoEST revealed that government and individual/group initiatives to promote digital teaching and learning, though well intentioned, did not reach the most vulnerable learners who did not have computers or access power. Many teachers and families did not own computers, nor were they computer

literate (UNICEF, 2017) while most low-income private and public schools had limited capacity to provide virtual classes. In 2013, the government promised every child in primary school a laptop computer with free internet access to facilitate digital learning (Mariga et al. 2017; Mugendi, 2019). However, this plan was shelved for political reasons, and because of the lack of political will and financial incapacity, the government was not able to broadly facilitate digital learning. With many countries turning to online schooling, the global demand for computers outstripped the supply, which made computers unavailable or costly for ordinary Kenyan families. Other households resorted to mobile devices. However, the small screens of most phones made learning for hours tiresome thus causing disinterest of strenuous subjects/topics in learners. Though mobile phone services are relatively good in Kenya (KNBS, 2019), they were shared with family members, and in a household with four children, it was difficult to access the internet due to data plan restrictions (Opeke 2018; UNICEF, 2017). Instead, most students accessed the internet through public cybercafés (Wamuyu, 2017), which tend to be unsafe or insecure and therefore predispose students to cybercrimes. For this reason, many informed and concerned parents refused to allow children to participate in these learning environments.

**Unfavorable Home Environment**

E-learning requires a lot of self-discipline and an appropriate setting since personal technology can be distracter to learning (Schneider, 2018). Even in situations where families had computers, many students failed to log on or stay focused on their computer. Whereas some online programs can track students' attendance and participation, the process is cumbersome and can be overwhelming to teachers and learners new to the system. This led to unreliable data-collection practices such as filling out e-google attendance sheet. Thus, those who were absent were predisposed to experience low performance, low self-esteem, and to drop out of school as a result. Furthermore, in face-to-face learning, students are more likely to be guided by the teacher's physical presence. In contrast, online classes predisposed the entire class to behavioral challenges, such as crying, yelling, and the use of profanity out of frustration when learning materials did not load. For this reason, many online classes were shortened versions of the face-to-face classes, which compromised the quality and quantity of learning.

While online learning requires a favorable home environment, many homes lacked the amenities necessary for conducive learning, such as electricity, running water, the internet, and bathrooms. Many families of children with disabilities lived in single-room houses, grass-thatched houses, or houses with corrugated iron sheets without a ceiling, which made it impossible to learn when it rained, which happened during the long rains month April through August. Homes/houses without children's bedroom left little space for different learning activities in the same space. One-roomed house served multiple purposes—storage, dining, sleeping, or even bathing. These conditions negatively affected the access and participation of children with disabilities with respect to digital learning.

**Fears and Uncertainties about the Future**

The Kenyan education system is majorly controlled by the government. The decision to postpone schooling until 2021 received support from national teacher and parent organizations. However, the disruption of schooling intensified families' fears and uncertainties about the education of their children with disabilities since it is apparent that the 2020 school calendar year was lost. School closures and cancellation of national summative examinations that were to begin in September 2020 (i.e., Kenya Certificate of Primary Education - KCPE and Kenya Certificate of Secondary Education - KCSE) meant mass repeating at all levels of schooling is unavoidable. With an inadequate education system that less meet the national education demand, this will lead to high competition for few places in 2022 and the coming years especially in grades 1 and 9 and college places.

## DISCUSSION

This study was based on a quick review of the situation in Kenya to inform program development on the current status of learners with disabilities. The findings have revealed that children with disabilities are losing ground academically because COVID-19 has profoundly impacted their education and daily lives as evidenced in the mega learning barriers: Challenges in public and low-cost schools, challenges with the curricula and digital infrastructure, poverty in households with children with disabilities, unfavorable home environment, and fears and uncertainties about the future. These mega learning barriers show the toll of COVID-19 and school closure on the education of learners with disabilities.

**The Academic Toll of School Closures on Children with Disabilities**

The Kenyan government's drastic measures to contain COVID-19 pandemic caused unquantifiable academic harm to millions of learners who were kept at home without learning opportunities, especially children with disabilities. The most impactful measure in this respect was the closure of learning institutions on March 16, 2020. Due to limited healthcare facilities and the surge of the pandemic, the central government gave the directive to county governments to designate 20 residential schools in each county as isolation health facilities, thereby ordering that the schools function as hospitals, testing centers, or quarantine centers (Waita & Njehia, 2020). However, this decision made schools hazardous and unavailable for throughout 2020. Kenya placed safety before education in 2020 and because of the virulent nature of the pandemic, Ministry of Education issued conflicting opening dates that made it difficult for educators and families to plan appropriately. With the unpredictable disease ravaging across Kenya, and the eagerness of the government to contain it before it overwhelms the inadequate healthcare system, on July

6, 2020, the government announced that schools will remain closed for the rest of the 2020 academic year.

Although schools opened in January 2021, the COVID-19 pandemic induced school closure will continue to negatively affect children with disabilities (i.e., lead to illiteracy, biases, aggressions, and a lack of appropriate information about COVID-19 preventative measures) and therefore predispose them to increased likelihood of academic failure and failed adult life. Even though the government cautiously opened schools and eased the restrictions of movement introduced in early March 2020, challenges persists and normalcy far away in the horizon. The two-meter distancing rule makes traveling expensive and difficult since few passengers in the bus translate to high fares in order for the operators to recoup costs and make profit (IMF, 2020b). Traveling costs and restrictions on movement and inefficient sanitization in schools at a time when the communal transmission of COVID-19 is on the increase is likely to scare some learners with disabilities and their families and teachers and therefore lead to unfavorable learning environment that predispose students with disabilities to school failures. Lack of resources and services increase COVID-19-related demotivation factors especially now when learning institutions are considered high-risk settings due to the high congregation of students from different places. Unfortunately, the abilities of parents, teachers, administrators, and other stakeholders (e.g., suppliers of school resources) to provide the support children need to navigate the education system from home are already limited. Previous studies have shown that disasters interfere with social structure and infrastructure (Chan, 2014) and pandemics cause serious harm to the affected communities (Chan, 2014; Heymann et al., 2015). For instance, the Ebola virus outbreak in West Africa caused deaths and damaged the fragile economies making it hard for patients as well as survivors to trust their governments' health guidelines (Heymann et al., 2015). Inadequate infrastructure, such as transportation systems (roads, railway, or seaways), and insecurities caused by the lack of basic needs such as clean water, food, or air, all lead to biases, desperation, fear, and violence that negatively affect economies and contribute to restlessness and mistrust of communities, institutions, and governments (Chan, 2014). As in the case of Ebola outbreak in West Africa that disrupted social and school life, vulnerable children—including those with disabilities, those from pastoral or nomadic communities, and the urban poor—are at increased risk of sexual exploitation, teen pregnancy, school dropout, and child labor (UNESCO Institute for Statistics [UIS], n.d.; Winters et al., 2017).

Moreover, school closures caused the kind of educational and social inequity (Bourdieu & Passeron, 1990) that is already felt in other realms of essential activity—including healthcare, employment, and housing—that determine quality of life. The COVID-19 induced economic recession (IMF, 2020b) has also triggered disability-based biases and aggressions. Many families of children with disabilities are becoming poorer, and children with disabilities are now vulnerable to violence as schools stayed closed and digital learning remained inaccessible in 2020, as it happens in disease ravaged communities (Chan, 2014). While schools already opened, the disease has gained foothold in Kenya and the

mitigating measures remain inadequately implemented. As with Ebola in West Africa, the severity of the infectious disease in this case is likely to be magnified by poverty, which make it difficult for it to be contained, treated, and prevented. Poverty limits information flow and access to the medical equipment, vaccines, and medicines needed to manage an infectious disease. It also promotes health fraud, rumors, fears, violence, and the further spread of disease (Chan, 2014). Considering the mega learning barriers of children with disabilities, alleviating effects of COVID-19 is paramount.

**Empowering the Disabled through the Collective Health Security**

Health security initiatives are to provide protection from threats to health (Fidler, 2003; Heymann et al., 2015). It helps affected individuals increase their ability to withstand the effects of calamities so that they can improve their own wellbeing and that of the community. Chan (2014) has analyzed the impact of Ebola outbreak in West Africa in terms of health security arguing that local and global responses are critical in the management of infectious diseases, many of which require control of misinformation along with the allocation, distribution, and management of resources to ensure that help reaches the targeted communities and localities. Individual and collective health security measures are critical to the management of infectious diseases and the improvement of the wellbeing of society. This can be achieved when citizens of all cadres are provided with education that helps them participate in their own development as well as that of the broader community. While taming the COVID-19 pandemic requires collective initiatives, at the present time, the disability community has mostly been left out of consideration with respect to COVID-19 management initiatives. Key to the containment of COVID-19 pandemic and its negative impact and overall eradication of poverty is the provision of quality education to all community members especially learners with disabilities so that they can acquire the appropriate knowledge to function in the community now and in the post-pandemic period. Improving digital infrastructure is therefore key to the provision of disaster education and engaging communities in the recovery process.

**Empowering the Disabled through Disaster Education**

Although school closure is just one COVID-19 mitigating measure, the global scale and speed at which it disrupted education reduced the chance of children with disabilities accessing appropriate education on the level of non-disabled learners. Moreover, children with disabilities and their families are less prepared for disasters, and many are caught in the mix of wanting to adhere to the COVID-19 preventative measures while also eking out a living in a country with limited safety nets (Kabare, 2018). Further, even though disaster preparedness can lower the rate of injuries, deaths, and destruction of property (Hoffmann & Muttarak, 2017), many families of children with disabilities are not provided with the necessary knowledge of how they can survive or protect themselves in the case of disaster. This is opposed to Muttarak and Pothisiri's (2013) argument that families with people with disabilities are better prepared than non-disabled families.

The negative impact on children are likely reverberate for decades, since those unable to access education services or resources as well as those traumatized by COVID-19 and its effects may not resume school at all when this disaster is over. Often it is assumed that rescuers will provide them with special support in the case of a disaster. Sadly, many are left out from the disaster intervention programs even though preparing children for disasters is key to building their resiliency (Krishna et al., 2018). Toughness is necessary for survival during and after disasters. When it comes to demographics, families tend to be more prepared for disasters than single people, and those with disabilities also tend to be more prepared than non-disabled families (Muttarak & Pothisiri, 2013). When it comes to socioeconomic status, high-income families tend to be better prepared than low-income families because they can use their disposable income to buy additional supplies and build appropriate structures that can withstand disasters (Mishra & Suar, 2007). People who have lived in a certain geographical area for a long time and understand the different local hazards tend to be more prepared for these disasters than newcomers who may be less familiar with the situation. Also, home owners tend to invest more in disaster prevention or management than renters, who often see themselves as capable of moving to a different location in case a disaster hits (Tanaka, 2005). Some individuals tend to be psychosocially prepared for hazards and often invest in disaster management, which also helps them to develop self-resiliency and coping mechanisms (Hoffmann & Muttarak, 2017).

Krishna et al. (2018) conducted a study with adults to determine the disaster preparedness, response, and recovery experiences of children living in poverty who were affected by the 2015 floods in Tamil Nadu, India. They found that resiliency (the capacity to recover quickly from difficulties) during and after disasters was key to their survival. Resiliency is influenced by many factors, such as education, health, ability, age, awareness, sex, gender, socioeconomic status, class, income, and degree, depth, frequency and intensity of trauma (Bonanno et al., 2007; Krishna et al., 2018). Since psychosocially prepared individuals can more easily develop self-resiliency and coping mechanisms (Hoffmann & Muttarak, 2017), it is important that children with disabilities and their families are provided with disaster education. Introducing disaster education will ensure that students with disabilities learn about disasters, develop appropriate repertoires, prepare for them, increase their resiliency, and feel encouraged to participate in the recovery process. Since disasters have serious economic, political, social, cultural, and linguistic impacts on communities, establishing priorities and resources to mitigate their impact is critical in helping the affected communities recover from the challenges and continue with their lives (Heymann et al., 2015).

Disaster education and other interventions and recovery effort require a multi-systemic approach (Masten, 2014) that centers on the child and family (Hielkema, 2017) to ensure that every reality of the child's experience is addressed (Bronfenbrenner & Ceci, 1994). In addition, preparation for the effects of disasters and interventions during and after disasters should consider the context and culture of the community in order to promote

adaptation and recovery (Jordans et al., 2016; Krishna et al., 2018). Education has been shown to improve the management of disasters and the propensity for survival in various settings and conditions (Hoffmann & Muttarak, 2017; Krishna et al., 2018). Offering disaster education can help children with disabilities and their families cope with the current situation and put them on the road to recovery.

**Involving Children with Disabilities in the Disaster Management and Recovery Process**

Disasters are damaging. They ruin economies and infrastructure while also causing death. Disasters tend to affect low-income countries more significantly than high-income countries because of a lack of preparedness and the destruction of utilities and infrastructure that lowers the possibility of a quick delivery of necessary survival materials (Shreve & Kelman, 2014; van der Keur et al., 2016). Various measures are taken to reduce fatalities and the destruction of facilities, for example, by building earthquake resistant houses or developing warning system for those living in risky areas to facilitate early escape (Andrews & Quintana, 2015). The extent of the damage caused by disasters can be devastating, even to well-prepared individuals. It is therefore recommended that people stock up on enough materials, such as food and water, that can help them survive for more than 72 hours just in case they do not get immediate relief after a disaster hits (Russell et al., 1995).

Children make up the biggest population in Kenya, and they are the most affected by disasters (Martin, 2010). Children are vulnerable to direct and indirect effects of disasters, including injuries, trauma, diseases, and illnesses (McDermott & Cobham, 2014; Mitchell & Borchard, 2014). Children are also vulnerable to exploitation as a result of displacement; separation from parents; death of their loved ones and caretakers (Taylor, 2014); inaccessible basic needs such as water, food, and shelter (Babugura, 2008); the inability to understand the disaster and the circumstances they are in; and the difficulty in coping with the changed situation (Buechner, 2020), especially when the structures of society break down (Masten, 2014). All children are gravely affected by disasters, but the most vulnerable categories are infants and young children, girl child, and children with disabilities. As previous studies show (McDermott & Cobham, 2014), unfortunately, Kenyan children are never prepared for disasters, often being caught in difficult environments that they cannot make sense of, leading to the most devastating consequences on their physical and mental health. They are vulnerable to physical and mental abuses (e.g., neglect, aggressions, rape, murder).

Kenyan children with disabilities have a lot of experience with disasters, and so further preparation and involvement in recovery is essential (Krishna et al., 2018). As other studies have shown (e.g., Amri et al., 2017; Ronan et al., 2016), the capacities of Kenyan children with disabilities (e.g., their resiliency, inquisitiveness, innovations) can contribute to the management of risks caused by disasters in any community. The participation of children in the management of disasters is critical for the wellbeing of society (UNISDR, 2015). Community members aware of the impact of disasters are more prepared to handle

the disaster and its after-effects than unaware communities. For instance, Hoffmann and Muttarak (2017) demonstrated how education about disaster education promoted the coping ability of individuals in Thailand and the Philippines after hazards had occurred. They found that disaster preparedness lowered the risks of harm caused by natural hazards, such as earthquakes and hurricanes, and outbreaks of epidemics or pandemics. Then, involving Kenyan children with disabilities in the recovery process is especially important at this time. Such involvement will help to nurture their resiliency, reduce their school dropout rates, and promote success in adulthood, thereby ensuring that they can contribute to the welfare of their communities.

The UN Goal 13 of the SDGs requires nations to prepare their citizens for various natural hazards due to climate change to avoid serious harm to society (UNISDR, 2015). The government of Kenya in partnership with international financial institutions— International Monetary Fund (IMF) and World Bank—have dedicated huge resources to mitigate effects of COVID-19 pandemic. This includes $739 million grant from the IMF (2020a). For instance, the government set aside $43,772,920 for May-June 2020 payment cycle to a total of 1,094,323 beneficiaries who each was paid $40 to cushion them from hurts caused by COVID-19. The beneficiaries of these funds were in three major money transfer programs known as the Inua Jamii Cash Transfer Programs—Orphans and Vulnerable Cash Transfer Program, Older Persons Cash Transfer Program, and Persons with Severe Disability Cash Transfer Program (NCPWDS, n.d.). However, corruption has seen families of children with disabilities denied financial support. ALMedlij and Rubinstein-Ávila (2019) study found that government support, implementation of disability legislation, disability awareness, and training of highly qualified teachers contributed to the development of education for students with learning disabilities in Saudi Arabia. Similarly, it is important to establish structures that promote disability awareness and inclusion and participation of children with disabilities and their families in the education sector. Equally, it is important to restructure the mechanism of distribution of COVID-19 funds to ensure that resources and services reach all needy families. Vital is sharing these information with the public especially the disability community and educating the masses not just about COVID-19 but also disability rights. Educating the masses ensures that appropriate information flows from one region to another to counter any misinformation that may be spreading and causing hostilities or mistrust in the community (Chan, 2014).

The approach of the intervention or response teams should be inter-disciplinary to allow various practitioners, such as doctors, anthropologists, preachers, economists, police officers, educators, and other professionals, families and lay people, to work with the affected community without agitating them or raising further suspicion. For instance, in situations where medics are suspected to be vectors, the communities should avoid any hostility as has been witnessed in countries like Nigeria, Pakistan, or the Democratic Republic of Congo where medics providing polio vaccines or administering quarantine orders have been killed (Chan, 2014; WHO, 2011). Such killings instill fear and mistrust,

discourage medics from well-established institutions or countries from aiding, cause closures of hospitals, schools, and exacerbate insecurity (Chan, 2014). Thus, improving digital infrastructure is key to addressing disasters by providing updated information, containing fear, providing education to all, and preparing and engaging learners with disabilities in the disaster recovery process.

## CONCLUSION

COVID-19 pandemic exposed children with disabilities to multiple disastrous circumstances—discrimination, stigma, aggression, and violence—that increased their miseducation since Kenya closed schools to control the spread of the virus. The nationwide lockdown and closures of schools significantly interrupted the economic, social, cultural, political, economic, linguistic, and technological structures of Kenyan society, thereby causing further educational harm to learners with disabilities. Deferment of learning left children with disabilities behind and caused physical, economic, and psychological hardship and trauma. Millions of learners with disabilities face many structural barriers in schools and community, including biases and infrastructural issues that make it difficult to participate in learning. Consequently, the disruption of education leaves behind a trail of damage that children with disabilities may not fully recover from without the implementation of mitigating measures. Therefore, making disaster education and involving children with disabilities and their families in the disaster management and recovery process is paramount to stopping COVID-19 pandemic from eroding the educational opportunities and threatening Kenya's realization of Vision 2030 poverty reduction.

### Limitation and Future Studies

This study focused specifically on the impact of the COVID-19 pandemic on the education of children with disabilities during the period March-December 2020. However, the disease continued to interrupt a wide range of groups and various sectors in Kenya into 2021. Before the COVID-19 pandemic, Kenya had recently dealt with flooding and locust plague and extreme drought. Therefore, future studies should focus on the intersectionality of these disasters to understand their impact on the education of students with disabilities and their families. Also, studies should compare the impacts of the COVID-19 pandemic on students with and without disabilities. In addition, future studies should focus on disaster education and management to understand their impact on children with disabilities and their families. Despite these limitations, there remains a gap in disaster education and disaster management as pertains children with disabilities. Nonetheless, this study provides a kind of starting point from which it is possible to initiate disaster education and recovery programs in Kenya. This way, this paper makes social realities by assessing the negative impact of COVID-19 pandemic on schooling of students with special needs in Kenya and by giving voice to learners with disabilities, this paper also contributes to possibilities of addressing the very invisible education and life aspects of students with disabilities.

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Research Article

# Beginning Teacher Support Model: Elementary Teachers' Resilience and Retention in Arizona

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**Abstract:**

In the United States, beginning teacher retention rates are extraordinarily low; only 50% of teachers remain in the classroom after five years. In particular, the state of Arizona has been recruiting significant numbers of teachers from out of state and attempting to retain them with minimal success. This persistent problem has led the neediest of students to have teachers with lower levels of experience, leaving those students with continually lower achievement gains. Drawing on integrated action research and grounded theory methodology, this study used a Creating Authentic Resilient Educators (C.A.R.E) model to support six new, out-of-state teachers in an elementary school district located in a high-poverty neighborhood in Arizona. In face-to-face group sessions and individual assignments, participants reflected on their experiences and examined multiple topics focused on persistence and resilience to reduce beginning teacher attrition. Participant responses showed that teachers must be nurtured and cared for in order to allow them to focus their time and energy on effectively caring for the students in their classrooms. Increasing support for new teachers has the potential to keep effective teachers in the classroom and improve the culture of teaching within schools.

**Keywords:** Teacher retention, Teacher attrition, Elementary education, Teacher resiliency, Teacher support

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## INTRODUCTION

In the United States, teacher retention is an ongoing and critical problem. Especially now, during the COVID-19 pandemic, there has been decreased interest in remaining in the profession and increased retirement to avoid exposure to COVID-19 within the classroom (De La Rosa, 2020). "Currently in [the state of] Arizona, there are 1,800 vacancies and 47% of the vacancies are filled by teachers who do not meet the state's standard certification requirements" (ASPAA, 2020, para. 2). Even prior to the 2020 school year, however, teachers were leaving the profession at alarming rates (Garcia and Weiss, 2019a; Kain, 2011). Evidence suggests that the number of years of teaching experience held by an educator may be positively related to student achievement (Burroughs et al., 2019; Hightower et al., 2011); thus, we need to keep experienced teachers in the classroom to ensure that all students succeed.

The importance of retaining out-of-state teachers in Arizona, the location of this study, is particularly noteworthy. The Arizona population has been growing in recent years due to an increase in job opportunities that has brought many new students to the state (Vanek, 2020). Unfortunately, the state has not been able to fill all of the teaching positions each year, especially since some Arizona-trained teachers leave to go to other states (ASPAA, 2015, 2020). Out-of-state recruitment of teachers has become necessary. While out-of-state teachers bring a richness to the culture of classrooms, offering new perspectives, experiences, and diversity, there are many unique challenges that come with being an out-of-state teacher. Teachers who have moved are navigating new lives in an unfamiliar location, along with new job experiences and responsibilities, and frequently experience loneliness as a result of leaving their friends and family behind (Author 1, 2015).

This nuanced group of out-of-state beginning teachers is not readily identified in the literature, yet districts around the United States recruit from out of their state and are affected by the complicating factors that this group may experience. This study, though small and local to an Arizona district, has lessons and strategies that may be applicable across the United States.

### *Effects of Teacher Attrition*

Teacher retention is a fiscally staggering and professionally draining issue. In fact, the cost of teacher attrition in the United States is approximately $7.3 billion a year (Garcia & Weisss, 2019a; Hallam et al., 2012). Teacher attrition is more than just a fiscal issue, though; it impacts the learning of students, infects teacher morale, and rattles the trust of the community (Garcia & Weiss, 2019a; Ingersoll, 2002; Stockard, 2004). The teacher attrition problem is largest in schools that have higher populations of students who are minorities,

living in poverty, and/or struggling academically (Burroughs et al., 2019; Center for Comprehensive School Reform and Improvement, 2007; Earley & Ross, 2006; Garcia & Weiss, 2019a); in these schools, teacher turnover is fully 50% higher (Ingersoll, 2002). Research further indicates that student learning is also directly affected by the experience level of the teacher: the lesser the experience, the lesser the level of student academic growth (Garcia & Weiss, 2019a; Kukla-Acevedo, 2009; P. Watkins, 2003). Therefore, we see that the neediest of students tend to have teachers with lower levels of experience, leaving those students with continually lower achievement gains.

In particular, teachers are leaving their profession during the initial years of their careers rather than persevering through those first years. Beginning teachers have been leaving the field at alarming rates, with nearly 30% leaving within the first three years of teaching (Fisher, 2011; Ingersoll & Merrill, 2012). Experts on this issue state that the problem in schools today is twofold: (1) attrition from those leaving the teaching profession, and (2) migration from those moving to teaching jobs at other types of schools (Ingersoll & Smith, 2003).

The impact of beginning teacher attrition on schools is significant. When employees work together as closely as teachers do, high turnover rates begin to affect morale and the development of relationships between coworkers, and the sense of community that is important to the success of a school begins to diminish (Joiner & Edwards, 2008). In many places, this creates a ripple effect of lack of morale and community that perpetuates more attrition. Administrators spend time reviewing procedures and policies rather than focusing on and recruiting new teachers (Bland et al., 2016; Watkins, 2016). Veteran teachers get overwhelmed with the additional expectations placed on them due to the inexperience of their newer colleagues (Ozder, 2011). At the end of the school year, many beginning teachers leave, forcing the cycle to repeat (Fantilli & McDougall, 2009). Morale crumbles, the teachers who remain become less willing to connect with new hires, and an ambivalence to the beginning teachers' plight emerges (Buchanan et al., 2013). Rollins (2008) notes that the school climate perpetuates a sink-or-swim mentality that continues year after year. New teachers, still constructing their professional identities, are greatly impacted by this negative climate (Smethern, 2007), which then perpetuates continuous staff turnover.

Administrators struggle with teacher turnover as well. It has been a challenge for principals to establish a productive and consistent culture while constantly interrupted by high turnover (Hallam et al., 2012; Watkins, 2016). Administrators are often unaware or uncertain of how to support new teachers or manage the reasons that cause teachers to abandon their posts (Esch, 2010; Hallam et al., 2012; McNulty & Fox, 2010; Schlichte et al., 2005; Watkins, 2016). With the intensity of the initiatives in schools today, administrators are not able to focus on altering climates and cultures to positively influence retention (Walsh et al., 2011; Watkins, 2016; WestEd, 2005). Joiner and Edwards (2008) suggest that the first step is to assess why teachers are leaving (before they can be encouraged to stay),

yet district and school administrators remain unaware of why new teachers are leaving and do not understand why those who do stay choose to remain (Barnes, 2017; Watkins, 2016).

### *Efforts to Improve Teacher Retention*

Across the nation, schools and districts have worked to maximize beginning teacher retention (Garcia & Weiss, 2019a; Turner, 2009). Some of the most common methods have included developing mentoring programs (assigning a colleague to a new teacher), formal professional development (sessions designed to enhance classroom performance or introduce strategies), and induction programs (intentional support sessions targeting new teacher needs, typically offered when beginning teachers first arrive). In Smith and Ingersoll's (2004) study of induction and mentoring programs, it was found that, while there was a relationship between beginning teachers receiving support and a higher retention rate, the strength of that relationship depended on the type of support and the number of supports received.

Support models have varied greatly across the nation for these novice teachers, and even internationally there has been a newer body of literature exploring methods and ideas for increasing retention. One support method that has been commonly used by districts is beginning teacher induction the day before the school year starts. One-day inductions provide new teachers with a common experience and sometimes increased connectivity with their beginning teacher peers. The typical objectives of this induction include personal skill development, socialization into the profession, an assessment of teaching effectiveness, and support in modifying practices or strategies (Martin, 2011). One-day sessions, however, may not be as impactful as ongoing induction opportunities (Mansfield & Beltman, 2019; Wechsler et al., 2010). Induction that also includes professional collaboration and a focused, site-based socialization has been shown to increase beginning teacher retention (Gossom, 2004; Martin, 2011; Schlichte et al., 2005). Professional collaboration also enhances teacher job satisfaction (Devos et al., 2012; Mansfield & Beltman, 2019; Martin, 2011; Schlichte et al., 2005). Districts with rich induction systems in place have noted a positive impact on the retention of beginning teachers (Ingersoll & Merrill, 2012; Mansfield & Beltman, 2019; Turner, 2009).

Other factors that have impacted the success of beginning teacher retention are a focus on the culture and climate of the school site and leadership by the principal in establishing a nurturing environment where new teachers feel supported and appreciated (TNTP, 2012; Turner, 2009; A. Watkins, 2016). This staff and administrative connectivity is especially critical when teachers are joining a staff without additional, non-school-related supports in the form of family or friends. As Joiner and Edwards (2008) note, "If the climate and the culture of a school building do not support the induction activities of mentoring, collaborating and growing professionally, then new teachers will not be successfully socialized into the school organization" (p. 5).

### *Context of the Study*

Arizona has been recruiting significant numbers of teachers from out of state and attempting to retain them. Given the increased challenges of being an out-of-state beginning teacher and the importance of this group for teacher retention in Arizona, this study's purpose was to explore potential methods for supporting those teachers and increasing their retention.

The targeted school district was consumed with a beginning teacher retention crisis. This retention crisis sparked attention from the community, school board, and administration, prompting them to further explore the factors that contributed to beginning teacher retention. This district, as well as neighboring districts, continued to try to find the magic formula to decrease teacher attrition through induction programs, coaching positions, and other creative support networks. Programming and curricular decisions for supporting and retaining new teachers continued to be developed and altered without any targeted data collection to monitor their effectiveness. The 2010-11 school district report submitted to the Arizona Department of Education captured the challenge from three years prior, when the attrition rate rose to 88%, noting the district's continued struggle with data on specific reasons why teachers leave because of the lack of participation on the exit survey. Exit interviews were the common method used to determine why beginning teachers who had resigned were leaving, yet this practice seemed to be underutilized and underanalyzed. Given these conditions, exploring the reasons why beginning teachers leave the profession and developing an intervention to improve beginning teacher retention were critical.

As a result, we created a program of informal support sessions for first-year, out-of-state teachers, to explore the effects on both retention and teacher attitude over the course of participants' first semester of teaching. The sessions were led by a district administrator; focused on personal and professional skills of everyday resiliency, including stress management, coping skills, and awareness of support structures (including their colleagues, administrative staff, district personnel, new friends, etc.); and were grounded in research about the needs of beginning teachers (Moir, 2011). The ultimate goal was to understand how such support might alter a beginning teacher's perceptions of their own persistence and resilience in dealing with the challenges of first-year teaching, thereby reducing beginning teacher attrition. Within the literature, there were no specific resources for how to customize support for out-of-state beginning teachers. Individual interviews we conducted with previous out-of-state beginning teachers prior to this study suggested that the following topics needed to be addressed: emotional support, feelings of isolation, and personal coping strategies. This led to the creation of a support program called the Creating Authentic Resilient Educators (C.A.R.E.) model.

The C.A.R.E. model (see Figure 1) was composed of key considerations for districts and sites when creating an innovative support plan for out-of-state beginning teachers. The overlapping concentric circles indicate the importance of each factor in the model. Both

district- and site-level support for and commitment to the retention of beginning teachers was considered crucial. The C.A.R.E. model required an informal setting in which a skillful facilitator met face to face with participants. The sessions themselves focused on developing personal skills, including self-efficacy, acknowledging work/life balance with stress management, increasing confidence, and developing self-advocacy skills. The central focus of this support was resiliency. Digital narratives and reflection opportunities were also an essential component of the model, to provide participants with a purposeful reflection on their face-to-face session experiences.

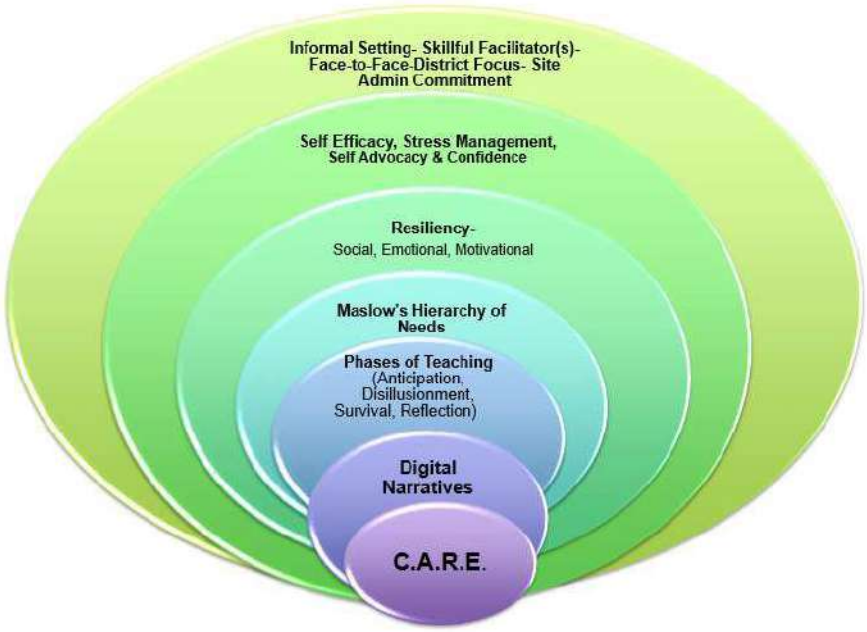


***Figure 1:*** Out-of-State Beginning Teacher Support Model – A Community of C.A.R.E.

## METHODS

We used an integrated action research (Herr & Anderson, 2014) and grounded theory methodology (Cresswell, 2009) for this 15-week study. Data were gathered from interviews, questionnaires, journal reflections, and mapping activities. We also had a significant focus on using innovative techniques to capture participant experiences through visual means, including drawing maps in face-to-face sessions and creating reflections using digital images on iPads. In this study, visuals allowed each participant to tell their story through multiple data sources and to reflect on how the support sessions were valued.

### *Setting*

The study took place in an elementary school district situated in a high-poverty neighborhood in Arizona. The district consisted of seven K-8 schools, one alternative placement school, and one 5-8 school and served approximately 5,600 students. The student

population of the district was considered high poverty, and all schools were designated Title 1. Roughly 13% of the students qualified for special education services, and 11% were identified as English Language Learner students. The district was given a C rating by the Arizona Department of Education, with one school given an F.

In the three years before this study, the district lost two-thirds of its staff to other districts, retirement, moving, or leaving the profession altogether. As a result, the district conducted out-of-state recruiting. In the 2012-13 school year, 54 beginning teachers were hired, with 19 of them arriving from out of state. Of that group, 36% of the beginning teachers resigned, and of that group, 63% were from out of state. In 2013-14, 98 beginning teachers were hired, of whom 33 were from out of state, and 42% of those beginning teachers resigned. In the 2014-15 school year, there were 25 beginning teachers hired, of whom 6 were from out of state. This study's intervention supported those six out-of-state beginning teachers.

### *Participants*

The participants in this study were new to the state, new to teaching, and not alternatively certified within the district. The district's Human Resources office initially identified these teachers as meeting the criteria of having zero years of experience in a classroom and having lived in Arizona less than three months. The six participants were all hired and began induction in July, when they were presented with the opportunity to be part of the study. None of the eligible teachers declined participation, and all completed informed consent to participate in the study. These teachers represented kindergarten through eighth grade and taught in five of the district's nine schools. Teacher names were changed to code letters to maintain confidentiality. Table 1 provides a complete list of the demographic information about each participant.

*Table 1:* Teacher Demographics

| Identifier | Gender | Age (years) | Teaching Assignment | School Description | Housing | Previous Moving Experience | Previous Residence (Region of the United States) |
|---|---|---|---|---|---|---|---|
| Teacher A | Female | 22 | Primary (K-2) | 47% Free & Reduced | Apartment with roommate | Yes | Plains State |
| Teacher B | Female | 25 | Primary (K-2) | 63% Free & Reduced | House with significant other | No | Eastern State |
| Teacher C | Female | 24 | Intermediate (3-5) | 66% Free & Reduced | House alone & then later with family | No | Western State |
| Teacher D | Female | 27 | Special Area (3 schools) | 71% Free & Reduced, 66% Free & Reduced, 96% Free & Reduced | Apartment with significant other | Yes | Midwest State |
| Teacher E | Female | 28 | Intermediate (3-5) | 98% Free & Reduced | Apartment with roommate | No | Midwest State |
| Teacher F | Female | 26 | Special Education | 96% Free & Reduced | Apartment, alone and later with roommate | Yes | Western State |

## *Intervention*

Each monthly professional learning session was customized to the emerging needs of the group and followed the phases of new teacher research as designed by Ellen Moir (2011). These monthly interactive sessions were typically three and a half hours long and provided intentional modeling of multiple identified instructional strategies, along with time for teacher sharing and self-reflection. In addition, monthly email updates about the content explored during the sessions were provided to the administrators at the district and school sites, as well as the master and mentor teachers (instructional coaches who are evaluators).

The 15-week intervention took place during the fall semester, and each participant was provided with release time (using a substitute teacher) to attend the support sessions. There were five face-to-face support sessions with 13 at-home reflection assignments. The concepts around these sessions focused on generating an awareness of the beginning teacher's feelings about their work, self, and fit within the new community of their school and the state. The lead researcher was an administrator within the district who facilitated all of the face-to-face support sessions, where participants completed session mapping activities. A second recorder was also present at the sessions; this individual did not

participate but did take notes on reactions and body language and shared those with the researcher.

Participants were given paper, markers, and crayons in each session, with directions to represent their responses to researcher prompts visually on the paper. The prompts connected with the concepts being discussed in the sessions, such as, "Represent your support structures. Who provides you with support? Whom do you rely on to help you be successful as a beginning teacher?" Participants then shared their visuals with the group. Participants were also provided with an iPad to complete digital journal reflections. These related reflection assignments provided participants with a platform to apply the strategies, concepts, and ideas discussed in the support sessions by digitally creating or capturing their understandings.

### *Measures*

The following four measures recorded changes in participants' perceptions, experiences, and retention as a result of the intervention.

#### *Measure 1: Session mapping activities.*

Mapping activities were used to explore the needs, perceptions, feelings, and experiences of participants, as well as to examine how their journeys aligned with Moir's (2011) phases of first-year teaching: Anticipation, Survival, Disillusionment, Rejuvenation, and Reflection. During each face-to-face session, participants were given a chart of the five phases and asked to place a sticker on the phase in which they perceived themselves to be at that point in time (see Figure 2). Participants then shared what was happening that had impacted their current choice of phase (see Figure 3). These stickers allowed participants to track their changes in attitude over the five sessions.

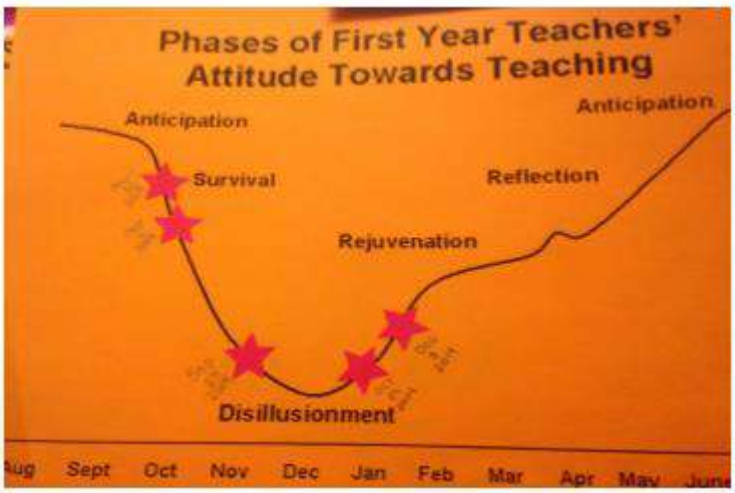


***Figure 2:*** Teacher C Attitude toward Teaching Chart

### *Measure 2: Pre- and post-intervention questionnaire.*

To explore the needs, perceptions, and feelings of participants, they were asked to complete a questionnaire at the beginning and the end of the intervention (see Table 2). The questionnaire explored what participants found valuable about the support sessions, including reflecting on their personal resiliency growth. The questionnaire included eight open-ended questions about participants' resiliency and the five phases of first-year teaching, as well as 15 Likert-scale items organized into four constructs (resiliency-emotional, social, motivational, and self-efficacy). A sample open-ended question was, "Describe what skills and traits you think will be important to succeed as a beginning teacher." A sample Likert-scale item was, "I am aware of my personal stress levels. Choose: Strongly Agree – Agree – Disagree – Strongly Disagree."

*Table 2***:** Questionnaire

| Open-Ended Items Examples: |
|---|
| Pre: What do you anticipate your first 15 weeks will be like as a beginning teacher?<br><br>Post: What were your first 15 weeks like? |
| Pre: Describe the phases you believe you will experience over the course of your first year.<br><br>Post: How was your experience the same or different from the phases? |
| Pre: Tell me about your biggest supporters.<br><br>Post: Tell me about the support structure you now have. Tell me about your biggest supporters. Have these changed since the support sessions began? |
| Pre: Resiliency is defined as the ability to bounce back from challenges. It has been noted in the beginning teacher research to be a skill set that is critically important that can be enhanced and developed in a teacher. Describe how resiliency currently plays a role in your professional life.<br><br>Post: How do you see resiliency as a part of your professional life now (if there was a change)? Did the support sessions influence this change? |
| Likert Inventory Items Examples: |
| 1. I am aware of my personal stress levels.<br><br>2. I am aware of how I respond when I get stressed.<br><br>7. I consider myself to be persistent (stick with it) when faced with challenges.<br><br>8. I have overcome setbacks to conquer an important challenge.<br><br>12. I have a network of emotional support.<br><br>13. I build relationships easily. |

### *Measure 3: Digital reflections.*

Each week, participants used their iPads to respond to prompts asking them to reflect upon and capture their first semester of teaching. The prompts aligned with the most recent face-to-face session's strategies, concepts, and ideas and were focused on exploring, developing, and enhancing resiliency skills and how that work might change self-perceptions. A sample prompt was, "What best represents your month's experience in Arizona?"

Participants were asked to take or find photos that represented their needs, perceptions, or feelings and respond to the prompt with words to explain their image selection (see Figure 3).

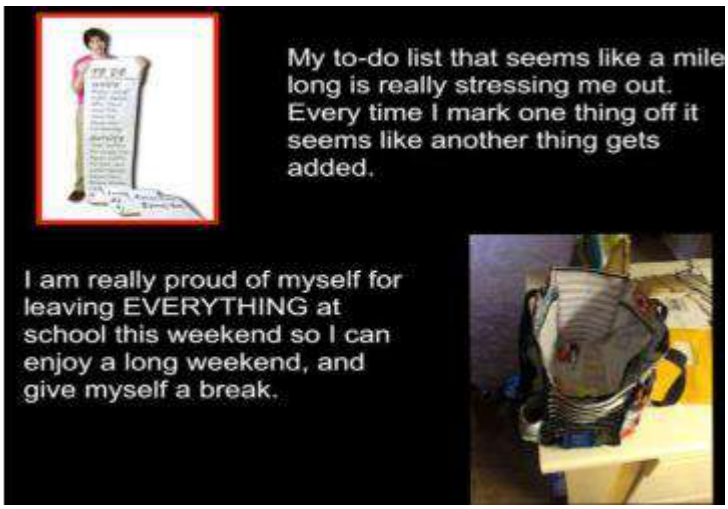


***Figure 3:*** Example of Digital Reflection Regarding Resiliency

Many of the participants used multiple images, combining photos they took themselves with online images or quotes. The purpose of the pictures was to provide an example of what the beginning teacher was focused on or something that reflected their week. Many reflections resembled collages. These digital reflections were created nine times, in weeks 2, 4, 5, 7, 8, 10, 11, 12, and 14. The reflections were also shared at the face-to-face support sessions. At the end of the intervention, participants combined their reflections to create a final digital story representing their 15-week journey, which they shared at the final face-to-face session.

### *Measure 4: Post-intervention interviews.*

In the last two weeks of the intervention, the lead researcher conducted 40-minute semi-structured, audio-recorded interviews with all participants. There were 10 primary open-ended questions asked in the interviews, along with follow-up probing questions. A sample question was, "Describe how the support sessions impacted your first 15 weeks of teaching."

### *Data Analysis*

The pre-and post-intervention questionnaire, session mapping activities, and digital reflections provided multiple sources of data to determine what changes occurred and what insights were gained by participants during the first 15 weeks of the school year. All of these sources generated qualitative data that were analyzed and explored for recurring themes using a grounded theory methodology (Creswell, 2009). As initial codes emerged from the data using open coding, categories that aligned with the theoretical models using axial coding were represented through supporting quotations. The goal was to extract understanding from the interconnectedness of these codes and data. Inter-rater reliability in coding was established via another researcher reviewing 30% of the data, with a 95% inter-rater agreement (Creswell, 2009).

## RESULTS

Through the creation of the C.A.R.E. model, the experiences of beginning teachers throughout their first semester were examined in relation to (1) the normative map of a teacher's journey, (2) participant resiliency and weekly experiences, and (3) participant impressions of the intervention.

### *Normative Mapping*

After participants read Moir's (2011) article about the five phases experienced by first-year teachers, they indicated during each face-to-face session where they perceived themselves to be in those phases. Each phase was assigned a number (10=Anticipation, 9=Reflection, 8=Survival, 7=Rejuvenation, 6-1=Disillusionment) to chart participant responses together. This information was then plotted onto a graph, with each participant in a separate color to show their experiences as compared to the trend line based on the research (Moir, 2011) (see Figure 4).

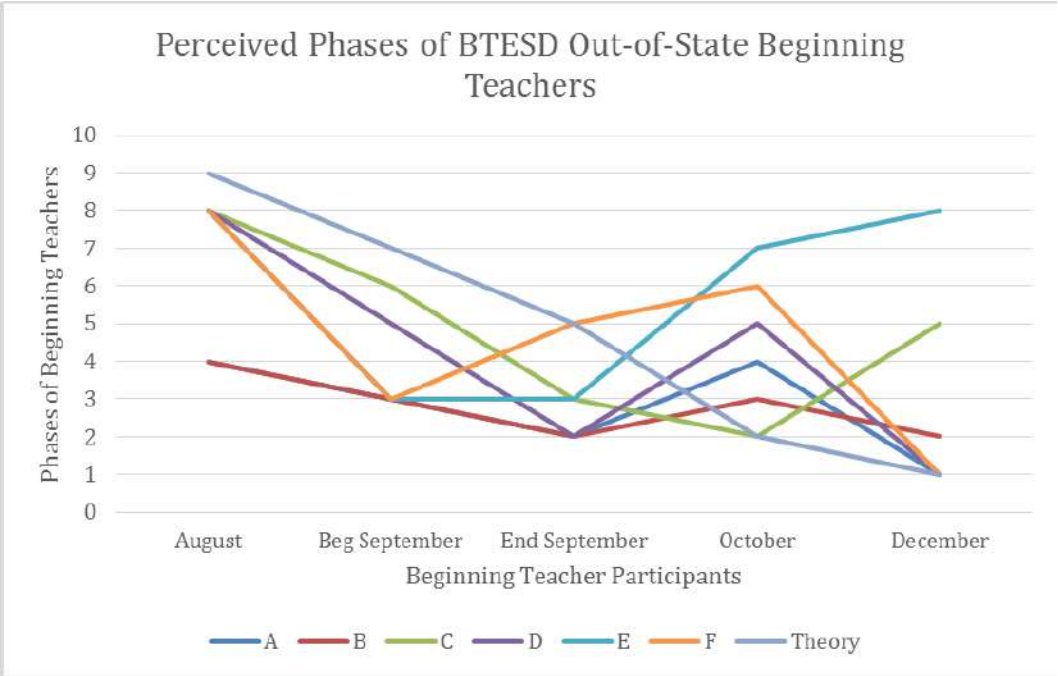


***Figure 4:*** Tracking Participant Phases of Teaching

In comparing Moir's (2011) research with participants' responses, it is evident that participants did not follow the exact theory line. According to participants' explanations for their choices, they chose their phases based on what was happening in both their personal and their professional lives. If participants were experiencing personal crises, they indicated greater challenges in their professional attitudes. For example, Teacher B started the year feeling overwhelmed and in the Survival phase, rather than in the expected Anticipation phase, due to the shock of moving and challenges with her living arrangements. She then slid immediately into Disillusionment, faster than the theoretical model would have suggested.

In addition to the mapping activity, participants' digital reflections were used to confirm their phase selections. There was considerable overlap between mapping responses and digital reflections, which highlighted that participants were consistent in the way they responded to each activity. For example, Participant F's December selection of an overwhelmed and crazy cartoon character confirmed her face-to-face session indication that she was in Disillusionment (see Figure 5).


***Figure 5:*** Teacher F Reflection

### *Participant Experiences*

The resiliency, feelings, and experiences of participants across these 15 weeks were assessed with participant journal reflections, the pre- and post-intervention questionnaire, and individual interviews. It was evident that participants in this study were overwhelmed for most of their first semester. For example, the words that appeared most frequently in the journal reflections were *lonely*, *exhausted*, and *stressed*. In triangulating the multiple data sources, the trends that emerged across all six participants were high levels of stress, exhaustion, and isolation. Each data source confirmed participants' feelings of incompetence, insecurity, and loneliness, as well as an ongoing search for connections. For example, Teacher D reported, "I know I need to make new friends, but that is the last thing I want to do after I put so much energy out with these kids all day is to have to sell myself to others." Participants' level of social isolation impacted all areas of their personal and professional lives, including how they responded to attention at their school sites.

Several of the participants made personal connections with work colleagues that encouraged feelings of belonging and connection. "I have a few more people I can rely on than I did in July for sure," said Teacher B. Others got comfortable with their independence at school and made one or two personal connections that helped them feel supported.

In addition to expressing the need for additional friends, support, and time, participants also struggled with concerns about housing and finances, particularly as the school year began. These themes were most evident in participants' journal reflections, where *money* and *house* were words indicating the most-repeated ideas (see Figure 6 for a compilation of all participant responses).


***Figure 6:*** Needs Most Frequently Mentioned by Participants

Interestingly, participants' self-confidence and belief in their own resilience shifted depending on their work/life balance. As personal issues arose, participants reported being more overwhelmed and stressed professionally. In each instance where a participant was experiencing a personal issue, that participant ranked their attitude about teaching and their professional self-confidence lower. This diminished self-confidence in the classroom as well. Most participants reported that, when they were feeling poorly about their abilities to teach or were consumed with personal issues, their students also behaved poorly. As Teacher E said, "Wow—that's scary…it's really true that if I am having a bad day, my students probably have a worse day. Everything is connected."

Participants' perceptions of themselves shifted over the course of this study. Participants were surprised at their high levels of stress and feelings of being overwhelmed, yet all noted pride in themselves for moving across the country and persevering through their first semester. "It's exhausting, and yet I am here every day for my kids because I am committed to them," stated Teacher F. Teacher C shared, "Some days I feel like a complete failure, and yet I get up the next day and think—well, good for me…I am acting like a grown-up and moved across the country and I am a teacher."

Participants also noticed positive changes in themselves as a result of the intervention. Participants' abilities to articulate their feelings, needs, and perceptions while utilizing the specific skills and strategies discussed in the face-to-face sessions became evident. Participants expressed their feelings using words like *resilient*, *self-confidence*, *advocate*, and *persevere* more frequently in later sessions than in earlier sessions. Teacher C indicated, "Being adaptive has helped me a lot, and I've had lots of things thrown at me." Teacher A reported, "Yes, I know now that I am resilient. I can use that term with confidence now."

The pre- and post-intervention questionnaires were used to assess participant changes across the intervention. Initially, key words in each participant's response were highlighted. Then the responses were examined by question, noting similar trends across participant responses and highlighting big ideas. Similarly, the questionnaire's Likert-scale

items were reviewed first by participant response and then by question, with the frequency of each response for each question calculated to explore trends. For example, before the intervention, 50% of participants strongly agreed that they had a network of emotional support, whereas 83% strongly agreed at the end. Before the intervention, 50% of participants strongly agreed that they had overcome setbacks to conquer an important challenge, while 67% strongly agreed at the end. Tellingly, 50% of participants strongly agreed before the intervention that they finished what they started, but 100% strongly agreed at the end. The following are other notable results:

- 67% of participants reported becoming more aware of their stress level because of the intervention.
- 67% of participants reported an increase in their resilience.
- 83% of participants reported an increase in their ability to overcome setbacks.
- 67% of participants reported an increase in intentional communication of their own needs.

Overall, participants' needs, perceptions, and feelings were very similar to one another. They all experienced the initial culture shock of a move and orientation to teaching. Over the semester, they transitioned into feeling more comfortable in their new home state and school and mildly proud of their personal resiliency and perseverance. In the final face-to-face support session, most of the group was still struggling to decide if they had made the right career choice and decision to move across the country. Since the conclusion of the study, one participant has left the teaching profession, and the rest (83%) remain in the same district.

### *Intervention Impressions*

In the narrative portion of the questionnaire and in the interviews, participants noted changes in how they perceived themselves as a result of the intervention and how they found the intervention to be beneficial for their personal and professional growth. Participants reported that the support sessions, journal reflections, and mapping activities gave them the opportunity to intentionally pause to reflect and consider how they were changing. In some cases, participants discussed realizing that they may have been overconfident in their ability to navigate the complexities of the classroom and initially discounted the impact that moving would have on them. The reality of their first semester in a new state and new job stunned them, and they reported feeling grateful that the intervention allowed them to share their fears and feelings of being overwhelmed with others experiencing similar circumstances.

In considering the face-to-face sessions, participants noted that the sessions provided them with a place to come where they felt safe sharing their experiences, needs, feelings, and perceptions. The interviews revealed that an authentic sense of camaraderie and

community had developed within the group, and participants reported that they developed a greater awareness of their own resilience and stress-management abilities as a result of the sessions. Teacher A noted, "They've really helped me. I didn't really care what we talked about. I just wanted to be there. It made me feel important and special and cared for." Teacher F shared, "It was good to be a part of a group where everyone understood what everyone was going through. Like, we are all very different—do different things and come from different places—yet all understood that we were going through the same thing." Teacher E indicated, "Being pulled from the classroom adds a different aspect to the sessions because it doesn't cut into after-work planning or weekend relaxation; I can still get those things done…" All participants shared similar reflections about how the sessions provided them with a purposeful pause and a safe place to share their experiences. Their connections with each other provided them with a supportive community that they had not yet established elsewhere, being new to the state.

Discussing the journal reflections, participants shared that they viewed the reflections as important in increasing their self-confidence and valuable in providing them a visual reflection of their first semester of teaching. Teacher A noted, "Looking for pictures that showed my mood was cathartic, and I really liked working on the iPad." Teacher B shared, "Doing the weekly reflections using pictures allowed me to be creative and capture my experiences using whatever 'medium' I wanted…I could choose how to express my feelings and experiences." Teacher D responded, "It wasn't too much work, but it made us think about how we were feeling and what was going on." Overall, the response to the journal reflections was positive, and participants appreciated how the reflections created a forum to capture their thoughts and feelings and encapsulate their experiences into a weekly visual product.

## DISCUSSION

The focus of this study was to develop and evaluate supports for out-of-state beginning teachers in Arizona, to improve their first-semester experiences and perceptions, and ultimately to increase their retention. This study was small, though there are conclusions and recommendations that can be useful for other districts around the country. There is a growing concern that a very high percentage of young teachers will continue to leave the profession unless this issue is addressed (Tirozzi et al., 2014). The participants in this study said the intervention made them feel supported within their new teaching environment, and they were retained at a higher-than-average rate.

To retain beginning teachers, districts and schools need to understand the challenges of recruiting and retaining high-quality teachers. Budget cuts have drastically reduced induction and mentoring/support programming for teachers. The estimated cost for implementing an effective retention and induction program is $6,000 per teacher in Arizona

(Burroughs et al., 2019; Tirozzi et al., 2014). Increased education funding is imperative to resolve this state crisis: "Underfunding is a significant contributor to Arizona's low academic performance and its diminishing ability to promote excellence in teaching" (Tirozzi et al., 2014, p.8). Arizona teacher pay remains one of the lowest in the country, and the state maintains one of the highest class-size ratios in the nation (ASPAA, 2020). To navigate the teacher shortage, "Arizona's leaders must make a collective effort to ensure the recruitment and retention of effective teachers through increased funding and improved working conditions" (APSAA, 2020, para. 4).

The recommendations here were provided to Arizona districts that are deep in a retention crisis (ASPAA, 2020). This phenomenon of recruiting out-of-state beginning teachers and the transient opportunities of the profession affirm the ongoing need for differentiated support that address different needs than the ones of in-state beginning teachers (Evans et al., 2019). Only 31 states require induction and mentoring, and only 22 states explicitly encourage reduced teaching loads for new teachers or offer mentor teachers; thus, the framework presented in the study is relevant to consider across the nation (Evans et al., 2019). The considerations for the model are provided below by district level and site level.

This study, since it was conducted at the district level, did not directly impact the school-site-level contextual experiences of each participant, but it did create an overall awareness of the challenges faced by out-of-state beginning teachers. Districts must be responsible for creating support structures for such teachers. They can also prioritize district-level funding for beginning teacher retention, especially for out-of-state teachers.

This study identified critical components to be considered when creating a district-level plan. The creation of a small and intimate community experiencing similar challenges was a key component of the success of this intervention. In the interviews, participants noted that they felt supported and validated through sharing their experiences with others who faced similar challenges. Teacher E shared, "Being pulled out of the classroom to go to a support session that was set up to be relaxing was so helpful to me. In the sessions we pinpointed what those stressors were…that helped." This is supported by the literature as well; recent studies of beginning teacher retention and resilience in Australia reveal that different types of support are valued by beginning teachers (versus the types valued by veteran teachers) and appear to influence teachers' views of their own resilience (Downey, 2018; Mansfield & Beltman, 2014; Papatraianou & Le Cornu, 2014). The supports valued by beginning teachers include being listened to, being offered advice and professional knowledge, being acknowledged and appreciated, having the realities of teaching confirmed, and being challenged professionally (Downey, 2018; Mansfield & Beltman, 2014; Papatraianou & Le Cornu, 2014). All these forms of support appeared crucial to facilitating beginning teachers' resilience in this study as well. In receiving these types of support, participants reported feeling more confident and competent in their teaching roles, making

them able to successfully assume a positive teacher identity (Garcia & Weiss, 2019b; Papatraianou & Le Cornu, 2014).

A skilled facilitator who understands the experiences of beginning teachers is another key component in any intervention. The underlying foundations of the C.A.R.E. model were caring, compassion, and empathy. The personality and skills of the facilitator are thus a critical attribute for district support. Ideally, any beginning teacher support sessions would be run by someone who understands, empathizes with, and is willing to listen to participants' stories and experiences without solving every problem. In this study, the facilitator's focus was on empowering participants to advocate for themselves and ask for help and direction when needed. The facilitator also emphasized increasing self-efficacy and developing confidence to explore problems. Personal and professional lives are so intertwined for beginning teachers that it is important to find a facilitator who truly understands the duality of this group's experience in being new to the state and new to the profession: "All of the significant relationships in which the early career teachers engaged provided a variety of support, the nature of which crossed traditional boundaries of the personal and professional; school and home; and face-to-face and online" (Papatraianou & Le Cornu, 2014, p. 112).

Finally, district personnel can intentionally structure beginning teacher support systems to include multiple layers at the district and individual school site levels. Papatraianou and Le Cornu (2014) found that schools need to promote informal staff interaction, which allows new teachers to develop supportive relationships with colleagues. Further, district-level support systems need to acknowledge and invest in the provision of informal support and learning opportunities for beginning teachers (Garcia & Weiss, 2019b; Papatraianou & Le Cornu, 2014).

At the site level, administrators need to be fully informed about and committed to differentiating support for beginning teachers (Schlichte et al., 1999; A. Watkins, 2016; Weller, 1982; Williment, 2003). According to feedback from participants, school-site-level support from administrators committed to establishing positive relationships with beginning teachers was critical for their success. Administrators can also assist with communication about upcoming initiatives; by front-loading information to beginning teachers and giving them strategies for success, they continue to build relationships and empower beginning teachers as contributing members of the staff. Beginning teachers want to feel that their input and insights are valuable to their administrators: "A principal who advocates for making reasonable working conditions for new teachers district policy, can change the status quo" (A. Watkins, 2016, p. 3). The importance of a principal's acknowledgement and recognition of beginning teachers cannot be overstated.

Administrators can also prevent their beginning teachers from taking on too many after-school assignments, teams, or clubs (Garcia & Weiss, 2019b; Gossom, 2004; A. Wakins, 2016). Beginning teachers struggle with life/work balance, and efficient lesson planning and

grading is developed over time, leaving beginning teachers with less extra time than their veteran counterparts. The challenge is that beginning teachers tend to struggle financially, making the additional income from after-school opportunities highly appealing despite the additional burden and stress. Administrators must try to avoid overworking this group. Partnering beginning teachers and veteran teachers with shared responsibilities is one approach to consider. Administrators can also align beginning teachers with positive and encouraging staff members who are willing to provide guidance and mentoring (Tait, 2008; A. Watkins, 2016). Certainly, the decisions administrators make regarding their beginning teachers will impact the ultimate retention and self-efficacy of this group.

## LIMITATIONS AND RECOMMENDATIONS

One of the main limitations of this study is the small number of participants. While the intimacy of the group was a critical component in enhancing its success and feeling of community, it does limit the ability to generalize these findings to other out-of-state beginning teachers in similar programs in a different district with a different facilitator. This study was also contextually based on specific characteristics of the participants' school district, potentially limiting its applicability to other school districts with different characteristics. For example, release time was secured for participants to attend face-to-face sessions, so they were able to participate as part of the workday. Asking already-stretched beginning teachers to add to their workloads by coming to support sessions after school hours would likely not provide them the same benefits.

One limitation in data collection for this study was not recording the entirety of each support session, meaning there may have been data that was not fully documented or captured. Participants felt uncomfortable about having audio- or video-recorded sessions. Instead, a second recorder took notes during the sessions, as well as participating in a debriefing after each session, as an alternate way to capture and verify the majority of session content. Even with such note-taking, however, there may have been comments and ideas missed.

In terms of future directions, this study is just the beginning of this work. The goal was to create a systemic model of support for out-of-state beginning teachers to maximize the number who remain in teaching. It was about more than just retention, however. The C.A.R.E. model focused on changing self-perceptions and increasing resiliency in new out-of-state teachers. Their ability to reflect, advocate for themselves, navigate stressors, and develop into a supportive community is critical. This work is even more critical with the isolation that has emerged due to COVID-19 and teaching remotely (De La Rosa, 2020).

Despite our successes, there are changes we would suggest for this model's use in the future. In order to know if the intervention truly impacted retention, the model must be extended through the end of the school year to permit participants to decide their plans for

the following school year. At the end of this study, in the middle of the school year, our participants were at their lowest point (as expected) and thus uncertain about remaining in their teaching positions the following year. Extending these supports could bring them to the end of the year in a much more successful way.

The time of the face-to-face sessions also would ideally be shortened in future iterations. Each of our sessions was three and a half hours, which was too long according to participant feedback. As a result, there was a need to fill the time with content rather than allowing conversation and brainstorming to occur organically. The length of time lent itself more to formal professional development than to the informal, supportive setting we were attempting to create. Ideally, sessions would be approximately one and a half hours long and would take place at a coffee shop or other informal venue (rather than in a more formal training room as was the case in this study) to reinforce the focus on personal connection and sharing.

Extending the participant group is another avenue for improvement and expansion. Mansfield et al. (2019) note that school leaders may need direct professional learning on creating a collaborative culture that enhances resiliency. All teachers benefit from a positive school culture, but the beginning teacher is even more sensitive to positive and collaborative environments (Mansfield & Beltman, 2019; Mansfield et al., 2012; A. Watkins, 2016). Ongoing professional development for site administrators and district leadership that includes recognition of the needs of beginning teachers has the potential to broaden the impact of supporting these beginning teachers and increase their retention.

## CONCLUSION

Across the United States, beginning teacher retention rates are extraordinarily low; only 50% of teachers remain in the classroom after five years (AEE, 2004; Chang, 2009; Garcia & Weiss, 2019a; Ingersoll & Perda, 2012). The COVID-19 pandemic has exacerbated this crisis: "In fact the need for great teachers and leaders is now greater than ever, particularly for the students most affected by the crises at hand" (Lachalan et al., 2020, p. 2). This study supported out-of-state beginning teachers in Arizona, where the retention numbers continue to be in a crisis (ASPAA, 2020). In this context, a platform was created for a group of such teachers to share insights into their struggles to remain in teaching after the first year. It is clear that teachers must be nurtured and cared for in order for them to fully devote their time and energy to effectively caring for the students in their classroom. The type of support shown in this study, though provided only a small sample and was localized to an Arizona district, has the potential to support other beginning teachers who are from out of state or moving for their new jobs. Increasing self-awareness and resiliency has the potential to create a ripple effect to retain more beginning teachers, as they become more likely to

persevere, ask for help, connect with others, and achieve a healthy life/work balance while positively impacting students and their community.

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Research Article

# Investigation of COVID-19 Phobia and Satisfaction with Life Levels of Students Taking Special Talent Entrance Exams

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**Abstract:**

*There is no doubt that COVID -19 has affected the whole world in every aspect of life. In this study, it was aimed to determine the relationship between COVID-19 phobia and life satisfaction levels of students participating in special talent entrance exams and their views according to some demographic variables. The sample of the study consists of 320 participants who took the special talent exam from the departments of physical education and sports teaching and coaching education at the University of Sutcü İmam. The research is a quantitative study and it was carried out in relational scanning model. Data were collected in August-September 2020. In the analysis of data Jamovi 1.6.12 statistical software program was used. As a result of the research; COVID-19 phobia and life satisfaction level arithmetic mean scores of the participants were determined to be in the middle score range. In normal circumstances, it was determined that the fear of COVID-19 had a negative effect on the participants, while life satisfaction is expected to be high due to the athletic and young age of the participants. In terms of demographic variables, significant differences were found in the COVID-19 Phobia Scale' and 'Life Satisfaction Scale' scores. In correlation and regression analyses, it was concluded that psychological, somatic, social and economic variables, which are independent variables, showed a negative low-level significant relationship with the life satisfaction of students, and they were also a significant predictor of life satisfaction. The results obtained from this study are predicted to shed light on the psychological, social, economic and similar effects of COVID-19 fear on people and provide significant contributions to finding solutions on these issues.*

**Keywords:** COVID-19, Satisfaction with Life, Special talent, Exam, Student.

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## INTRODUCTION

The coronavirus disease, also known as COVID-19, originated in Wuhan, China, and has been spreading around the world, causing it to be declared as a global pandemic by the World Health Organization. This infectious disease continues to significantly affect people's living standards in different ways. Increasing rapidly, the disease-related cases and fatality rates cause many people to develop coronavirus fear or phobia. According to Üstün and Özçiftçi (2020), no fixed information exists about this disease that broke out in Wuhan in December 2019, while the rapid transmission of the disease and the continuous increase in the number of cases and deaths have turned into a kind of fear.

### *Significance of the Study*

It is assumed that the life satisfaction of individuals is negatively influenced by factors such as anxiety, stress, sadness, and uncertainty experienced by people during the COVID-19 Pandemic. The COVID-19 Pandemic-related anxiety and fear have become an important problem that influences the life satisfaction of individuals at different levels. One of the most important reasons for this research is that it is a matter of curiosity to find out the level of these problems and the extent to which such problems have reached. This study has revealed potential answers to satisfy such curiosity and to similar questions.

The target group of this research is the students who take special talent entrance exams, and individuals who do sports and are involved in the sports community. The target group consists of students who play sports as amateur or professional athletes or who are found eligible to participate in talent exams after having passed a certain score threshold determined in written exams. Under normal conditions, the life satisfaction of individuals who do sports is expected to be at good levels. It is also a matter of curiosity to what extent they experience the fear of COVID-19. This study, aimed at determining the level of COVID-19 phobia and life satisfaction of the students closely related to sports, will be shed light on obtaining information about the situation of other people in terms of a bigger impact. It is understood from a myriad of studies (Atılgan, 2018; Bingöl & Alpkaya 2016; Dalkıran & Tuncel, 2007; Koca et all., 2018; Dry 2003) that sportsmen are more advantageous in self-confidence, self-esteem, extroversion, and social competence, the sport has an important role in reducing mental fatigue, individuals who do sports generally have a positive view on life, and their life satisfaction is high because they are happy. Sport is a simple, cheap but important tool in preventing and treating some diseases (Akgün, 1993, p. 149,150). Whether the benefits of the above-mentioned sports on individuals accelerate the negative direction on life satisfaction due to COVID-19 phobia will be observed in the research findings.

The COVID-19 outbreak has affected individuals psychologically with reports of possible collective trauma beginning to appear (Garfin et al.2020). The increase in the rate of cases and deaths and a huge amount of news about the pandemic circulating constantly

on the agenda in the press may be a source of anxiety and concern. Some individuals feel beyond anxiety and develop a type of fear (Gencer, 2020). This research has been conducted for reasons of satisfying the curiosity about the psychological and social effects of COVID-19 disease on people through an in-depth analysis. Therefore, it aims to determine the relationship between coronavirus phobia and satisfaction with life levels of students participating in special talent entrance exams, identify their opinions based on various demographic variables, and examine whether there is a significant difference in terms of these opinions. The hypotheses related to the research are given below.

H1: There is a significant difference regarding coronavirus-19 phobia of students according to gender, age, education level, the order of preference, and COVID-19 anxiety.

H2: There is a significant difference regarding the order of preference and COVID-19 anxiety according to the satisfaction with life of the students.

H3: All perceptions of students of coronavirus-19 phobia in psychological, somatic, social, and economic dimensions are predictive of satisfaction with life.

### *Literature Review*

The literature review reveals that happiness is positively associated with life satisfaction (Cohn et al., 2009; Kaya & Orçan, 2019; Peterson, Park & Seligman, 2005). Sport is an important phenomenon that influences the spectators and those who play sports, which collectively constitute the important elements of the sports industry, revealing strong emotions. Such strong emotions make individuals feel happy and care about happiness at all times. Unhappy people should not be expected to focus on and maintain their work and sports. It is thought that the COVID-19 virus, which is called a pandemic disease, significantly affects the happiness levels of all sports elements, especially athletes (Atılgan, 2020). Aristotle drew attention to the importance of the concept of happiness for societies, defining it as a tool that includes the feelings of virtue and honor and that enables a healthy and enjoyable lifestyle in human life, and emphasized that the concept of happiness is related to leisure time. Happiness is a fundamental dimension of a person's life and is largely based on internal psychological processes involving individual values and goals (Agid et al., 2012; Sylvester, 2005). Due to the close meaning of the concepts of happiness and life satisfaction, we will have important ideas about the level of happiness with the learning of the level of the effect of COVID-19 phobia on life satisfaction through the result of this research.

The virus affects large populations in various aspects, including political, social, psychological and economic consequences (Arpacı, Karataş & Baloğlu 2020). In late 2020 and early 2021, huge increases in case fatality rates were observed. In line with the report of Üstün and Özçiftçi (2020), as of March 3, 2020, the estimated fatality rate announced by the World Health Organization is 3.4% worldwide due to the COVID-19 pandemic, while the analysis of these death cases reveals that the demographic profile is predominantly 2/3

in men, 1/3 in women, more than 80% are over the age of 60, and more than 75% have chronic diseases such as cardiovascular diseases, diabetes, and cancer. As put forward by Leonardo Pujol (2020) in December 2020, according to the Global Health 50/50 database, the number of men who lost their lives due to COVID-19 is higher than women in most of the countries where such data are available and accessible. The relevant rate is 62% in countries including Turkey, Serbia, Kyrgyzstan, and Hong Kong. In his book "On the Genetic Superiority of Women", Maolem cites data showing that women are biologically stronger than men, despite the role of behaviour and lifestyle choices.

Due to the measures taken by countries against the virus, the daily lives, as well as lifestyles of individuals, have completely changed (Pakpour and Griffiths 2020). People in quarantine lose their face-to-face connections and traditional social relationships, which in turn has been identified as a serious source of stress (Zhang et al.2020). Prospective studies have shown that a threatening event and its subsequent stress-related responses are associated with physical and mental health problems over time (Garfin at all.2018). People are forced to make a great number of changes in their lives to cope with mental and physical health problems arising from the COVID-19 pandemic. Many people were also inevitably forced to give up or change their habits and adopt new ones. It has been observed that coronavirus phobia and restrictions are disrupting the living standards of most people.

Employee interests require continuity commitment to the organization. Many employees continue to work to meet the basic needs of themselves and their families, even if they do not like their job. It was found that teachers' perceptions of professional burnout have a significant effect on organizational commitment and collective efficacy perceptions (Aydoğmuş & Tükel, 2019). Due to the COVID-19 Pandemic, employees also had to lose their current jobs. This situation also affects children / students in a chain. According the Dosil et all., (2019), The incessant social, cultural and economic changes in which society is immersed, does require developing coping skills towards change that allow teenagers to successfully develop as active subjects of society. Schnepfleitner & Ferreira (2021), By developing awareness and appreciation of personal and sociocultural context, educators can better facilitate transformative learning situations within existing contextual constraints. There is a need to help students actively participate and engage with the concepts presented in context.

The sample group of this study is comprised of individuals interested in amateur or professional sports, bearing in mind that these individuals fall into a group that is expected to have the ability of self-control to avoid developing any type of coronavirus phobia or its potential effects on their satisfaction with life even if such a phobia occurs. In other words, such an ability to control their self-confidence, self-efficacy, and self-esteem is essential. Van Yperen (2020) postulates that in some part of the training of athletes, it is essential to develop and maintain self-regulation skills. Self-regulation refers to all

resources that increase future performance and the act of consciously structuring the path to one's goals (Van Yperen, 2020). What is important here is to maintain self-regulation skills as well as to avoid or minimize situations such as anxiety and phobia in the individual's self with the intention of achieving satisfaction with life. Otherwise, the satisfaction with life of individuals may be adversely affected.

In the early days of the COVID-19, efforts were made to take precautions mainly in the context of medical science. Later, with the acceptance that this virus which has affected people of life in every field (psychological, social, economic, etc.), has started to be on the agenda of people. For example, the Ministry of Health in Turkey 'Science Board, microbiology, infection, intensive care, academics working in the field of pulmonology and internal medicine committee has been established. The physical and mental trauma experienced by those who survived this disease or the troubles experienced due to the death of their relatives and consequently the loss of work brought many economic difficulties.

Considering these factors, it has been observed that there is a need for collective action to prevent the virus; psychology, communications, statistics, composed of working in fields such as sociology of religion at the Ministry of Health in Turkey 'Social Science Council has been established. It can be considered as an important indicator of the necessity of these researches carried out with the establishment of the Social Sciences Board.

## METHOD

### *Participants*

According to Karasar (2015), the survey model includes arrangements made on a sample, using the whole population or a group of the population, in a population consisting of many elements, to make a general judgment about the population (p. 79-80). The population of the study consists of those taking special talent exams in the field of physical education teaching and coaching education departments of the Physical Education and Sports School of Kahramanmaraş Sütçü İmam University. Since all students in the research population were included in the research sample, no other sample selection was made. The scale forms were distributed to the participants to fill in a sufficient time. 320 usable feedbacks were provided for data from the collected forms. 37.2% (n = 119) of the participants included in the research sample are female and 62.8% (n = 201) are male. 17.8% of the participants are in the age group of 18-20 (n = 57), 44.7% of 21-23 (n = 143), 23.8% of 24-26 (n = 76), and 13.8% (n = 44) of 27 and over. 43.8% (n = 140) of the participants are high school graduates, 29.1% (n = 93) have an associate degree, and 27.2% (n = 87) have an undergraduate degree. The the order of preference of candidates for special talent entrance exams is teaching by 24.7% (n = 79) and coaching by 31.6% (n = 101), and coaching through evening classes by 43.8% (n = 140). Anxiety about COVID-19 during

participation in special talent exams is graded as “highly anxious” by 21.3% (n = 68), “a little bit anxious” by 33.8% (n = 108), and “never anxious” by 45% (n = 144).

### *Research Design and Data Collection Tools*

The research is a quantitative study carried out in a relational survey model. Relational survey models are aimed at determining whether there is a relationship between two or more variables, and if so, the degree and level of the relationship (Karasar, 2014). This study has been designed to find out the opinions of the students who take special talent exams during the pandemic process in terms of some demographic variables regarding the coronavirus phobia and satisfaction with life levels and whether there is a significant difference in these opinions. It also aims to reveal the effect of coronavirus phobia on the satisfaction with life of the participants. Approval was obtained from all students participating in this study via an "Informed Voluntary Consent Form". Also, a research approval was obtained from the Faculty of Medicine Clinical Research Ethics Committee of the Kahramanmaraş Sütçü İmam University with the 341-research protocol code and the decision numbered 19 and dated 09/09/2020.

**COVID-19 phobia scale (CP19-S):** The scale was developed by Arpacı, Karataş & Baloğlu (2020) as a 4-dimensional scale with 20 items and 5-point Likert (1: Strongly disagree and 5: Strongly agree). It consists of 'Psychological', 'Somatic', 'Social' and 'Economic' sub-scales. Sub-scale scores are obtained by the total score of the answers given to the items in that sub-scale while the total C19P-S score is obtained by the sum of the sub-scale scores and ranges from 20 to 100 points. The height of the scores indicates the height in the sub-scales and general coronaphobia. The Cronbach's alpha internal consistency coefficient of the scale was determined to be 0.926. In this study, the Cronbach Alpha coefficient was found to be 0.928.

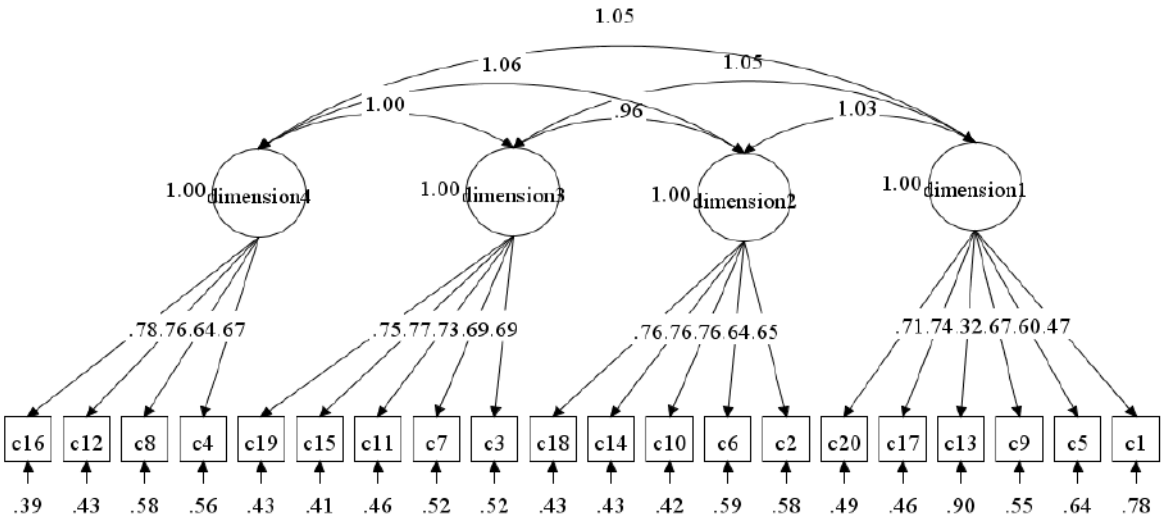


Figure 1. CP19-S Scale Diagram Model

Since the CP19-S scale has been developed recently, a Confirmatory Factor Analysis was conducted within the scope of this study to verify the four-dimensional structure of the scale. As a result of the analysis, it was observed that the four-factor structure of the scale was confirmed and the fit indices of the model were at good fit (SRMR = .40) and acceptable levels ($x^2$ / sd = 2.42, CFI = .94, TLI = .93, RMSEA = .067).

**Satisfaction with life scale:** Developed by Diener, Emmons, Larsen & Griffin (1985, 72), the "Satisfaction With Life Scale" was adapted into Turkish by Dağlı & Baysal (2016). The original form of the scale consists of a factor, 5 items, and a 7-point scale of Likert type. The scale had already been adapted into Turkish by Köker (1991) and used by various scholars in Turkey as a 7-point scale. Dağlı & Baysal (2016) identified that the responses of 7-point as in the original form of the scale were not appropriate for the Turkish culture and reduced these points to five. Then, the scale was readapted into Turkish from English to take its final form. The scale is graded as "Strongly disagree (1), Slightly disagree (2), Neither agree nor disagree (3), Highly agree (4) and Strongly agree (5)". The Cronbach's alpha internal consistency coefficient of the scale was determined as .88, while in this study, the Cronbach Alpha coefficient was found to be .79.

### *Data Analysis*

The data of the study were analysed by using Jamovi 1.6.12 statistical software program. Whether the scores obtained show normal distribution or not was examined via the skewness coefficient method to determine the tests to be used in the study (Büyüköztürk, 2018, p. 40). The skewness values obtained as a result of the analysis were calculated as "-.287" for the "COVID-19 Phobia (CP19-S) Scale" and ".383" for the "Satisfaction with Life Scale". It is assumed that the values range between +1 and -1 and the distribution is normal. The t-test and One-Way Analysis of Variance (ANOVA) tests were used to determine the differentiation of participants' opinions in terms of demographic variables. In groups with significant differences, the Post-Hoc Tests was used to determine the source of the difference. In addition, the researchers investigated whether there is a meaningful relationship between the "COVID-19 Phobia Scale" and "Life Satisfaction Scale".

## RESULTS

Table 1

*Participants' Judgements of the Order of Fear-type Emotion Verbs on the Scale*

| Scales | N | Min-Max | $\overline{X}$ | SS |
|---|---|---|---|---|
| **COVID-19 Phobia Scale** | 320 | 20-126 | 63.54 | 17.16 |

Arpacı, Karataş & Baloğlu (2020), who developed the CP19-S scale, stated that the scores ranged between 20 and 100 points, and high scores indicated a higher overall coronaphobia. According to Table 1, the average score of the CP19-S scale of the participants is medium.

Table 2

*The arithmetic mean and standard deviation values of the CP19-S scale and satisfaction with life scale scores of the participants*

| **Scales** | **N** | **Min-Max** | $\overline{x}$ | **SS** |
|---|---|---|---|---|
| **CP19-S** | 320 | 1- 6.3 | 3.18 | .86 |
| **Satisfaction With Life Scale** | 320 | 1-5 | 2.68 | .87 |

Table 2 shows that the average scores of the participants for both scales are medium.

Table 3

*Independent group t-test results according to the gender variable scores of the participants*

| **Scales** | **Gender** | **N** | $\overline{x}$ | **SS** | **sd** | ***t*** | ***p*** |
|---|---|---|---|---|---|---|---|
| **CP19-S** | Female | 119 | 3.01 | .99 | 318 | -2.67 | .008* |
| | Male | 201 | 3.27 | .76 | | | |
| **Satisfaction With Life Scale** | Female | 119 | 2.80 | .99 | 318 | 1.79 | .075 |
| | Male | 201 | 2.61 | .78 | | | |

*($p$<0,05)

According to Table 3, no statistically significant difference was found in the scores of the satisfaction with life scale $t$ (318) = 1.79; $p$<0.05. in terms of the gender variable as a result of the t-test, while a significant difference was found in the CP19-S scores t (318) = -2.67 $p$<0.05. It is observed that male participants ($\overline{X}_{male}$=3.27) have significantly higher levels of coronaphobia compared to female participants ($\overline{X}_{female}$=3.01).

Table 4

*One-way analysis of variance (ANOVA) results of the COVID-19 Phobia Scale scores according to the variables of age, education level, the order of preference, and COVID-19 anxiety*

| Variables | Category | N | $\overline{X}$ | SS | *F* | *p* | Groups with differences (Post-Hoc Tests) |
|---|---|---|---|---|---|---|---|
| **Age** | 18-20 (a) | 57 | 2.92 | 1.01 | 5.44 | .001* | d – a, b, c |
| | 21-23 (b) | 143 | 3.17 | .90 | | | |
| | 24-26 (c) | 76 | 3.13 | .64 | | | |
| | 27 and over (d) | 44 | 3.60 | .67 | | | |
| **Education level** | High School (a) | 140 | 2.97 | .97 | 7.70 | .001* | b, c - a |
| | Associate Degree (b) | 93 | 3.38 | .76 | | | |
| | Undergraduate Degree (c) | 87 | 3.30 | .67 | | | |
| **The order of preference** | Teaching (a) | 79 | 3.36 | .95 | 3.66 | .027* | a - b |
| | Coaching (b) | 101 | 3.02 | .86 | | | |
| | Coaching – Evening classes (c) | 140 | 3.19 | .78 | | | |
| **COVID-19 Anxiety** | Highly Anxious (a) | 68 | 4.11 | .45 | 78.69 | .000* | a - b, c |
| | A little bit anxious (b) | 108 | 2.82 | .66 | | | |
| | Never anxious (c) | 144 | 3.00 | .83 | | | |

*($p$<0.05)

As is seen from Table 4, as a result of the analysis, statistically significant differences were found in the variables of age $F$ (3.316) = 5.44; $p$<0.05., education level $F$ (3.316) = 7.70; $p$<0.05., the order of preference $F$ (3.316) = 3.66; $p$<0.05. and COVID-19 anxiety $F$ (3.316) = 78.69; $p$<0.05. The Post-Hoc Tests was conducted to determine among which groups the difference occurred. In terms of the age variable, a statistically significant difference of $p$<0.05 was found between the COVID-19 phobia levels of the participants in the age groups of 18-20, 21-23, and 24-26, and the age group of 27 and over. One may also notice that the COVID-19 phobia levels of the participants in the age group of 27 and over are significantly higher than the other age groups.

The analysis related to education level reveals that the COVID-19 phobia levels of the students with an associate degree and undergraduate degree are significantly higher than graduates of high school. One may observe that in terms of the the order of preference variable, the COVID-19 phobias of the participants whose first choice is teaching is significantly higher than the participants whose first choice is coaching and that students who are highly anxious in terms of the COVID-19 anxiety variable have significantly higher levels of COVID-19 phobias than students who are a little bit anxious and never anxious.

Table 5

*One-way analysis of variance (ANOVA) results of the satisfaction with life scale scores of the participants according to the variables of age, education level, the order of preference, and COVID-19 anxiety*

| Variables | Category | N | $\overline{X}$ | SS | *F* | *p* | Groups with differences (Post-Hoc Tests) |
|---|---|---|---|---|---|---|---|
| **Age** | 18-20 (a) | 57 | 2.84 | .88 | 1.93 | .124 | – |
| | 21-23 (b) | 143 | 2.63 | .94 | | | |
| | 24-26 (c) | 76 | 2.56 | .79 | | | |
| | 27 and over (d) | 44 | 2.86 | .74 | | | |
| **Education level** | High School (a) | 140 | 2.71 | 1.00 | .257 | .773 | – |
| | Associate Degree (b) | 93 | 2.63 | .72 | | | |
| | Undergraduate Degree (c) | 87 | 2.69 | .81 | | | |
| **The order of preference** | Teaching (a) | 79 | 2.35 | .88 | 7.71 | .001* | b, c – a |
| | Coaching (b) | 101 | 2.80 | .85 | | | |
| | Coaching – Evening classes (c) | 140 | 2.77 | .85 | | | |
| **COVID-19 Anxiety** | Highly Anxious (a) | 68 | 1.94 | .67 | 38.71 | .000* | b, c – a |
| | A little bit anxious (b) | 108 | 2.88 | .80 | | | |
| | Never anxious (c) | 144 | 2.88 | .82 | | | |

*($p$<0.05)

As a result of the analysis shown in Table 5, no statistically significant difference was found in the satisfaction with life scale scores of the participants in terms of age ($F$ = 1.93; $p$ = .124) and education level ($F$ = .257; $p$ = .773) variables. A statistically significant difference was found in the variables of the order of preference $F$ (2.317) = 7.71; $p$<0.05., and COVID-19 anxiety $F$ (2.317) = 38.71; $p$<0.05..

It is observed that the satisfaction with life levels of the participants whose first choice is teaching are significantly lower than the participants whose first choice is coaching and coaching of evening classes. Besides, the levels of satisfaction with life of the students who are highly anxious in terms of the COVID-19 anxiety variable are significantly lower than the students who are a little bit anxious and never anxious.

Table 6

*Correlation results between psychological, somatic, social, and economic sub-scales of COVID-19 phobia scale variables and satisfaction with life scale scores*

| Variables | Psychological | Somatic | Social | Economic |
|---|---|---|---|---|
| **Satisfaction with life** | -.193* | -.276* | -.279* | -.242* |

N=320

*$p$<.05

Table 6 reveals that there is a negative and low level of a significant relationship between the satisfaction with life scores of the participants and psychological (r = -. 193), somatic (r = -. 276), social (r = -. 279), and economic (r = -. 242) as independent variables. It

can be stated that as the phobia of the participants about COVID-19 increases, their satisfaction with life scores decrease.

Table 7

*Results of standard multiple regression analysis regarding the prediction of satisfaction with life of psychological, somatic, social and economic sub-scales of COVID-19 phobia scale variables*

| Variables | B | Sh | B | T | *p* |
|---|---|---|---|---|---|
| **Fixed** | 3.559 | .180 | | 19.728 | .000* |
| **Psychological** | .115 | .083 | .129 | 1.385 | .167 |
| **Somatic** | -.223 | .113 | -.234 | -1.981 | .048 |
| **Social** | -.247 | .109 | -.253 | -2.272 | .024 |
| **Economic** | .071 | .113 | .076 | .629 | .530 |

R= 0.303 $R^2$= 0.092

*F* (4. 315)=7. 98 *p*= .000

According to Table 7, the psychological, somatic, social, and economic sub-scales of the COVID-19 phobia scale have a low and significant relationship with the satisfaction with life scores of the students (R = 0.303, $R^2$ = .092, $p$ <.05). Psychological, somatic, social, and economic sub-subscales explain about 9% of the total variance in students' satisfaction with life.

## DISCUSSION

This study was conducted during an extraordinary period during which the COVID-19 disease broke out and spread all over the world. In light of various analyses, it was observed that the COVID-19 phobia score (63.54) and the arithmetic mean scores of the COVID-19 phobia scale and satisfaction with life scale were found to be at a medium level. Gencer (2020) found that the average overall score obtained from the coronavirus fear scale was close to the medium level. Before May 2020, Arpacı, Karataş, & Baloğlu (2020) found the average of coronavirus 19 phobia scores as (mean = 65.42) in their research on the 17-89 age group. Although the age group in our study is generally under 35, the mean scores are close. This may be attributed to the fact that the second wave of the virus began to appear in the world in August-September, 2020. In addition, this can be explained by the idea that the low COVID-19 phobia score reduces the effect of the virus on young people, in other words, the low mortality rate in the young population.

There was no significant difference in life satisfaction scale scores in terms of the gender variable. In a study conducted by Tümkaya, Çelik, and Aybek (2011) on students, it was stated that life satisfaction did not differ according to gender. The coronavirus 19 phobia was significantly higher in men than women based on the results of the CP10-S

scale. As is observed from the explanations of scientists enlightening us on social media and TVs, it has been known that women are more resistant to this virus, and men who are infected with the COVID-19 virus are more likely to die, and such realities affect phobia perceptions. Üstün and Özçiftçi (2020) support this result in the studies of Leonardo Pujol (2020). In Zoralioğlu's (2020) study, it was found that male patients had lower oxygen saturation, longer hospital stay, and more severe CT findings than women. Ünal (2020) found the behavioural protection from coronavirus score of women higher than men in his research.

In terms of the age variable, it was concluded that the COVID-19 phobia levels of the participants aged 27 and over were significantly higher than the other age groups (18-20, 21-23 and 24-26 years). Given the data of the World Health Organization and the health ministries of countries, the belief that the virus affects young people less and the number of young people in mortality rates may show an effective variation on the COVID-19 phobia.

In terms of the educational level variable, it was concluded that the COVID-19 phobia levels of the students with an associate degree and undergraduate degree were significantly higher than graduates of high school. As the level of education increases, the level of consciousness increases, thus; the level of taking measures against the virus as well as of the phobia increases. Sever and Özdemir (2020) concluded that university students experience a sense of burnout during the pandemic process.

It was concluded that in terms of the the order of preference variable, the COVID-19 phobias of the participants whose first choice is teaching was significantly higher than the participants whose first choice is coaching. As students are supposed to be in the first 300,000 among the 2,296,138 candidates who took the exam in the university entrance exams (according to the data of the Center for Assessment, Selection, and Placement) to be eligible to choose a department of teaching, the accumulation of knowledge and education level of the students is higher, which is possibly a result that supports each other with the findings of the educational level variable.

It was concluded that highly anxious students had significantly higher levels of COVID-19 phobia than students who are a little bit or never anxious. High results of COVID-19 phobia among highly anxious students are potentially expected results that are rationalized in this research. Üstün and Özçiftçi (2020) purported that "The existing panic and anxiety have turned into a kind of fear due to the rapid transmission of the disease and the continuous increase in the number of patients and deaths." It was determined that the satisfaction with life levels of the participants whose first choice is teaching were significantly lower than the participants whose first choice was coaching and coaching during evening classes. While the level of phobia increases inversely with the COVID-19 phobia, the level of satisfaction with life decreases.

In terms of the COVID-19 anxiety variable, it was found that the satisfaction with life levels of highly anxious students were significantly lower than a little bit anxious students or students with no anxiety at all. It was determined that there is a negative low-level significant relationship between the satisfaction with life scores of the participants and the independent variables, including psychological, somatic, social, and economic factors. It can be stated that as the COVID-19 phobia of the participants increases, their satisfaction with life scores decrease. It is stated by Afacan and Avcı (2020) that health and lifestyle are closely related to each other. Chen et al. (2020) suggest that precautions against the spread of the virus may lead to a lifestyle that may also cause various chronic health problems by increasing anxiety and depression, as well as causing inactivity. Bakioğlu et al. (2020) recommend developing strategies to protect mental health and increasing psychological resilience during the COVID-19 pandemic.

Ensuring measurement invariance is a prerequisite for meaningful comparisons between groups and at different times (Akın Arıkan & Demirtaş Zorbaz, 2020). This study was conducted in the time period when the level of first wave of COVID-19 virus decreased in many countries in the world and the level of wave 2 started in some countries. It is thought that conducting new studies with the measurement tools used in this research or with different scales can provide significant benefits to acquiring new information and maturing ideas. In the event of the end of the virus, making new measurements with similar measurement tools can provide results in different dimensions and develop new perspectives.

## *Conclusion and Recommendations*

As a result, a significant relationship was found between scores of the COVID-19 phobia scale and satisfaction with life scale. Besides, demographically significant relationships were found between the COVID-19 phobia and satisfaction with life. The results have a consistent pattern with the results of research in medical sciences and psychosocial fields, and the inferences could be interpreted depending on the opinions of the participants. By using the results of this research, strategies to prevent disease-related phobias can be developed to increase people's satisfaction with life.

This study has some limitations. It was only carried out on the students who took the special talent exams. The satisfaction with life scale used in this study can be seen as a good start to understand students' satisfaction. Therefore, in future studies, it is estimated that significant contributions will be made to the literature if analysis could be made on stress, anxiety, happiness, motivation, academic achievement, future anxiety/expectation, attitude and similar concepts together with the COVID-19 phobia scale. Also, conducting analyzes for students in all departments at a university and in several different countries will provide a very robust and interesting study. In the light of the information to be obtained, it is ensured that the psychological and social problems will be seen concretely in the society along with easier solutions.

Given the studies on the life satisfaction levels of students and other individuals in the period before the pandemic (Akyol, Başaran & Yeşilbaş, 2018; Çivitçi, 2012; Dorahy et al., 2000; Gündoğar et al., 2007), it is understood that life satisfaction was at high levels. It can be said that the pandemic has changed the life satisfaction level of the students.

This study which was conducted during the tough times of the pandemic is fairly enlightening when it comes to the emotional and psychological effects of the COVID-19 on students. The results of this study will be useful in the field of knowledge for current higher education administration and future researchers to better understand how a global pandemic determines students' satisfaction and their ability to succeed in academic careers.

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Research Article

# Primary school teachers' views on Syrian Students' Turkish and math skills and the confronted challenges

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**Abstract:**

*This research attempts to reveal the views of the primary school teachers, having Syrian students in their class, on these students' Turkish and mathematics skills and the challenges they have confronted in the classroom. The research used a mixed research method and 347 primary school teachers who met the criterion of having Syrian students in their classes participated in the research. Quantitative data were gathered through a five-point Likert type questionnaire consisting of 27 questions, and qualitative data were collected with eight open-ended questions. Descriptive statistical methods were used during quantitative data analysis and descriptive analysis for qualitative data. The research findings revealed that Syrian students' reading, reading comprehension and problem solving skills were not sufficiently developed due to the lack of speaking Turkish. In the same vein, there were communication problems with students and parents due to the language barrier which affects Syrian students' choice of friends and their success in classes. Another research finding suggested that Syrian students were at a satisfactory level in operational skills that do not require verbal knowledge, especially in mathematics lesson. In addition, the parents were identified to be indifferent to the students' lessons and they did not help with their homework. The participants' common view was that Syrian students should receive Turkish education in separate classes (preparatory class) in order to solve the language problem before schooling.*

**Keywords:** Refugee education, refugee children, Turkish skills, math skills, primary school teachers.

**Citation:**

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## INTRODUCTION

Due to reasons such as famine, hunger, civil war, human rights violations, economic and political problems in the world, people leave their countries and migrate to other countries. Therefore, the lives of children uprooted from their countries are interrupted and various problems such as abduction, rape, early marriage, child labor, and staying away from school are encountered (Boyden, de Berry, Feeny, & Hart, 2002; McBrien, 2005). Education serves as one of the substantial factors in restoring the feeling of normalcy and returning to a normal life for children who have been uprooted from their country (Peterson, 2011, Talbot, 2015). Besides, education is required to build a peaceful future and to gain a hopeful approach about the future (Sinclair, 2001; IIEP-UNESCO, 2011; Talbot, 2015). The United Nations High Commissioner for Refugees (UNHCR) (2000) states that education is not only a profound human right, but also one of the fundamental factors for the healing of refugee children. In this regard, it is essential for refugee children to have educational opportunities.

### *Second language acquisition and identity*

Refugee children need language support so that they can communicate with others, learn the language of the host country and develop a sense of belonging. Language is a factor that can support or prevent the integration of refugee children (Cerna, 2019). Refugee children often attach importance to the acquisition of that country's language for their future success in the new country (Pryor, 2001). However, language proficiency may vary significantly across different dimensions. For instance, children may be competent at colloquial and spoken language, while they may be far behind in academic language (McBrien, 2005). Cummins (1981) explained this by advocating that Basic Interpersonal Communication Skills (BICS) and Cognitive / Academic Language Proficiency (CALP) are qualitatively different skills. Cummins (1981) stated that BICS includes skills such as pronunciation, basic vocabulary and grammar that are needed in everyday communication situations. Most refugee students can rapidly develop these skills in about two years after the first exposure to the second language. Cognitive Academic Language Proficiency (CALP) focuses on proficiency in the academic language or language used in the classroom in various content areas. In addition to language acquisition, students need to develop skills such as comparing, classifying, synthesizing, evaluating, and inferring during the development of academic competence. Therefore, it takes at least five years for students who acquire a second language to develop the CALP. Language skills are essential not only for academic success, but also for students with immigrant or refugee backgrounds to develop a sense of school belonging (Cerna, 2019). It may be useful to encourage refugee students to express their opinions and participate in class discussions in order to help them form their personal identity (Mosselson, 2006).

Creating and reconstructing identity plays a significant role in the integration of refugee students into schools and communities. Schools are places for socialization and thus

having a responsibility to help refugee students understand the new country and become a part of it (Kaprielian-Churchill, 1996). If refugee students cannot balance their own culture with that of the host country, it may be difficult for them to adapt to the new country (Nakeyar, Esses, & Reid, 2017). Therefore, combining the culture of the host country with their own culture is paramount in the refugee students' adaptation and learning process (Kaprielian-Churchill, 1996).

### *Models of refugee education and applications in Turkey*

The increasing refugee or asylum-seeking population due to these forced migrations entails the countries to take measures and develop education policies. In this regard, countries have adopted different integration models to ensure the integration of migrants and refugees. Assimilation and multiculturalism models are two main models among these models (Choquet, 2017). The assimilation model is built on a universalist policy that attributes the same rights to everyone regardless of their differences, based on the principle of equal dignity for its citizens considering cultural and religious differences (Choquet, 2017). The multicultural model, on the other hand, is based on a policy of difference based on a universalist assumption: all citizens should have the right to live according to their culture and religion (Choquet, 2017). The aim of both models is to ensure that all citizens are equal, but differ in the way they are encouraged.

In this context, countries embrace three different models to adapt refugee students to their current education system (Tsioupis & Paida, 2020). The first of them is a separate site, where refugee students are placed for different periods, and a separate school model (Nilsson & Bunar, 2016; Short, 2002; Short & Boyson, 2012). While this model is implemented for middle school and high school students in the USA and at the local level (in Malmö city) in Sweden for refugees aged 13-15. The second model used especially for 7-9-year-old refugee students is Direct Immersion model, in which students are directly admitted to the current education system (Nilsson & Bunar, 2016). In this model, the new student is directly placed in one of the existing classes, with or without the support of second language (Nilsson & Bunar, 2016). The third model for refugees is a separate classroom or in-school program. In this model, students who have insufficient language skills to participate in normal classes are taught in a class called transition class, preparatory class, or admission class (Nilsson & Axelsson, 2013; Short, 2002; Short & Boyson, 2012). According to the European Commission report published in 2019, 42 European countries adopted the separate classroom model for the students with migrant background (Cited in: Tsioupis & Paida, 2020).

The separate model is put into force for primary and secondary school students in Turkey by establishing "Temporary Training Centers" (TTC) (Human Rights Watch, 2015; Nilsson & Bunar, 2016; Short, 2002). A model of separate sites, Temporary Training Centers in Turkey (TTC) were opened inside and outside the camps in the Syrian border provinces. A program of Arabic and Turkish education was implemented in these centers.

The opening of these centers was later left to the approval of the governorships (MoNE, circular numbered 2014/21) and their number was increased. However, Project on Promoting Integration of Syrian Kids into the Turkish Education System (PIKTES) was implemented in 2016 with a view to adapting refugee students to the education system and help them learn languages. Thanks to this project, the number of students enrolled in public schools increased, the need for TTCs decreased and these centers started to close. School age children in Turkey are given the right to register directly to the state schools (Ministry of Education, Circular No. 2014/21) and placed in an appropriate class considering their age, and the second model was applied. According to the Immigration Administration General Directorate of September 2020 data, there are 1.197.124 Syrian school children in Turkey (5-17 years). 770.924 of these children are enrolled in the e-school affiliated to MoNE and FSIMS (Foreign Student Information Management System) (General Directorate of Lifelong Learning, 2021). These data indicate that direct immersion model is widely used in Turkey. Adaptation classes were opened in schools in Turkey within the scope of PIKTES in order to ensure the adaptation of refugee students to the education system and to help them learn a language (MoNE, circular 2019/15). Adaptation classes can be opened with at least ten students at each grade level, if there are no ten students, the multigraded class is provided as such: 3th and 4th grades in primary schools; 5th and 6th grades; 7th and 8th grades in secondary schools (MoNE, 2019/15 circular). Turkish teachers are assigned in these adaptation classes and these teachers conduct Turkish lessons. Branch teachers are assigned for other branch courses, but if there is no branch teacher, Turkish teachers also carry out the branch courses (MoNE, 2019/15 circular).

### *Problem statement*

Different models used around the world and in Turkey facilitate refugee students to adapt to the current education system and to reach the school. However, the studies conducted on the education of refugee or asylum-seeking children demonstrate that these children also encounter various obstacles and problems when they reach school (Aldaraghmeh, 2020; Aydın & Kaya, 2019; Avcı, 2019; Block, Cross, Riggs & Gibbs, 2014; Boylu & Işık, 2020; Gencer, 2017; McBrien, 2005; Taylor & Sidhu, 2012). Of all the problems, the language barrier is the leading one (Aydın & Kaya; 2015; Bosswick & Heckmann, 2006; Dolapçıoğlu & Bolat 2019; Human Rights Watch, 2015; Khawaja, & Howard, 2020; Özkale & Yanpar-Yelken, 2020; Papapostolou, Manoli & Mouti , 2020; Ünal, Taşkaya, & Ersoy, 2018; Yohani, 2010). In addition to language problems, refugee students have various problems such as academic failure (Çelik, 2019; Khawaja, & Howard, 2020; Yurdakul & Tok, 2018), peer problems (Samara, El Asam, Khadaroo, & Hammuda 2019), adaptation problems (Dolapçıoğlu & Bolat 2019; Gün & Baldık, 2017; Lerner 2012; Levent & Çayak, 2017; Samara et al., 2019; Uzun & Bütün, 2016), discrimination (Heckmann,2008; Levent & Çayak, 2017; Mcbrein, 2005; Uzun & Bütün, 2016) and non-communication (Aydın & Kaya; 2015; Çimşir & Baysal 2020; Dolapçıoğlu & Bolat, 2019; Gün & Baldık,

2017; Levent & Çayak, 2017; Uzun & Bütün, 2016). Besides, studies showed that refugee students had low Turkish language proficiency and experienced problems in their reading and reading comprehension skills, which negatively affects their academic achievement (Aydın & Kaya, 2015; Aykırı, 2017; Boylu & Işık, 2020; Çimşir & Baysal, 2020; Hamilton, Lunenburg, Slate & Barners, 2021; Stathopoulou and Dassi, 2020). Some of the researches revealed that parents, just as refugee students, also had problems in communicating and supporting their children due to the language barrier (İstanbul Bilgi University Children's Studies Unit (ÇOÇA), 2015; Oikonomidoy & Karam, 2020; Tsioupis, & Paida, 2020).

Schools need to take some precautions and interventions in order to solve or minimize these problems and to ensure students' learning. Still, no improvement was observed in some of the refugee students' academic achievement despite the measures (Kaplan et al., 2016). If students are not progressing with the attempts made in such situations, the issues need to be revised and evaluated in depth (Khawaja & Howard, 2020). There is limited information about why refugee students, who perform significantly lower than expected performance and have difficulty in acquiring literacy and numeracy skills, experience difficulties in these issues (Khawaja & Howard, 2020). A review of literature indicated few studies dealing with the skills of refugees in Turkish and mathematics lessons (Aldaraghmeh, 2020; Biçer & Özaltın, 2020; Boylu & Işık, 2020; Demir & Alyılmaz, 2020; Tiryaki & Oğraş, 2020) and this subject has been found worth researching. Aldaraghmeh (2020) searched the problems of refugee students in Turkish speaking skills; Biçer and Özaltın (2020) analyzed the Turkish language skills of Syrian students and their adaptation to school; Boylu and Işık (2020) examined the situations encountered in the learning process of refugees who learn Turkish in provinces where Syrian refugees are intensely populated, and in their teaching Turkish; Demir and Alyılmaz, (2020); Tiryaki and Oğraş (2020) sought teachers' views on the teaching process of Turkish lessons to Syrian students. This research, unlike the studies mentioned above, dealt with the primary school teachers' views regarding Syrian students' Turkish and mathematics skills and the challenges they have confronted. The starting point of this research was the deficiencies and problems related to Turkish and mathematics skills that the researcher observed in the Syrian students in her classroom and school while working as a teacher at a primary school with 1906 students (405 Syrian students) in 2019. Thus, it was wondered about whether other primary school teachers with Syrian students in their class had similar problems as well, and it was considered as a topic worth researching.

### *Purpose of the study*

This research attempts to examine the primary school teachers' views on Syrian Students' Turkish and mathematics skills and the challenges they have confronted. In line with this aim, answers to the following questions were sought:

1. What are the primary school teachers' views on Syrian Students' Turkish skills?

2. What are the primary school teachers' views on Syrian students' math skills?

3. What are the primary school teachers' views regarding the challenges they have confronted with Syrian students in the classroom?

### *Significance of the Study*

The research findings are paramount in terms of revealing the status of Syrian students in Turkish and mathematics lessons and finding solutions to the problems experienced on this subject. In line with unveiling the current level of Syrian students, students' needs are also identified to gain the skills of these courses. In this regard, teachers' sharing of their experiences and recommendations will serve as an example to their colleagues who teach Syrian students. The findings will provide information to schools, teachers and those concerned in order to increase the quality of education offered to Syrian students, to develop curricula and to improve their cultural adaptation as well as academic performance.

## METHOD

### *Research Design*

Having a descriptive research design, the research used a mixed research method. This research method is conducted by using quantitative and qualitative methods together in line with the principles of pragmatist philosophy in order to examine the research problem comprehensively and multidimensionally (Yıldırım & Şimşek, 2016). Mixed research as a method focuses on the collection, analysis and integration of both qualitative and quantitative data; thus, it provides a better understanding of the research problem than any method used alone (Creswell & Plano Clark, 2007: cited in Creswell & Plano Clark, 2014). The reason for choosing the mixed method in this research was to obtain information from more participants regarding the level of skills that Syrian students should acquire in Turkish and mathematics lessons; the reasons why these skills are sufficient or insufficient and the problems experienced are examined in detail and in depth with qualitative data. In this regard, the research welcomed the convergent parallel design, one of the mixed research designs. This design entails that the researcher collects quantitative and qualitative data in the same phase (simultaneously), but analyzes the two data types independently, and interprets the findings together (Creswell & Plano Clark, 2014). In this research, quantitative and qualitative data weigh equally. During the data collection process, quantitative and qualitative data were collected simultaneously; the data were analyzed independently in the analysis phase, and then the findings were combined and interpreted and the results were obtained in the discussion phase (Figure 1).

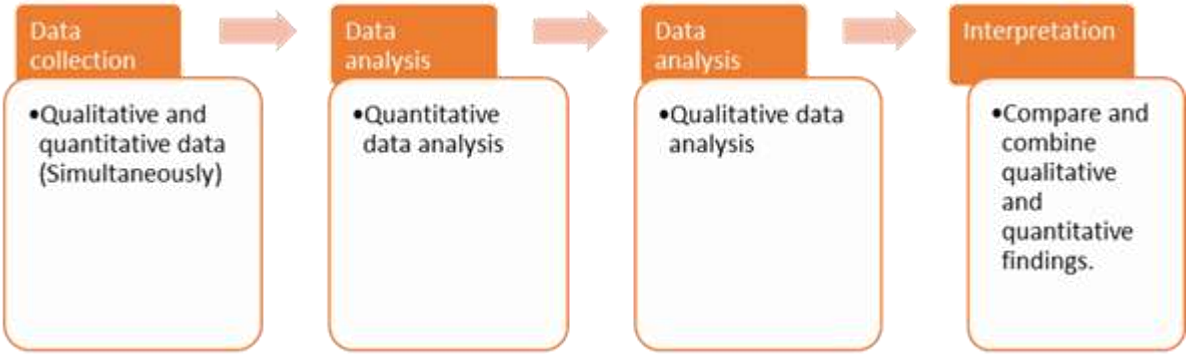


***Figure 1:*** Research Process regarding Convergent Parallel Design

### *Instrumentation and data collection*

The quantitative data were obtained by administering the questionnaire called "Problems confronted by Syrian students during their educational process" to primary school teachers. The questionnaire, developed by Ergen and Şahin (2019), is a five-point Likert type and consists of 27 questions. Cronbach's Alpha reliability analysis was performed for the reliability coefficient of the data collected with the questionnaire. Cronbach's Alpha reliability analysis is used in cases where items are scored by the grading method (Can, 2018). The reliability coefficient was not included in the study conducted by Ergen and Şahin (2019). The Cronbach's Alpha reliability coefficient was determined as .65 in the present research. If the Cronbach's alpha value is 0.60 <R2 <0.80, it is considered highly reliable (Yıldız & Uzunsakal, 2018). The level of reliability indicates that the questionnaire can be used. The scoring of the questionnaire is as follows (Ergen & Şahin, 2019):

(a) “totally disagree" between 1.00-1.49;

(b) "less agree" between 1.50-2.49;

(c) " moderately agree " between 2.50-3.49;

(d) “mostly agree” between 3.50-4.49 ;

(e) "totally agree" between 4.5-5.00

Qualitative data were collected with 8 open-ended questions prepared by the researcher in order to obtain in-depth data and support quantitative data. For the validity of the open-ended questions, the views of two experts with doctoral degrees in educational sciences were consulted and corrections were made in line with their recommendations. The views of 30 teachers working at 15 different schools were taken in written and the collected data were analyzed through using a descriptive analysis method.

### *Participants*

This research was conducted with teachers having Syrian students in their classrooms in schools located within the central districts of Adana during the 2019-2020 academic year. Criterion sampling, one of the purposive sampling methods, was used in the research. The criteria were determined as having at least 1 Syrian student in the class and working as a teacher in the central districts of Adana. The research was conducted with 347 primary school teachers who met this criterion and who accepted to be volunteers. The current mean of the classes in which these teachers work was 27; the mean number of Syrian students in the classroom was 6. Table 1 depicts information regarding the demographic characteristics of the teachers.

Table 1

*Demographic Information regarding Teachers (N = 347) (Quantitative Part)*

| **Variables** | **Category** | **f** | **%** |
|---|---|---|---|
| **Gender** | Female | 244 | 70.3 |
| | Male | 103 | 29.7 |
| **Seniority** | 0-5 years | 20 | 5.8 |
| | 6-10 years | 27 | 7.8 |
| | 11-15 years | 82 | 23.6 |
| | 16-20 years | 65 | 18.7 |
| | 21 years and over | 153 | 44.1 |
| **Graduation Faculty** | Education Faculty | 246 | 70.9 |
| | Faculty of Science and Letters | 21 | 6.1 |
| | Other faculties with four-year license | 67 | 19.3 |
| | Training Institute/Education College | 13 | 3.7 |
| **Grade Level** | 1st grade | 86 | 24.8 |
| | 2nd grade | 72 | 20.7 |
| | 3rd grade | 103 | 29.7 |
| | 4th grade | 81 | 23.3 |
| | Adaptation class | 5 | 1.4 |
| **Doing Postgraduate Education** | Yes | 27 | 7.8 |
| | No | 320 | 92.2 |
| **In-Service Training for Syrian Students** | Yes | 177 | 51.0 |
| | No | 170 | 49.0 |

Table 1 demonstrates that 244 are females and 103 are males out of 347 teachers. 20 of these teachers had 0-5 years of seniority; 27 of them had 6-10 years; 82 of them 11-15 years; 65 of whom had 16-20 years and 153 of them 21 years or over seniority. 246 of the teachers graduated from education faculties, 21 from science and letters faculties, 67 from others with four-year license, and 13 from training institutes or Education colleges. Considering the grade levels, 86 of the teachers taught the first classes; 72 of them the second classes; 103 of them the third classes; 81 of them the fourth and 5 of whom taught the adaptation

classes. While 27 of these teachers received postgraduate education, 177 of them participated in in-service training for Syrian students.

The distribution of teachers' gender, seniority, graduation faculty, grade level, postgraduate education and in-service training for Syrian students was taken into account with a view to reflecting the diversity of the participants for quantitative data at a maximum level. Table 2 displays the demographic characteristics regarding the teachers from whom qualitative data were gathered through open-ended questions.

Table 2

*Demographic information regarding teachers (Qualitative Part) (N = 30)*

| Variables | Category | f | % |
|---|---|---|---|
| **Gender** | Female | 16 | 53.3 |
| | Male | 14 | 46.7 |
| **Seniority** | 0-5 years | 4 | 13.3 |
| | 6-10 years | 1 | 3.3 |
| | 11-15 years | 8 | 26.7 |
| | 16-20 years | 4 | 13.3 |
| | 21 years and over | 13 | 43.3 |
| **Graduation Faculty** | Education Faculty | 20 | 66.7 |
| | Faculty of Science and Letters | 2 | 6.7 |
| | Other faculties with four-year license | 5 | 16.7 |
| | Training Institute/Education College | 3 | 10.0 |
| **Grade Level** | 1st grade | 5 | 16.7 |
| | 2nd grade | 5 | 16.7 |
| | 3rd grade | 12 | 40.0 |
| | 4th grade | 4 | 13.3 |
| | Adaptation class | 4 | 13.3 |
| **Doing Postgraduate Education** | Yes | 3 | 10.0 |
| | No | 27 | 90.0 |
| **In-Service Training for Syrian Students** | Yes | 18 | 60.0 |
| | No | 12 | 40.0 |

Table 2 depicts that the qualitative data were gathered from 16 female teachers and 14 male teachers. 4 of these teachers had 0-5 years of seniority; 1 of them had 6-10 years; 8 of them 11-15 years; 65 of whom had 16-20 years and 13 of them 21 years or over seniority. 20 of the teachers graduated from education faculties, 2 from science and letters faculties, 5 from others with four-year license, and 3 from training institutes or Education colleges. Considering the grade levels, 5 of the teachers taught the first classes; 5 of them the second classes; 12 of them the third classes; 4 of them the fourth and 4 of whom taught the adaptation classes. While 3 of these teachers received postgraduate education, 18 of them participated in in-service training for Syrian students.

### *Data Analysis*

Descriptive statistical methods were used during quantitative data analysis. Descriptive analysis was preferred in the analysis of qualitative data obtained from open-ended questions. In descriptive analysis, the collected data are analyzed, summarized and interpreted by taking into account the predetermined themes (Yıldırım & Şimşek, 2016). In this regard, a framework was initially created for analyzing the data based on open-ended questions; themes were determined in line with this framework. Afterwards, the data were read, coded and organized according to the thematic framework. The elicited data were supported by direct quotations and explained through making associations and comparisons among the findings.

*Ethics Committee Certificate:* This study was approved by the Hitit University Ethics Committee with the decision dated 27.02.2020 and numbered 2020-14.

## RESULTS

This section covers the findings related to the quantitative and qualitative data analysis.

### *Findings regarding quantitative data*

The descriptive analysis results of the primary school teachers' responses are presented in Table 3.

Table 3
Descriptive Analysis Results related to Questionnaire Items

| Items | $\bar{X}$ | S |
|---|---|---|
| 1. I think Turkish reading comprehension skills are sufficient. | 1,93 | 0,96 |
| 2. I think Turkish writing skills are sufficient. | 2,12 | 0,96 |
| 3. I think Turkish listening comprehension skills are sufficient. | 2,05 | 0,92 |
| 4. I think Turkish speaking skills are sufficient. | 2,20 | 0,86 |
| 5. I think problem solving skills are sufficient in math class. | 2,21 | 1,00 |
| 6. I observe they have problems in one-to-one studying. | 3,32 | 1,11 |
| 7. I observe that elder students have adaptation problems. | 3,82 | 1,12 |
| 8. I observe that they use violence among themselves. | 3,72 | 1,27 |
| 9. I observe that they use mutual violence with Turkish students. | 3,13 | 1,25 |
| 10.I observe that their games include violence. | 3,40 | 1,31 |
| 11.I observe that Syrian students choose their friends among themselves. | 3,91 | 1,09 |
| 12.I observe that they are more absent than other students. | 3,75 | 1,28 |
| 13.I think that the material available in the school (projection etc. equipment) is sufficient for visual expression. | 3,06 | 1,37 |
| 14.I think the financial resources of the school are sufficient. | 1,88 | 1,04 |

| | | |
|---|---|---|
| 15.I think the financial participation of parents is sufficient. | 1,68 | 0,92 |
| 16.I think the participation of parent meetings is sufficient. | 1,93 | 0,97 |
| 17.I think parents take care of their students enough. | 1,86 | 0,87 |
| 18.I observe that parents use violence against their children. | 2,52 | 1,9 |
| 19.I think parents' Turkish knowledge is sufficient. | 1,47 | 0,78 |
| 20.I think parents are helpful enough with their children's homework. | 1,49 | 0,72 |
| 21.I think Syrian guides are sufficient. | 2,19 | 1,17 |
| 22.I think the activities of the school guidance service are sufficient. | 3,01 | 1,19 |
| 23.I think Syrian students should receive education in separate classes. | 3,72 | 1,38 |
| 24.I think it would be appropriate to include parents in parent education. | 4,47 | 0,83 |
| 25.I think it would be appropriate to create funds by transferring resources to schools. | 4,20 | 1,15 |
| 26.I think it is appropriate to combine with other classes after mainstreaming. | 3,84 | 1,26 |
| 27.I think it is appropriate for the elder ones to receive education in separate classes. | 4,14 | 1,08 |

Table 3 displayed the mean of the questionnaire items, indicating that the questionnaire items were not responded at the level of "totally agree" and "totally disagree". The teachers were identified to less participated in I1, I2, I3, I4, I5, I14, I15, I16, I17, I19, I20, I21; while they participated in I6, I7, I8, I9, I10, I11, I12, I13, I18 and I22 at a medium level; lastly, they mostly participated in I23, I24, I25, I26 and I27. Accordingly, teachers were of the view that Syrian students' Turkish reading comprehension, writing, listening comprehension, speaking skills and their problem solving skills in math lesson were insufficient. Besides, the findings suggested that teachers did not consider the financial resources of the school, the financial participation of the parents, the participation of parents in the meetings, the parents' help with their students and their homework, and the Syrian guides sufficient. As is observed in Table 3, teachers stated that Syrian students have problems in one-to-one studying and that elder students have adaptation problems; Syrian students use violence among themselves and with Turkish students and their games include violence; parents use violence against their children. The teachers also noted that Syrian students choose their friends among themselves, they are more absent than Turkish students and school guidance services are sufficient. The teachers also mentioned that Syrian students and elder students should receive education in separate classes, that they could be combined with other classes after mainstreaming, that it would be appropriate to create funds by transferring resources to schools and to include parents in parent education.

### *Findings related to Qualitative Data*

With the purpose of supporting the data collected through the questionnaire and obtaining more in-depth data, the written opinions of 30 teachers from 15 different schools were taken with eight open-ended questions, and these data were analyzed with

descriptive analysis. The primary schools these teachers work are in the neighborhoods where families with lower socio-economic status live, and they work at public schools in the neighborhoods where Syrians mostly migrate. The class size mean of the teachers is 26, and the mean number of Syrian students in their class is 10. The families of the Syrian students live in the districts of Seyhan and Yüreğir, which are the central districts of Adana, in the neighborhoods where migrant families are settled. Some of the adults in these families are working in jobs related to their professions, some in wage jobs, while some are unemployed. These families generally have low or middle income levels.

In this section, the findings obtained from the descriptive analysis are presented according to the thematic framework based upon open-ended questions.

### *Views on reading skill*

The teachers were asked "What are your views regarding the reading skills of Syrian students in your classroom?". The responses were coded under the theme of views on reading skills and presented in Figure 2.

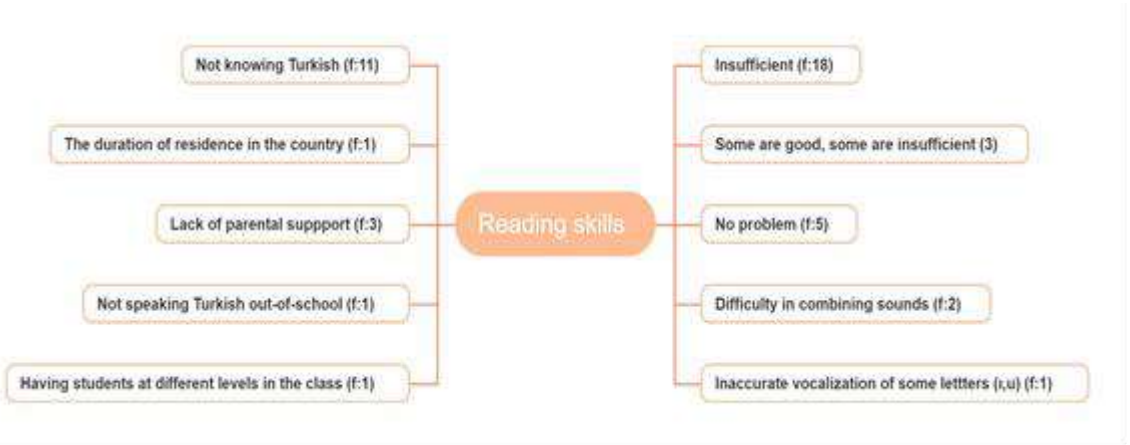


***Figure 2:*** Teachers' views on reading skills

Upon analyzing the primary school teachers' views on Syrian students' reading skills in Figure 2, the majority of the teachers believed that Syrian students' reading skills are insufficient (f:18). In discordance with this finding, some teachers stated that there is no problem in students' reading skills (f:5), some students are good while some are insufficient (f:3). In addition, the identified problems included students' difficulty in combining sounds (f:2) and incorrectly vocalizing letters (f:1). The teachers contemplated that the biggest reason why the students' reading skills are insufficient and undeveloped is due to lack of using Turkish language (f:11). Moreover, the lack of parental support, the duration of students' residence in Turkey, their preference not to use Turkish out-of-school and receiving education in the same classes with the students at different levels were identified to affect students' reading skills. Some of the teachers expressed their views as follows:

**FT12:** *I think they cannot read at a sufficient level. They have difficulty in understanding what they read. They are reading slowly and inaccurately. Letter and syllable mistakes are commonly made.*
**FT8:** *There is no positive progress since they do not speak Turkish; parents, students and teachers cannot get along with each other and they do not come to school regularly.*
**MT2:** *Even though they were in the 2nd grade, their reading skills did not develop as they could not receive family support and also they mostly did not speak Turkish in the family.*
**MT6:** *There are those who can read but do not speak Turkish. I mean they don't understand what they read. The reading levels of the others are usually at a low level.*

### *Views on reading comprehension skill*

The teachers were asked "What are your views regarding the reading comprehension skills of Syrian students in your classroom?". The responses were coded under the theme of views on reading comprehension skills and displayed in Figure 3.

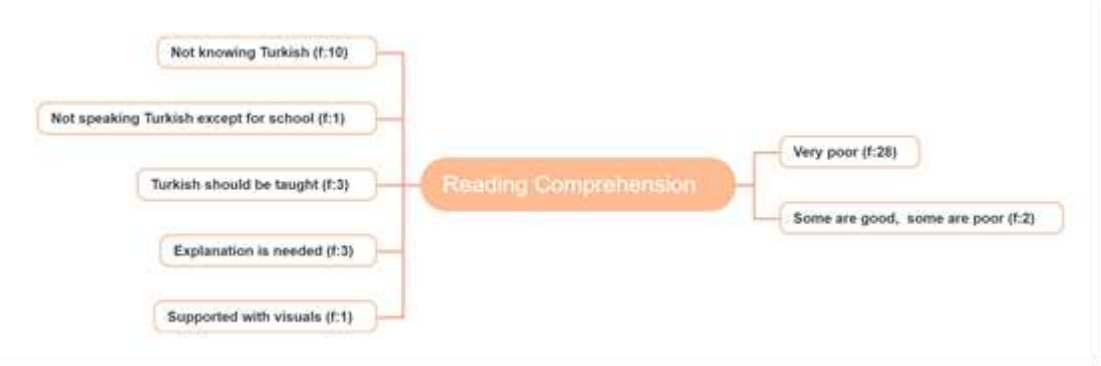


***Figure 3:*** Teachers' views on reading comprehension skill

As is seen in Figure 3, primary school teachers envisaged that Syrian students had poor reading comprehension skills (f:28). Different from this finding, the teachers indicated that some of their students comprehended what they read and that some of them had very poor reading comprehension skills (f:2). They listed the reasons for the poor reading comprehension skills as the lack of knowing Turkish (f:10) and not speaking Turkish out-of- school (f:1). The teachers concluded that Turkish should be taught (f:3), texts should be supported with visuals (f:1), and explanations should be made regarding the text or sentence (f: 3) in order to ensure the Syrian students' improvement in reading comprehension skills. Some of the teachers expressed their views as following:

**MT10:** Those *who have insufficient Turkish speaking skills, who have not developed vocabulary yet and who can express themselves with a limited number of words were identified to have difficulties and problems in their reading comprehension skills. In order for the reading and comprehension skills to develop, the student's Turkish must be developed sufficiently, and activities are carried out in the classroom.*

**FT9:** *They do not understand most of what they read since they do not know the meaning of the words.*

**FT6:** *Since they do not speak Turkish, they cannot make sense of what they read.*

**MT2:** *Reading comprehension skills are not developed as reading skills are undeveloped.*

**MT3:** *They have difficulties because they do not know most of the Turkish words' meanings.*

### *Views on operational skills (addition, subtraction, multiplication and division) in mathematics class*

The teachers were asked "What are your views regarding the mathematical operations (addition, subtraction, multiplication and division) of Syrian students in your classroom?". The responses were coded under the theme of views on the operational skills in mathematics and depicted in Figure 4.

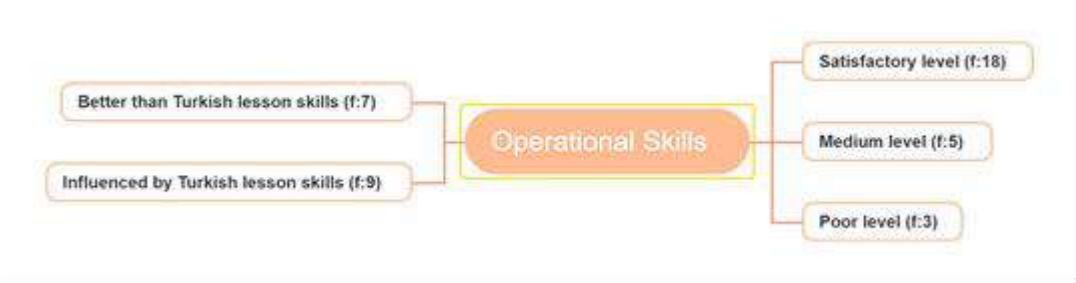


***Figure 4:*** Views on operational skills (addition, subtraction, multiplication and division) in mathematics lesson.

According to Figure 4, teachers were found to consider that Syrian students' operational skills were at a satisfactory level (f:18). In addition, some teachers believed that Syrian students' operational skills were at a medium (f: 5) or low level (f: 3). Teachers stated that students' operational skills were affected by those in the Turkish course (f: 9) and that they were better than their reading and reading comprehension skills (f:7) in the Turkish course. Some of the teachers voiced their views as follows:

**MT5:** *Their operational skills are better than reading and understanding.*

**MT1:** *I observed that they have intermediate level skills... Yet, they are better than reading comprehension.*

**FT13:** *They are doing operations at a class-level that are not based on instructions.*

**FT10:** *They are more successful in mathematics lesson. They're doing operations.*

### *Views on problem solving skill in mathematics class*

The teachers were asked "What are your views regarding the problem solving skills of Syrian students in your classroom in math lesson?". The responses were coded under the theme of views on the problem solving skills in mathematics and depicted in Figure 5.

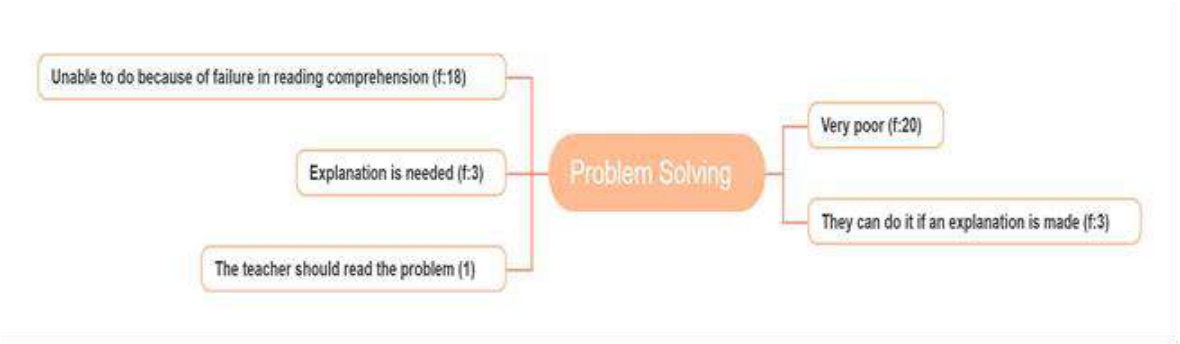


***Figure 5:*** Views on problem solving skill in mathematics lesson

As is seen in Figure 5, teachers indicated that students' problem solving skills were very poor in mathematics lesson (f:20). They also stated that the students were incapable of solving the problem since they could not understand they read (f:18). The teachers recommended that the students could understand the problem when their children read or explained the problem (f:3). Some of the teachers expressed their views as follows:

**MT10:** *Syrian students with insufficient vocabulary were found to also have problems in problem solving skills in mathematics lesson. The main problem here is that I am reading but I do not understand or I understand but I cannot express it. The inadequacy of comprehension-expression skills is a problem.*

**MT2:** *Since their reading and comprehension skills in Turkish are undeveloped, they are normally not sufficient in problem solving.*

**FT1:** *They have difficulties in solving problems due to their poor Turkish expressions and understanding. However, they solve it directly when I read and explain the problem.*

**FT9:** *Success in problem solving is very low due to their limited vocabulary.*

### *Views on the confronted challenges*

The teachers were asked "What are the challenges you have confronted with Syrian students in your classroom?". The responses were coded under the theme of views on the confronted challenges and shown in Figure 6.

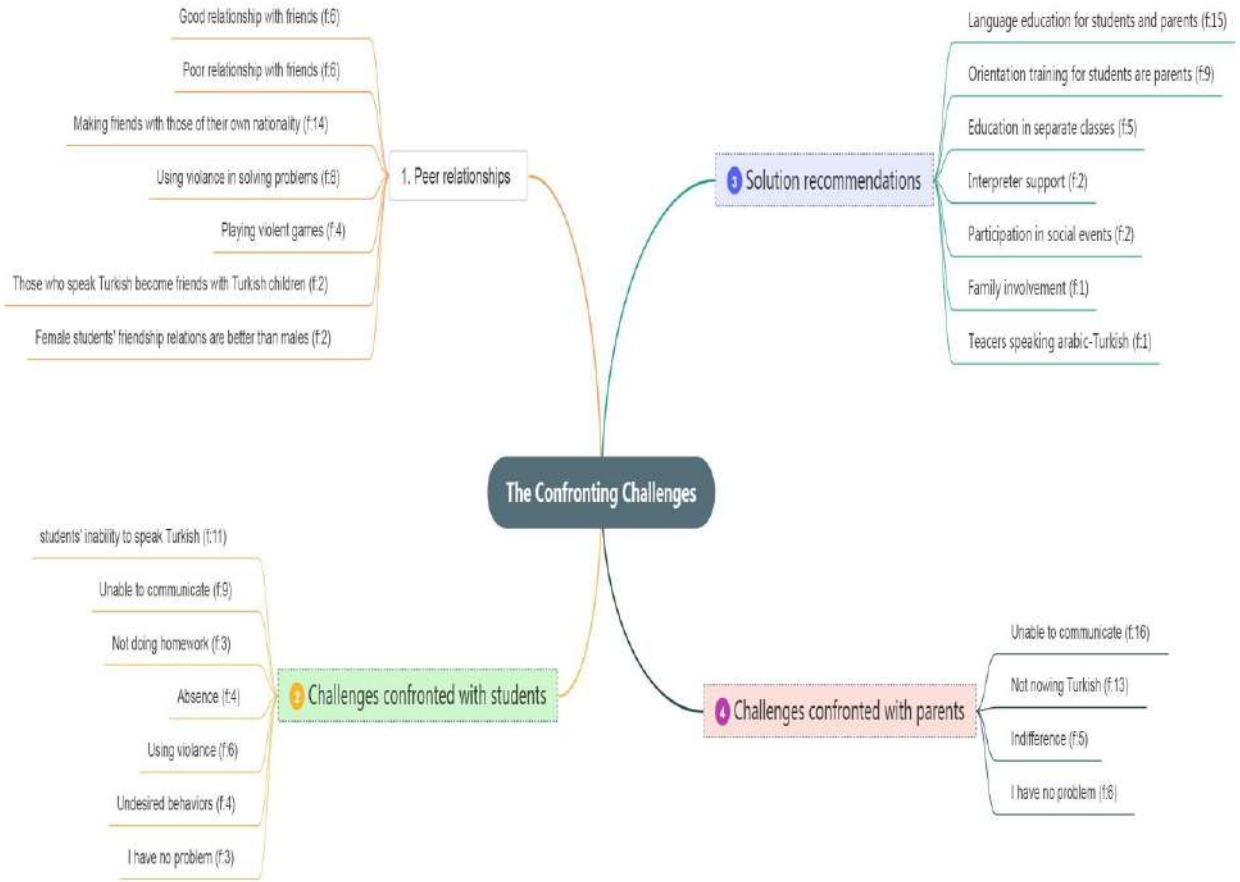


***Figure 6:*** Views regarding the confronted challenges

As seen in Figure 6, there are four sub-themes in the theme of the challenges teachers confronted with Syrian students: peer relationships, problems with students, problems with parents and solution recommendations. Considering teachers' views on peer relationships; some teachers mentioned that the students had good relations with their friends (f:6), while others stated that they did not have good relations (f:6). The biggest challenge encountered in the theme of peer relationship is that students preferred to be friends with those of their own nationality (f:14). Furthermore, playing violent games (f:4) and using violence in problem solving (f: 8) were also among the problems. Some of the teachers expressed their views as follows:

**FT3:** *Generally, they make friends among themselves or if they have elder brothers or sisters at school. If there is a problem, they solve it with their own method (beating).*

**MT10:** *Syrian students generally play games with each other and think that they are not liked or excluded by other students at the school. Their games usually include violence. In fact, even in the adaptation class where all Syrian students are present, students cannot play games together. Their games contain disservice.*

The most common problems were students' inability to know Turkish (f:11) and unable to communicate (f:9) in the sub-theme of the challenges confronted with the student. Besides, not doing homework (f:3), absence (f:4), using violence (f:6), and engaging in undesired behaviors (f:4) were the other challenges confronted by teachers. On the other hand, there are also teachers who stated that they did not experience any problems (f: 3). Some of the teachers expressed their views as follows:

**MT3:** *Since they do not know Turkish well, they have difficulty in understanding the lesson and doing the activities. Their education is disrupted as we cannot fully communicate with the parents. Their absence is medium and over.*
**FT11:** *Inability to do their homework properly. Not listening to me in class. I think this may be due to the fact that they don't understand me.*

Considering the sub-theme of the challenges confronted with parents; the problems of not communicating (f:16) and not speaking Turkish (f:13) were found to be mostly experienced. Parents' indifference to their children (f:5), and the lack of their support were among the challenges confronted by the teachers. On the other hand, six of the teachers mentioned that they did not have any problems with parents. Some of the teachers expressed their views as follows:

**MT10:** *The parents of Syrian students are by no means included in education. They do not take sufficient responsibility for their children's education. Families do not attend school meetings and do not follow their students' progress. Parents who cannot express themselves in Turkish do not come to school to ask about their children's progress.*
**MT11:** *I haven't almost experienced any problems. I can even say that they are much more caring and respectful than my other parents.*
**MT1:** *We could not communicate because of the language problem. I tried to talk to a few people through an interpreter.*

Upon analyzing the sub-theme of solution recommendations provided for these challenges experienced by teachers; the following recommendations were presented: language education (f: 15) and orientation training for students and parents(f: 9), education in separate classes (f:5), interpreter support (f: 2), participation in social activities (f: 2), family participation (f:1) and appointment of teachers who know Arabic-Turkish (f:1). Some of the teachers expressed their views as follows:

**MT1:** *First of all, students and parents should be included in orientation training. Before starting school, they should be taught Turkish at least at a level for understanding simple words and commands... During the lessons, there should be interpreters in classes during Turkish lessons...*
**FT5:** *Before starting primary school, they must take Turkish language lessons for at least one year. 1st Grade Primary School is too late to learn Turkish. Syrian students should take compulsory Turkish learning lessons one year before they start primary school.*

**FT14:** *They should definitely return to their own classes after learning literacy-comprehension in another separate classroom.*

## DISCUSSION

This research attempts to reveal primary school teachers' views on Syrian Students' Turkish and mathematics skills and the challenges they have confronted. The research used a mixed method in order to obtain in-depth and detailed data.

The quantitative findings showed that Syrian Students' Turkish reading comprehension, writing, listening comprehension and speaking skills were not sufficient. The qualitative findings support this finding. Most of the teachers assumed that Syrian students' reading skills were insufficient. The biggest reason for the students' inadequacy regarding reading skills may be due to the fact that students do not know Turkish. Besides, the lack of parental support, the duration of students' residence in Turkey, not speaking Turkish out-of-school school, and receiving education in the same classes with the students at different levels also affect students' reading skills. The qualitative findings on reading comprehension skill demonstrated that Syrian students' reading comprehension skills were very poor. They stated that the reason for the poorness of this skill is that the students did not know Turkish and they do not speak Turkish out-of-school and thus the teachers recommended that they be taught Turkish, the texts be supported with visuals and explanations be made about the text or sentence in order to improve it. Likewise, Aykırı (2017) also concluded in his interviews with primary school teachers that Syrian students had trouble in understanding what they read. In the interviews performed with fifteen foreign students attending primary school, Çimşir and Baysal (2020) noted that students mostly encountered problems in Turkish lessons, which require reading, reading comprehension and language skills. In this regard, Boylu and Işık (2020) examined the problems encountered in teaching Turkish to the students living in provinces where Syrian students are densely populated, and concluded that the use of Turkish out of school negatively affects the Turkish learning process, as the people in the provinces where the students live, know Arabic. This result is line with those of this research. In the study conducted with 120 teachers in Greece, Stathopoulou & Dassi (2020) determined that refugee students had a low literacy level. Similarly, Aydın and Kaya (2015) interviewed seven teachers and a school principal and hence emphasized that Syrian students started school without having Turkish education and therefore they did not have Turkish proficiency, affecting their success in other courses.

One of the findings obtained from the quantitative data was that problem solving skills were not sufficient in mathematics lesson. Qualitative findings supported the result in a way that Syrian students' problem solving skills were very poor and this was due to their inability to understand what they read. Teachers also mentioned that when the teacher reads or explains the problem, the students can solve the problem as they understand it. Even though the Syrian students' problem-solving skills were very poor,

that the processing skills in the mathematics course were at a good level is among the qualitative findings. Furthermore, the primary school teachers asserted that Syrian students' math processing skills were better than their reading and reading comprehension skills in Turkish lesson. In a similar sense, Aydın and Kaya (2015) put forward that Syrian students' success in other courses was affected due to the lack of their Turkish proficiency. The results in the same study referring that Syrian students understood numerical lessons much better and they were more successful in these lessons despite having difficulties in language lessons also support the findings of this research. In this context, Çimşir and Baysal (2020) also confirmed that Syrian students had problems in Turkish lessons because they require more reading, reading comprehension and language skills and that they had less difficulty in mathematics lesson than Turkish. Besides, Aksakal (2017) certified that Syrian students had difficulty in verbal lessons that require to know Turkish, yet they were more successful in lessons such as mathematics and physical education that language knowledge keeps in the background.

The quantitative findings suggested the financial resources of the school, the financial participation of the parents, the participation of the parents in the meetings, the parents' help with their students and their homework as well as the Syrian guides were considered as inadequate by the teachers. Similarly, qualitative findings revealed that parents were indifferent to their students, they did not help with their homework, and they had communication problems due to the lack of knowing Turkish. Parallel to these findings, the report announced by Istanbul Bilgi University Child Studies Unit (ÇOÇA) (2015) in order to share the interviews with teachers and administrators revealed that Syrian parents had poor relations with the school and had limited communication with teachers and administrators due to the language barrier. Likewise, Tsioupis & Paida (2020) interviewed fourteen Refugee Education Coordinators affiliated to the Greek Ministry of Education and found that refugee parents had little or no communication with their children's school and teachers. Family support is of great importance for Syrian students to adapt to school and to be successful in their classes. Refugee parents had a decisive role in raising their children's awareness related to the necessity of school education and connecting them with their children's school (Tsioupis, & Paida, 2020). Oikonomidoy & Karam (2020) emphasized that family support cannot be underestimated when it comes to refugee-background children, and that parents' support is required to guide their children's academic learning. In this regard, it is essential that refugee parents make an explanation on the necessity of their children's school enrollment and attendance, and engaging refugee parenst in their children’s schooling in the long run (Tsioupis, & Paida, 2020). The language barrier has a significant place in the low participation of refugee parents. However, the lack of support or opportunities provided by schools to parents may also have an effect on this situation. To illustrate, a handbook was prepared in New Zealand to facilitate the adaptation of refugee students and to increase parental involvement, and some refugees were used as resource persons to inform families

regarding homework and the functioning of the school (Ministry of Education Auckland, 2016). The New South Wales Department of Education has taken some measures to help schools strengthen their ties with parents of various cultural and linguistic backgrounds and to develop parent / school partnerships. One of these measures offers a special program for Pacific Communities and Youth Partnerships that includes homework support (MIPEX, 2015). In this regard, parents can be provided language support with the participation of people who know Arabic-Turkish in Turkey. In addition, providing information about the functioning of the school and how to support students can be helpful in ensuring school-family cooperation.

According to quantitative findings, teachers witnessed that Syrian students had problems in one-to-one study and that elder students had an adaptation problem; moreover, Syrian students used mutual violence among themselves and towards Turkish students, they used violence in their games, and that parents used violence against their children. Teachers also declared that Syrian students chose their friends among themselves, they were more absent than other students and that the school guidance service is sufficient. These findings are also confirmed by the qualitative data referring that the biggest problem in the peer relations dimension was to choose friends with those of their own nationality, as well as having problems in playing violent games and using violence during problem solving, absenteeism, as well as communicating. Likewise, Lerner (2012) concluded that refugee students who were placed in classrooms with the direct immersion model in the USA encountered problems in adapting to the classroom due to the language barrier. Bulut, Kanat-Soysal, and Gülçiçek (2018), in their study, interviewed with fourteen primary school teachers who conduct Turkish lessons, and identified that Syrian students' schooling without acquiring sufficient language skills causes communication problems. What is more, a study conducted with refugee children and adolescents in Canada revealed that 86% of refugee adolescents (12-21 years old) experienced some form of bullying such as mockery, social exclusion, physical bullying, unfair treatment, racist insult, and intellectual disdain (Wesley Urban Ministries, 2014). The studies conducted by international organizations found that the drop out level of the refugee students with low skills was higher than other students (OECD, 2016), and refugee children did not attend school five times more than non-refugee children (UNHCR, 2016).

Considering the quantitative findings, the teachers were of the opinion that Syrian students and older students should receive education in separate classes, that they can be multigraded with other classes after this education, that it would be appropriate to create funds by transferring them to schools and to include parents in parents' education. In qualitative findings, on the other hand, teachers suggested training in separate classes to solve problems, establishing preparatory or adaptation classes, providing language training to students and parents, providing interpreter support along with increasing social activities. Providing refugee students an opportunity for getting education in different grades intramural program is one of the models implemented in both Turkey and

different countries. However, teachers believed that this practice should be more widespread. Similar findings emerged in various studies. To illustrate, Çelik (2019) emphasized that orientation training should be provided for Syrian students; Aykırı (2017) recommended to give education in separate schools or classes. Akin to the teachers' recommendation on establishing adaptation or preparatory classes for language teaching, UNHCR (2015) advised that these students be taught Turkish with the practice of Turkish preparatory class or summer school. UNHCR (2015) stressed that not only students but also parents should learn Turkish and they should be informed about the system. Accordingly ÇOÇA (2015) endorsed that language courses should be opened within the Public Education Centers in schools and interpreters should be assigned in schools so as to strengthen the relations between Syrian parents and the school. Similar to the teachers' proposal for increasing social participation, Biçer and Özaltın (2020) advised that activities should be organized to ensure both Turkish and Syrian students' participation; moreover, UNHCR (2015) favored organizing exhibitions and special day celebrations in order to warrant the harmony of Syrian students and to draw attention to the common aspects of different cultures.

## CONCLUSION

The research findings revealed that Syrian students' reading, reading comprehension and problem solving skills were not sufficiently developed due to the lack of speaking Turkish. In the same vein, there were communication problems with students and parents due to the language barrier which affects Syrian students' choice of friends and their success in classes. The common opinion of the participants was that Syrian students should receive Turkish education in separate classes (preparatory class) in order to solve the language problem before schooling. Language proficiency is a factor that will facilitate or prevent Syrian students' adaptation to the school and the culture of the host country. It is important for them to learn to speak Turkish in terms of communication; however, it is not enough to achieve academic success. Hence, the development of Syrian students' Basic Interpersonal Communication Skills (BICS) along with their Cognitive Academic Language Competencies (CALP) should be taken into consideration, and studies should be conducted to examine and measure these skills independently.

Over and above, the participants thought that Turkish education should be enabled to solve the communication problem between the students and their parents. At that point, it is of paramount importance to offer Turkish training programs and open courses with a view to promoting both Syrian students and their families. This training can be effective both in facilitating students' adaptation to classes, increasing their success in classes and solving communication problems together with reducing the burden of teachers in the classroom. Turkish education as a foreign language can be given as a separate preparatory class within the schools, or it can be provided in weekend courses at Public Education Centers.

Research findings showed that parents were indifferent to students' lessons and they did not help with their homework. This problem may have resulted from parents' not knowing Turkish and having insufficient knowledge about the education system. Without the parental support, it is quite difficult for students to be successful in their school life. School-parent and teacher-parent cooperation is vital for the student to reach the desired level in the lessons and to gain the fundamental skills and values. In this context, it is a must to enroll parents in parent education, as suggested by the participants. It will also be useful to inform parents about the Turkish education system. At this juncture, briefings can be planned by the guidance services of schools as short meetings, weekday or weekend seminars.

One of the research results was that Syrian students were at a good level in operational skills that do not require verbal knowledge, especially in mathematics class. Nevertheless, they did not have the same success in problem solving questions that necessitate reading comprehension. Participants believed that when the problem is explained, students can understand and solve it. Teachers' professional skills and their approach towards students play a significant role in this case. Teachers can explain the problem for their students, and they can help them understand and solve the problem by concretizing it though drawings, visuals or figures, diagrams etc.

This research focused on Syrian students' skills in Turkish and mathematics lessons. Similar studies can be conducted for different courses. Besides, students' and parents' views on this situation of Syrian students can be examined, and different studies can be carried out with the views of the school's counselors.

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Research Article

# Teachers' Reflection and Level of Reflective Thinking on the Different Dimensions of their teaching practice

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**Abstract:**

*The present study deeply aims to reveal teachers' reflection and their reflective thinking levels on the different dimension of their teaching practice with regard to the dimension of learning objectives, content, learning-teaching process, and measurement and evaluation in the context of English courses. The study was designed as case study method. The study group was composed of 27 teachers selected based on the criterion sampling method. Results showed that the participant teachers had information about reflective thinking skills and they made some changes in the lesson plan because they thought that a lesson plan for the learning objectives ignoring students' prior knowledge was ineffective. Based on teachers' opinions, it was also determined that the content consisted of similar topics and was very intense and heavily based on vocabulary teaching. Results indicated that participant teachers reflected on teaching methods and techniques, activities and materials, student motivation, classroom atmosphere, and ensuring participation in the lesson. It was also revealed that the efficiency of measurement tools and the need to prepare measurement tools with regard to the learning objectives should be realized. Based on their reflective diaries, participant teachers also reflected at the technical, practical and critical levels and developed reflection-in-action, reflection-on-action, and reflection-for-action. Providing teachers with in-service training courses such as thinking skills, problem solving and decision making techniques, risk and crisis management that will contribute to overcoming their shortcoming and mistakes is thought to improve their reflective thinking skills.*

**Keywords:** Reflective teaching, Reflective thinking, teacher, English course

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## INTRODUCTION

In today's society, people are expected to have acquired certain skills. These skills include problem solving, creative thinking, critical thinking, learning to learn, and reflective thinking. Undoubtedly, the most important of these skills is reflective thinking skill, which is one of the high-level thinking skills. Dewey (1933) defines reflective thinking as an effective, consistent and careful way of thinking. Ünver (2010) associates reflective thinking with problem solving and explains it as a thinking process for finding solutions by identifying positive and negative situations faced by a person in the education process.

Schön (1983) emphasized that reflection can be done in three different times in his study on the situations in which reflective thinking should be done. These are "reflection-in -action", "reflection-on-action" and "reflection-for-action".

Reflection-in-action is the process that includes the decisions we make at that moment while performing an action. Schön (1983) expressed it as thinking on foot during action. In other words, it is the ability to make decisions when faced with situations without thinking about what to do before. During reflection-in-action, we reveal the ability to tackle with the unexpected situations by using our repertoire of examples. In this case, an individual knows more than he/she can say, but does not express it with words, he/she only reveals it with actions. It usually requires the ability to make the right decisions when unexpected situations are encountered. It is difficult to carry out it with theoretical knowledge, it is more related to one's own skill. A lived example from the present study in which the teacher could make the right decision when unexpected situations happened can be given as follows*: "…I saw the children had an unexpected reaction to the Picture Strip Story and adjusted the lesson plan. Then, I used another activity which I think would be more appropriate for the students' level, which was reaaly effective...."*.

Reflection-on-action is the process that requires stopping for a while after performing our actions and reflecting on what happened. It is to decide how it goes, what is good and what is bad, what needs to be changed. It is to change actions and practices by asking questions on actions and developing new ideas. A certain amount of time and effort should be spent to reflect on the action (Schön, 1983). A lived example about a participant teacher from the present study who reflected on his/her past experiences is as follows: *"To enable my students to predict the English equivalents of types of holiday correctly, Quiz Show technique along with visuals instead of "Matching" technique would be more effective so that students could participate effectively."*

Reflection-for-action involves thinking about future actions with the purpose of developing or altering a practice. It also requires teachers to use examples, insights and knowledge so that they can look at problems from a different perspective. These features can be used as an important driving force for the development of professional knowledge in teacher training programs (Loughran, 2002). A lived example from the present study in

which the teacher thinks about future actions with the desire of developing or altering a practice is as follows: *"I saw the students become passive during my two lessons. Considering their reactions, I can change the method of teaching by thinking more about which communicative approach tecnniques I used."*.

In addition to the descriptions made by Schön (1983) for the application of reflective thinking, there are classifications explaining the levels of reflective thinking. One of these is the leveling made by Van Manen (1977). Van Manen (1977) stated that reflective thinking can be done at three levels. These are technical reflection level, practical reflection and critical reflection.

Technical reflection is the basic level of reflection. The efficiency and effectiveness of the final results are emphasized, no criticism or changes are made about the results. The existing information is the most accurate information and the desired conclusions should be reached with this information. In other words, it is not considered to make a new configuration or change the information. The aim here is to use the existing information efficiently. Teachers at the level of technical reflection are generally individuals with little experience, who choose the lessons appropriate for them and aim to achieve the learnign objectives set in the lessons (Van Manen, 1977). A lived example from the present study in which the teacher applied a technique and received positive feedback is as follows: *"The "Spot the differences" technique was very good while describing the two different actions. It enabled students to comprehend the subject better visually…"*.

The level of practical reflection allows efforts that can be done to achieve a particular goal. These efforts can be made based on assumptions. Individuals' learning can be facilitated by reflective thinking through applications. Reflection at the practical level can be defined as a reflection area where teacher candidates or teachers begin to benefit from their experiences in teaching skills, and try to think about the problems they encounter and find solutions (Ünver, 2010). In this area, a teacher candidate or teacher analyzes student behavior to understand whether the learning objectives were achieved, how they were achieved, and if not, why they were not achieved. They interpret observable student behaviors based on their individual perceptions (Wilson & Jan, 1993). A lived example from the present study in which the teacher describes a positive situation he/she encountered and also questions the reasons of this situation who reflects at the practical level by stating in his/her reflective journal is as follows: *"The learning objectives I determined were effective. I think that I made the lesson more effective and fun by attracting the attention of the students thanks to the materials and the activities I prepared. I managed to make the students achieve the learning objectives I determined. I was only a guide, and the students were more active"*.

Critical level of reflection has a broader explanation that includes levels of practical and technical reflection. What distinguishes critical reflection from them is that they are approached with a critical point of view during and after the actions. While making critical reflection, the individual uses not only the knowledge he / she has but also the infrastructure

that constitutes it (sociocultural environment, religion, language, family structure, tradition, customs, etc.). The level of critical reflection varies from person to person and it is very difficult to define its limits. For this reason, open mindedness is necessary. A lived example from the present study in which the teacher with moral, ethical and systematic perspective reflects at the critical level is as follows: *"I am a teacher and I understand that the task of a teacher is to enable his/her students to achieve learning objectives. I still have shortcomings and I have to go further in my teaching profession. I am trying to do my best. I strive to be a different teacher".*

Reflective thinking is seen as a very important process in terms of teachers' being able to follow the developments in educational science, to implement what they have learned, and to follow their own developments in line with scientific knowledge and experiences. For this reason, reflective thinking should be taken into consideration in both theoretical and practical contexts, and appropriate climate should be provided to help teachers gain the ability to use reflective thinking (Altınok, 2002). Reflective thinking ensures professional development of teachers. It improves the ability to analyze and understand classroom events. It helps the teacher to create a learning environment that contributes to make predictions and think (Ünver, 2003).

When the characteristics of the reflective thinking teachers are examined, it is seen that the teacher's role in the constructivist approach is in parallel with the features expected from the teacher. In reflective teaching, the student is at the center and takes an effective and decision-making role. A teacher who adopts reflective thinking better evaluates his students, renews his/her methods and strategies, draws conclusions for himself/herself by following every practice, and is open to self-renewal (Rodgers, 2002). In congruent with this view, teachers who have reflective thinking skills aim to raise students who have an objective perspective, who are environmentally-conscious and aware of their responsibilities, and who have problem-solving skills (Ekiz, 2006). A reflective teacher is a development-oriented and an open-minded individual who focuses on lifelong learning, and who has the ability to plan and evaluate the teaching process effectively by self-assessment (Norton, 1994; Semerci, 2007; Ünver, 2003). In English Language Curriculum of Secondary Education in Turkey, reflective thinking teacher characteristics are also emphasized and teachers are expected to evaluate the student during the process, record what has been done in the teaching process, and review it by going back and checking.

When the relevant literature was reviewed, it is seen that the studies about reflective thinking skills and reflective thinking activities of teachers and teacher candidates were the focus of attention (Ayçiçek, Yanpar Yelken, & Yokuş, 2019; Aydın, & Çelik, 2013; Aydoğmuş, 2017; Aslan, 2009; Atalay & Karahan, 2016; Aydın & Çelik, 2013; Dilekli & Orakcı, 2019; Dolapçıoğlu, 2007; Duban & Yanpar-Yelken,2010; Ekiz, 2006; Elmalı, & Balkan Kıyıcı, 2018); Ersözlü, 2008; Evin-Gencel & Güzel-Candan, 2014; Gedik, Akhan & Kılıçoğlu, 2014; Gencer, 2008; Hasırcı & Sadık, 2011; Keskinkılıç, 2010; Kırnık, 2010; Kızılkaya & Aşkar, 2009; Kirk, 2000; Koç & Yıldız, 2009; Kozan, 2007; Köksal & Demirel, 2008; Langer, 2002; Lee;

2005; Ocak, Ocak & Saban, 2014; Oruç, 2000; Özbek, 2014; Semerci, 2007; Şahin 2009; Şahan, & Kalkay, 2011; Tok, 2008a, 2008b; Töman, 2015; Yorulmaz, 2006).

### *Reflective Teaching and English as a Foreign Language*

Over the past two decades, there has been a trend towards teaching reflective teaching skills in in-service and pre-service teacher education. Reflective teaching occurs by collecting detailed information about classroom situations such as working with individuals, creating classroom environments, planning and managing teaching, selection of content, and individual competence (Ogonor & Badmus, 2006).

Reflective teaching is a widely used concept recently, and it is frequently encountered in debates about professional and modern education. Reflective teaching which is a frequently used method especially in teaching English as a foreign language (EFL) and in raising English teachers, can be defined as thinking about what is happening in the teaching environment and making some differences in line with these thoughts during and after the teaching process (Mc. Collum, 2002). Pennington (1992) defines reflective teaching as "reflecting on experiences and reflection of these experiences". Henderson (1996) also defines reflective teaching as an inquiry approach and creative problem-solving activities that emphasize giving importance to others and that is based on constructivism in teaching. In this context, reflective teaching can be considered to be extremely important in terms of both students' showing positive characteristics in the cognitive and affective domains and professional development of teachers.

When examined a number of studies in the literature, a study conducted on teachers in Pakistan by Ahmad, Said, Zeb, Rehman, Ahmad, and Khan (2013) examined how reflective teaching practices affect teachers' teaching and classroom skills and the researchers found a significant improvement and increase in the teaching skills of teachers who received reflective practice training. It was also found that the teachers made more original plans for their own lessons, brought effective solutions to classroom problems, and their interactions with their teachers, students and parents were of higher quality and function. In a study conducted by Choy and Oo (2012), the extent to which teachers performed reflective teaching and what they think about their own practices were examined. The results of the research revealed that teachers showed inadequacies in realizing the principles of reflective learning. In another study conducted by Mathew (2011), the role of reflective teaching in providing an effective classroom learning environment to improve English language skills was discussed. According to the findings of the study, it was found that reflective teaching practices contributed to a rich environment and resource for realizing English language skills, a purposeful learning-teaching process, a reflective and interactive teacher-student communication, and a significant increase in students' success as well as a significant contribution to the professional development of teachers which was also seen as an important finding in Aydoğmuş's (2017) study and Fakazlı and Kuru Gönen's (2017) study exploring EFL university instructors' perceptions on reflective

practices. In similar studies conducted by Minott (2011) and Nodoushan (2011) to determine the effects and results of the reflective teaching practices in teacher candidates, it was found out that reflective teaching helped the development of their own knowledge and awareness, their inquiry skills improved in addition to that reflective teaching practices developed their affective and professional skills such as controlling their own emotions, interacting positively with those around them, and empathy.

Given the advantages of reflective teaching practice for teacher professional development, reflective teaching practice can be seen as useful ideas, suggestions and a vital tool for teachers to deal with difficult situations. What is more to the point, with the help of reflective practice, teachers can increase their efficacy by apprehending their teaching practices more broadly (Rudd, 2007) in addition to that it aids to protect against superficial learning (Schnepfleitner & Ferreira 2021). In fact, it helps teachers to recognize their strengths and weaknesses, and ultimately contributes more strongly to students' equal learning (Rezaeyan & Nikoopour, 2013; Rudd, 2007). As a result, reflective practice in teacher professional development emerges to be an important tool in problem solving, as it presents a great opportunity to go back and come up with the best strategies to achieve the goals (Ferraro, 2000; Rudd, 2007). Therefore, as Fakazlı and Kuru Gönen (2017) emphasized, systematic practice opportunities provided for teachers can make a difference in helping teachers develop reflection ideas and participate in reflective practice on a regular basis, which further increases the importance of the present study.

It should also not be forgotten that the quality of the teachers who are the practitioners of the educational process plays a determining role on the quality of the teaching performed. (Pollard, 1997). It is a necessity to question the qualifications of teachers, who have an important role in the educational process, and to train them in accordance with the requirements of the age. It is extremely important for teachers to be aware of the fact that reflective thinking and reflective teaching are an integral element for professional development and that they are used at every stage of the teaching process, which increases the importance of the present study. For this reason, the present study deeply aimed to reveal teachers' reflection and their reflective thinking levels on the different dimension of their teaching practice in the context of secondary EFL courses. For this purpose, the answers were sought for the following sub-problems:

**1)** What do teachers understand from the concept of reflective thinking?
**2)** How do teachers use reflective thinking skills with regard to the dimension of learning objectives of secondary EFL courses?
**3)** How do teachers use reflective thinking skills with regard to the dimension of content of secondary EFL courses?
**4)** How do they use reflective thinking skills with regard to the dimension of learning and teaching process of secondary EFL courses?

**5)** How do they use reflective thinking skills with regard to the dimension of measurement and evaluation of secondary EFL courses?

## METHOD

In the present study, case study method was used. The case study method involves examining an event in depth rather than breadth (Wellington, 2000). This method focuses on the property and complexity of an event and allows different data collection techniques to be used together (Cohen & Manion, 1994; Stake, 1995). The reason for choosing the case study method in this study can be explained as an in-depth examination of development of the participant teachers with semi-structured interview form and reflective diaries.

### *Participants*

Criterion sampling, one of the purposeful sampling methods, was used in the sample selection of the study. In criterion sampling, the sample is formed in accordance with predetermined criteria or criteria (Yıldırım & Şimşek, 2013). Accordingly, the sample of the study consisted of 27 volunteer teachers working in three different secondary schools in a city in the Central Anatolia Region in the 2019-2020 academic year.

Table 1 presents the distribution of participants in regard to their characteristics.

Table 1
*Participant Demographics*

| | | N | % |
|---|---|---|---|
| **Gender** | Male | 13 | 48 |
| | Female | 14 | 52 |
| | Total | 27 | 100 |
| **Education** | Graduate | 19 | 70 |
| | Undergraduate | 8 | 30 |
| | Total | 27 | 100 |
| **Grades Taught** | 5th Grade | 5 | 18 |
| | 6th Grade | 6 | 22 |
| | 7th Grade | 8 | 30 |
| | 8th Grade | 8 | 30 |
| | Total | 27 | 100 |
| **Teaching Experience (Years)** | 11-15 years | 17 | 63 |
| | 16-20 years | 10 | 37 |
| | Total | 27 | 100 |

As can be seen from Table 1, of the 27 teachers, 14 (52%) were female and 13 (48%) were male teachers. With regard to the level of education, there were 19 (70%) teachers with graduate degree and 8 (30%) with undergraduate degree. With regard to the teaching experience of the participants, there were 17 (63%) teachers between 11-15 years and 10 (37%) teachers between 16-20 years. As for grades taught, 5 (18%) teachers were teaching 6$^{th}$ grades, 6 (22%) teachers 5$^{th}$, 8 (30%) teachers 7$^{th}$, and 8(30%) teachers 8$^{th}$ grades. Participants' identities were kept secret and each teacher was indicated with a code such as T1, T2, T3.

### *Data Collection*

In this study, semi-structured interview form and reflective diaries were used as data collection tools. Before the questions of the semi-structured interview form were prepared, national and international literature on the research topic was reviewed. Following the design of the subject, the questions that were thought to be included in the form were presented to the examination of three faculty members, two of whom were in the field of curriculum and instruction, and one of whom was in the field of educational measurement and evaluation. The questions asked to teachers in the study are as follows:

**1)** What comes to your mind when you say the concept of reflective thinking?

**2)** What are your views on the learning objectives of your lesson? What kind of shortcomings do you think there are in terms of the learning objectives of your lesson? What do you do to overcome these shortcomings? In this context, what are your thoughts, feelings, assumptions, beliefs, values and attitudes?

**3)** What are your views on the content of your lesson? What kind of shortcomings do you think there are regarding the content of your lesson? What do you do to overcome these shortcomings? In this context, what are your thoughts, feelings, assumptions, beliefs, values and attitudes?

**4)** What are your views on the learning-teaching process of your lesson? What kind of shortcomings do you think there are in the learning-teaching process of your lesson? What do you do to overcome these shortcomings? In this context, what are your thoughts, feelings, assumptions, beliefs, values and attitudes?

**5)** What are your views on the measurement and evaluation dimension of your lesson? What kind of shortcomings do you think there are in the measurement and evaluation aspect of your course? What do you do to overcome these shortcomings? In this context, what are your thoughts, feelings, assumptions, beliefs, values and attitudes?

Research data were collected through face-to-face interviews with the participants. These interviews were conducted by the author of the study. An agreement was reached on the place and time of the meeting with each participant before interview. In addition, in the pre-interview, the participants were informed about the scope, context and aims of the research. Permission was requested from the participants to record the interviews, and it

was stated that if not allowed, the researcher would take notes during the interview. All participants gave permission for audio recording. In the present study, data collection tool and procedures were also examined for ethical concerns and approved by Gazi University Institutional Review Board for Research with Human Subjects (application no: 2019/09-30 - 21.10.2019). The author also tried to be sensitive about the ethical principles that should be followed in the qualitative studies suggested by Creswell (2007), and accordingly, it was stated that each participant was free to participate in the research before starting the interview, and they could end the interview whenever they wanted, and answer the questions as they wanted. The interviews were conducted in the schools where the teachers work, at determined hours. The interviews lasted between 30-50 minutes.

During the research process, participant teachers were also asked to write a reflective diary for 8 weeks in order to evaluate their teaching practices in their own lessons and to review their performance and processes at the end of the day. In order for teachers to reflect the teaching process better before starting the application, the steps to be followed by them while writing a diary were designed as suggested by Mitchell and Coltrinari (2001). They are as follows;

| **Section** | **Explanation** |
|---|---|
| Definition | What happened? |
| Awareness | What were your thoughts, feelings, assumptions, beliefs, values and attitudes? |
| Analysis | What were the thoughts and reasons behind your practice and actions? |
| Evaluation | What were your good sides? What were your bad sides? |
| Reconstruction | What changes can be made? What can be planned for future teaching practices? |

In the study, both semi-structured interview and keeping a reflective diary were carried out simultaneously in the research process in order to reveal participant teachers' reflection and their reflective thinking levels on the different dimension of their teaching practice deeply.

### *Data Analysis*

In this study, descriptive analysis technique was used for the data analysis of semi-structured interviews. Descriptive analysis technique is a type of analysis in which the sub-problems of the research are determined in advance and the themes are derived accordingly (Hatch, 2002; Yıldırım & Şimşek, 2013). Within this context, four stages of descriptive analysis were followed. In the first step, a framework for descriptive analysis was created. In other words, the themes or dimensions under which the data to be collected, organized and presented were determined in advance. In the second stage, the data were processed according to the thematic framework prepared. In other words, the data were read and organized according to the previously prepared framework. At this stage, some data were

excluded from the analysis as they were completely unrelated to the thematic framework prepared. In addition, direct quotations to be used in the reporting phase were also determined at this stage. The third stage was the process of defining the findings. At this stage, the data organized according to the thematic framework were defined in an easily understandable and readable language and supported by direct quotations. The fourth stage was the interpretation of the findings, and the explanation, association and interpretation of the identified findings were realized.

Reflective diaries were also used to determine at what level and what kind of reflection teachers made. A total of 143 unstructured reflective diaries written by 27 teachers were analyzed using the content analysis technique. The diaries were read several times by the researcher himself and an expert in the field of measurement and evaluation, and whose research and teaching interests are reflective thinking skills. The written and transcribed documents were examined based on the framework of Griffiths and Tann (1992) in order to describe Schön's different types of reflective thinking and the data were also analyzed with regard to the "Rubric of Reflective Thinking Levels" suggested by Taggart and Wilson (1998) to describe Van Manen's three levels named technical, practical, and critical rationality in the study.

Within this context, teachers' remarks were classified as reflection-in-action, reflection-on-action, and reflection-for-action based on overwhelmingly Griffiths and Tann's (1992) framework to describe Schön's different types of reflective thinking. When some of the remarks had more than one reflective level, the higher level of reflective thinking was tagged for the remark. They are as follows along with examples from the present study.

1. Rapid reflection (instant and mechanized reflection-in-action) 2. Repair (contemplative reflection-in-action)

   For example, in the present study, a participant teacher with a reflection to be called "thinking on his/her feet" stated that he/she overcame a negative situation by expressing his/her opinion as follows:

   *"I use a text that was not very relevant to real life in the unit and the questions about the text challenged the students. I thought I wish I had never made them carry out the activities related to this text. But then, I used a reading text which I think was related to this unit, and appropriate for the students' level and would appeal to the students in real life. As a result, this content I prepared made the students feel very enjoyable and made them easy to learn."*

2. Review (less formal reflection-on-action at a specific time), 4. Research (more structured reflection-on-action over the course of time)
   For example, in the present study, based on his/her personal perceptions a participant teacher made some explanations about his/her negative experiences and alternative solutions for them by pointing out:

*"I don't think the technique I used today was effective. By applying the "Picture Strip" technique, I could have helped them understand the storyline better."*

For reflection-for-action that entails viewing problems from a different perspective, a teacher's statement below with his/her desire of developing or altering a practice for future actions can be given as an example:

"I observed students today during my lesson. Based on their reactions, I can change the method of teaching by thinking more about which communicative approach techniques I used."

With regard to Van Manen's three levels named technical, practical, and critical rationality, "Rubric of Reflective Thinking Levels" suggested by Taggart and Wilson (1998) was used. Any remarks based on teaching action or theme was regarded as reflective at one of the levels of reflective thinking. Each comprehensible part or remark was coded by means of topical and level coding schemes. The remarks were formed mainly by the level coding scheme. Therefore, the higher level of reflective thinking was tagged for this remark when some of the remarks had more than one reflective level. The results of level of reflective thinking along with examples from the present study are shown in Table 2.

Table 2

*Examples for the Participant Teachers' Reflective Thinking Levels*

| **Level of Reflective Thinking** | **Theme** | **Reflective Entry** |
|---|---|---|
| **Technical level**<br><br>"Focus on behaviors, content, and skills from past experiences or theory derived from readings or course works, without looking for alternatives" | Measurement and Evaluation | "Although self-assessment and peer-assessment methods I used were consistent with learning objectives, many students did not take active part in them. Some of the students remained passive." |
| **Practical level**<br><br>"Assess implications and consequences of actions and beliefs" | Learning objectives | "The learning objectives I determined were effective. I think that I made the lesson more effective and fun by attracting the attention of the students thanks to the materials and the activities I prepared. I managed to make the students achieve the learning objectives I determined. I was only a guide, and the students were more active." |
| **Critical level**<br><br>"Systematically question practices" | Learning and Teaching process | "I designed teaching techniques such as "Information Gap", "Picture Strip Story", "Timetable" and "Scrambled Sentences". I understood from my teaching practices that I had to do more teamwork to make the students more active. I know I had some shortcomings in applying these techniques. I believe that I will be an even more useful teacher by coping with my shortcomings. |

### *Validity and Reliability*

In qualitative research, a number of strategies are used to ensure internal validity (credibility), external validity (transferability), internal reliability (consistency), and external

reliability (verifiability) (Lincoln & Guba, 1985). In this context, participant confirmation was used to ensure internal validity in the current study. Accordingly, after the interview with each participant was written on paper, it was shared with the relevant participant and the participant was asked to review their opinions and complete any shortcomings. The same process was repeated for each interviewer. Some participants were sent the text of the interview via e-mail, while others were delivered by hand. A detailed description strategy was used to ensure the transferability of the research. Accordingly, each stage of the research was presented to the readers in all details and all processes were mentioned as clearly as possible. In order to ensure the consistency of the research, the strategy of consensus among three coders specialized in qualitative research was used. Cresswell (2014) points out that integrity between coders is one of the important processes that ensure reliability in qualitative research. The reliability formula [Reliability = Consensus / (Consensus + Disagreement)] suggested by Miles and Huberman (1994) was used, and it was determined that the consistency between the coders was 85.8% as a result of the computation.

Finally, an expert review strategy was used to ensure the verification of the study. In this process, the current research was shared with another faculty member specialized in qualitative research, and the expert was asked to evaluate the research as a whole in terms of its conceptual dimension, objectives, problem, method, pattern, data collection tool, analysis and reporting of the data, and to indicate the shortcomings, if any. The expert suggested that the statements in the reflective diaries should be categorised with regard to Schön's different types of reflective thinking (reflection-in-action, reflection-on-action, and reflection-for-action) and Van Manen's three levels named technical, practical and critical rationality. The study was finalized by considering the recommendations made by the expert review.

## FINDINGS

In this part, the responses of the participant teachers to the questions about reflective thinking skills and the findings from the reflective diaries were examined. It was seen that both of them supported each other.

Data obtained from interviews with participant teachers were collected under five themes and they were as follows:

1) Opinions of Teachers on Reflective Thinking Concept.

2) Reflective Thinking Skills of Teachers Regarding Learning objectives of Course.

3) Reflective Thinking Skills of Teachers Regarding Course Content.

4) Reflective Thinking Skills of Teachers Regarding the Learning and Teaching Process of Course.

5) Reflective Thinking Skills of Teachers Regarding the Measurement and Evaluation of Course.

### *Opinions of Teachers on Reflective Thinking Concept*

Of the 27 participants, 13 of them (48%) saw reflective thinking as the transfer of knowledge or thought to students and teaching practice. They also emphasized student-centeredness and empathy in reflective thinking with the following sentences:

*"Reflective thinking can be the transfer of own knowledge to students and teaching practice. Individuals with this are empathetic, understanding, self-confident. " (T3)*

*"Reflective thinking is transferring the learned knowledge to students, receiving feedback, being open to criticism, being able to criticize oneself, and valuing thoughts." (T7)*

Seven of the teachers defined reflective thinking as making use of past experiences and learning from mistakes.

*"Reflective thinking is learning from their experiences. These individuals act more carefully and consciously because of the situations they have experienced in the past. These individuals are creative, predictive, and rational conscious individuals."(T8)*

*"They are individuals who act in a planned program, evaluate the result of their thoughts and realize their responsibilities, and say "I made a mistake" when he/she made a mistake." (T3)*

Four of the teachers defined reflective thinking as self-criticism, being a guide and empathizing.

*"Reflective thinking requires self-criticism, evaluating what they have been done and making conclusions from them."(T11)*

*"Reflective thinking is to approach problems in a critical and questioning way and to have logical (deductive, inductive) thinking skills."(T23)*

*"I know what reflective thinking is about, it is criticizing one's actions and changing his/her behavior." (T27)*

Three of the teachers stated that they had never heard of the concept of reflective thinking before. Teachers' views on this are as follows:

*"Reflective thinking was the subject of our "New Directions in Education" course while I was doing my master's degree, but now I don't remember much. I have also come across the concept of reflective thinking several times while working for teaching qualification exam." (T9)*

When the views of the above teachers were examined closely, it is seen that out of the 27 participants, 20 of them (74%) could directly define the concept of reflective thinking. However, from the data obtained from the interviews, it is understood that the teachers who participated in the study, and who could not define the concept of reflective thinking, used

reflective thinking from time to time when they gave information about their classroom practices. The situation can be summarized with the sentences of some participant teachers about classroom practices in the context of the English language curriculum:

*T18: "The learning objectives were not very suitable for the developmental characteristics of the students. I think there should have been more achievable learning objectives. It is not right to expect so much from children of this age. Children both cannot reach these learning objectives academically and their desire to learn decreases. Especially since I thought that reading and writing learning objectives should be both real-life related and achievable, I created real-life learning objectives by considering the levels of children."*

*T24: "Units are actually interesting to students. Colorful books and pictures etc.. They like them. But I'm having a problem. I find some reading texts unsuitable for the students' level and their prior knowledge is insufficient. Suddenly there are difficult texts in the books and some difficult questions about them. In this case, students' motivation deteriorates and their self-confidence decreases. I feel there is a perception among students that learning English is very difficult. In order to overcome these problems, I create content based on real-life which is appropriate for students' levels. These contents I prepared are more liked by the students and they learn more easily. "*

According to the teachers' views above, the participant teachers stated that the incompatibility of learning objectives and content determined in the curriculum with the development levels of the students negatively affected the cognitive and affective behaviors of the students. In order to overcome these negative situations, it is seen that participant teachers think reflectively by creating learning objectives and content related to students' development levels and real life. The opinions of the participant teachers are supported by Schön (1983) who suggests that professional lived experience results in one's capacity to think reflectively by calling it a "repertoire of knowledge", "hidden information" or "thinking on your feet.". Schön(1983) also argues that professional practice relies on tacit knowing-in-action instead of received knowledge. It should not forgotten that one doesn't have to define the concept in order to use reflective thinking skills because Schön (1983) underlines that "all helping professionals" (ministers, social workers, nurses, teachers, etc.) develop the capacity of reflective thinking over time which serves them well, when there are unexpected human events one must respond to.

### *Reflective Thinking Skills of Teachers Regarding Course Learning objectives*

Considering the theme of "Reflective Thinking Skills of Teachers Regarding Course Learning objectives", it was reflected during the interview that ,of the 27 participants, 19 of them (70%) made a change in the lesson plan due to the lack of students' prior knowledge, and they also stated that a lesson plan for learning objectives of the course could not be applied and the learning objectives could not be achieved before the prior knowledge was completed. Teachers' opinions on this point are given below:

*"Due to the lack of students' prior knowledge, I am making a change in the lesson plan. I think that a lesson plan for course learning objectives cannot be implemented and the learning objectives cannot be achieved unless students' prior knowledge is completed. "(T11)*

*"The learning objectives are really difficult to reach, so I start my lesson by completing the lack of prior knowledge of the students in every lesson." (T18)*

When the reflective thinking skills of some teachers regarding the learning objectives were examined, they stated that the number of learning objectives was high and that not all of the learning objectives were necessary. In this context, it is seen that some of the teachers emphasized the need to include learning objectives that cover different functions of the language and that can encourage language learning.

*"It is not possible for me to reach all of the learning objectives. Because the learning objectives of the lesson have to find direction in various ways. In addition, there are so many learning objectives that it is very difficult for students to reach all of them. I only focus on critical learning objectives. Time is a big problem for the other learning objectives."(T22)*

*"Since I think that some of the learning objectives are well above the development levels of the students, I try to adapt the learning objectives of the course to the levels of the students as much as possible. It is really difficult for students to internalize some of the learning objectives."(T25)*

*"… The learning objectives should be simpler. I give more weight to learning objectives that include the daily language correctly and make learning a language more enjoyable. I skip some learning objectives because I think they are unnecessary. I make adaptations on learning objectives that need to be simplified. "(T8)*

One of the teachers, on the other hand, makes self-criticism and questions himself/herself about how to eliminate the negativity by stating:

*"I am disappointed when I see that not all learning objectives happen. However, I make some changes in my teaching so that my students can gain these learning objectives better." (T19)*

Reflective diaries were used to determine at what level and what kind of reflection teachers made. T1 stated in his/her reflective journal by reflecting at the technical level and developing reflection-on-action as follows;

*"I believe that the learning objectives I set within the framework of "Biographies" unit were effective. During my teaching practice, I saw all the students taking active part in the activities."*

In the context of technical reflection, T1 simply reflected the reasons for the ineffectiveness of the learning objectives without elaborating and developing original comments. In the context of reflection-on-action, T1 reflected on his/her past teaching experience and gave a positive feeedback about the learning objectives of the course that he/she determined when the course was over.

T7 reflected at the practical level and developed reflection-on-action by drawing attention to the relationship between learning outcomes and student behavior. He/She states;

*"The learning objectives I determined were effective. I think that I made the lesson more effective and fun by attracting the attention of the students thanks to the materials and the activities I prepared. I managed to make the students achieve the learning objectives I determined. I was only a guide, and the students were more active."*

Based on practical reflection and reflection-on-action, T7 analyzed the dimension of learning objectives of the course and evaluated the results and effects of his/her actions and beliefs. T17 who reflected at the critical level and developed reflection-for-action expressed;

*"I am a teacher and I understand that the task of a teacher is to enable his/her students to achieve learning objectives. My aim was to ensure that students reach the learning objective of creating a story based on visuals in today's lesson. There was much less active participation in the course than I expected which caused me to have a guilty conscience. The fact that there were not many students who did not participate shows that I still have shortcomings and that I have to go further in my teaching profession. I am trying to do my best. Next week, I will design an activity that students can realize within the framework of collaborative learning and do compensatory work for the learning objective that students cannot achieve in the desired way. I strive to be a different teacher "*

In the context of critical reflection and reflection-for-action, T17 systematically questioned himself/herself regarding the learning objectives of the teaching process, developed original ideas about what he/she can do differently in the future and examined the issues related to the practices in a moral, ethical and systematic perspective.

T13 evaluated the learning objectives of his/her teaching process in terms of a moral, ethical and systemic perspective and developed original ideas about the relationship between the learning objectives of the teaching process and different variables such as teaching materials and different methods and techniques, which showed that he/she achieved critical reflection. In the context of reflection-for-action, he/she critically reflected on his/her teaching experiences, what he would be able to do differently in his/her future practices and what kind of tools and materials he would use differently with the following sentences:

*"In today's lesson, my aim was to enable students to achieve the learning objective about the ability to make comparisons between the two countries. I do not think I fully achieved my goal. Nevertheless, the interest and participation of the students in the course was effective. When I noticed that some students felt hesitant about not taking active part in the course, I tried to get them to focus their attention on the course by asking them questions. Because as the participation increases, the interest in the course increases. In order to make a lesson most efficient, we must make use of important elements such as different methods and techniques, authentic materials. I will consider my today's*

*teaching experience in my future lessons. In my opinion, gaining experience in teaching profesion is of great importance. "*

### *Reflective Thinking Skills of Teachers Regarding Course Content*

When looked at the theme of "Reflective Thinking Skills of Teachers Regarding Course Content", of the 27 participants, 15 of them (56%) stated that the content consisted of similar topics and was very intense and at the same time it was based on vocabulary teaching. In this context, teachers stated that they prepared content for the learning objectives in which different structures took place by considering the student levels for some learning objectives. Some of teachers remarked:

"*I think the topics and the content are intense, so I skip similar content as much as possible and put critical content to the forefront and even create content for some learning objectives myself." (T3)*

*"I think it is important that the content always takes into account the well-being of the student and the best interests of the child. I think this is sometimes overlooked in programs. In this context, it is important to ensure that content arrangements are in line with students' future plans or expectations. I am trying to prepare content for some learning objectives by taking into account student levels. (T6)*

*"I find that the content is focused on vocabulary, making it difficult for students to remember what they learned. Although I think that students' learning vocabulary is positive, I sometimes prepare content that includes different daily language structures.*" (T21)

One of the teachers stated that spelling and grammar rules were ignored in the content and he/she made some arrangements regarding this situation as follows:

*"It is a big problem that grammar rules are not given enough attention in the content. The fact that there are problems such as grammar, spelling mistakes and expression mistakes in the text makes the comprehension of the texts difficult. That's why I try to find mistakes and correct them as much as possible before lesson, which is a waste of time, unfortunately. "(T16)*

When looked at the reflective diaries to determine what level and what kind of reflection teachers realized, T3 who reflected at the technical level and developed reflection-on-action about the sequence of content expressed:

*"I could not make the sequence of content properly. First of all, I should have started my lesson with the content of "The Internet". Then I could go on with "On the Phone."*

T8 developed reflection-in-action by stating that he/she encountered a negative situation during the learning and teaching process and that he/she with a reflection that could be called "thinking on his/her feet" actually overcame the situation. He/She also reflected at the practical level by emphasizing that the level of the students should be taken into consideration when choosing the content and that it should be connected with real life. T8 expressed:

*"The unit named "Appearance and Personality" was actually interesting. Initially, the visuals and making sentences about visuals made the students feel enjoyable. However, a text that was not very relevant to real life in the unit and the questions about the text challenged the students. I saw that students' motivation deteriorated and their self-confidence decreased. I thought I wish I had never made them carry out the activities related to this text. But then, I used a reading text which I think was related to this unit, and appropriate for the students' level and would appeal to the students in real life. The text was also about the physical and personality characteristics of celebrities. This content I prepared made the students feel very enjoyable and made them easy to learn."*

As regards critical reflection, it was found that no participants achieved this level with regard to the dimension of content.

### *Reflective Thinking Skills of Teachers Regarding the Learning and Teaching process of Course*

Looked at the theme of "Reflective Thinking Skills of Teachers Regarding the Learning and Teaching Process of the course", it is seen that all of the 27 participants (100%) had reflective thinking skills. Participant teachers stated that attracting students' attention made the lesson more enjoyable and that visual and concrete materials motivated them and increased their participation in the lesson and the permanence of the learning. Some of the teachers with reflective thinking skills stated:

*"I think that the activities are not enough and there are activities that we could not do due to lack of materials and opportunities. To compensate for this, I give them as homework. In addition, I try to make up our shortcomings by giving research assignments and finding slides on the subject on the internet. I try to complete the topic I think is missing by repeating at the beginning of the next lesson. "(T1)*

*"I use slides which are appropriate for the topic in order to make the lesson more enjoyable, to get the attention of the students. The images on the slide attract more attention of the students, they are motivated and participate better in the lesson. They listen to the lesson and actively participate in the lesson." (T12)*

*"Concrete material attracts more attention of students and becomes permanent in their minds. This also makes the lesson more enjoyable. For this reason, I try to bring concrete material in almost every lesson." (T19)*

*"Before the lesson, I look at the activities I have done in that lesson in the previous years and the subject I will teach in that lesson from at least three or four references. This is how I update my knowledge. I try to understand the questions that students may think about newly added topics beforehand and to make the learning-teaching process effective by preparing materials that facilitate understanding of the topics. "(T23)*

*"Since there are not more activities, I prepare activities that will develop critical thinking, make them easier to understand, ant not make students get bored. I also prepare activities with lots of exercises that they can use when they study on their own. "(T21)*

When the reflective diaries were examined, T17 reflected at the technical level and developed reflection-on-action about teaching techniques by explaining:

*"I don't think the technique I used today was effective. By applying the "Picture Strip" technique, I could help them understand the storyline better. "*

Teachers who reflected at the practical level and developed reflection-on-action made comments based on their personal perceptions about not only mentioning whether the techniques they used were effective or not, but how they were effective if they were effective, and why they were not.

T20 who reflected at the practical level and developed reflection-on-action stated:

*"To enable my students to predict the English equivalents of foods correctly, "Quiz Show" technique along with visuals instead of "Information Gap" technique would be more effective so that students could participate effectively. "*

T9 who reflected at the critical level and developed reflection-for-action made ethical and systemic investigations about teaching methods, made progress in self-understanding and self-actualization, and revealed original and educational generalizations.

*"I designed teaching techniques such as "Information Gap", "Picture Strip Story", "Timetable" and "Scrambled Sentences". I understood from my teaching practices that I had to do more teamwork to make the students more active. I know I had some shortcomings in applying these techniques. I believe that I will be an even more useful teacher by coping with my shortcomings. The fact that the techniques I used along with the materials I prepared this week, that is, collaborative teamwork and student-centered methods and techniques contributed to the active participation of students, as well as the ability of students to use the language in functional and communicative terms really satisfies me on behalf of my teaching profession. "*

### *Reflective Thinking Skills of Teachers Regarding the Measurement and Evaluation of Course*

Looking at the theme of "Reflective Thinking Skills of Teachers Regarding the Measurement and Evaluation of Course", it is seen that ,of the 27 participants, 18 of them (67%) question the efficiency of measurement tool by remarking:

*"I think some measurement tools are not suitable for the learning objectives. Therefore, I try to determine the measurement tools according to the learning objectives by preparing a table of specifications." (T11)*

*"As for measurement and evaluation, I think there are no sources except the course repetitions at the end of a few units. Therefore, I give students tests for learning objectives. I do exams for listening and speaking. "(T13)*

*"There are learning objectives that should be gained to students in the curriculum. The feedback I received from the students is the best tool to show me how much I teach. After exam, I analyze exams. This analysis is done for each question separately. From here, I find the opportunity to understand which subject is understood by looking at the frequency of each question. I definitely re-lecture topics that are not well understood. "(T23)*

One of the teachers, on the other hand, questions himself by criticizing the contradictory situation he experienced in terms of measurement and evaluation by stating:

*"Actually, I am not very satisfied with this assessment and evaluation. You evaluate the students as a whole, but unfortunately this is not the case with our exam system. This situation creates a contradiction. We direct the child to learn by living through new programs, but that is not valid for central exam. Therefore, I prepare the sudents for the real world by taking the reality of the central exam into consideration. "(T24)*

When the reflective diaries were examined, T27 reflected at the technical level and developed reflection-on-action by explaining:

*"Although self-assessment and peer-assessment methods I used were consistent with learning objectives, many students did not take active part in them. Some of the students remained passive. I had a bad experience about duration. "*

In the context of technical reflection, T27 did not elaborate and develop original comments by simply stating the reasons why the students did not have too much active participation although assessment methods were consistent with learning objectives. T27 also made a negative evaluation by going back his/her evaluation experiences, which was the evidence of the fact that he/she developed reflection-on-action.

Participant teachers, who reflected at the practical level and developed reflection-on-action, did not only describe the problems they experienced during the evaluation process but also stated the reasons for the problems experienced and what should be done to solve the problems.

T23 who reflected at the practical level and developed reflection-on-action made some explanations about his/her negative experiences and alternative solutions for them.

*"The lack of student participation in the evaluation process made me unhappy. Nobody except the same students all the time wanted to attend the class. I had to choose myself the students to make them answer the questions. I could have used alternative assessment methods such as "Story-Telling and "Reporting Tasks", "Oral Questionnare" and "Picture-cued Tasks" that would make students*

*more active. In addition, I could not perform an evaluation process as I wanted because of time anxiety."*

T9 who reflected at the critical level and developed reflection-for-action made original inferences about the assessment methods as follows:

*"I designed the evaluation techniques such as question and answer, filling in the gap, and matching. In my teaching practice, I saw that only students who were willing and knew the answer took active part i the course. In order for the assessment techniques to be effective, heterogeneous collaborative teams should be formed, in which students who attend and do not attend the course will be together. Then, the alternative assessment materials such as "Story-Telling", "Reporting Tasks" and "Picture-cued Tasks" should be given to these heterogeneous teams based on individual assesment and team assesment. I am going to make use of these assessment materials in my next lesson. Only answering the questions asked by the teacher does not mean that the teacher made an effective evaluation. The evaluation should be made with the active participation of the students by making them enjoyable rather than making them feel anxious. "*

It can be inferred that T9 who reflected at the critical level and developed reflection-for-action systematically questioned his/her teaching experiences about the evaluation of the teaching process and developed original ideas about what he/she could do differently in the future.

## DISCUSSION AND CONCLUSION

The present study explored teachers' reflection and their reflective thinking levels on the different dimensions of their teaching practice with regard to the dimension of learning objectives, content, learning-teaching process, and measurement and evaluation in the context of English course.

Based on the findings of the first sub-problem of the study, it was revealed that most of the participant teachers had information about reflective thinking. Considering the professional seniority of the teachers participating in the study, it is seen that there were no participant teachers for less than 10 years. Based on this, it can be said that professional experience is an important variable on teachers' reflective thinking. This finding of the study is supported by similar studies. When the literature was examined, it is seen that the relationship between reflective thinking and experience was emphasized by many researchers (Lee, 2005; Rodgers, 2002). In fact, as a result of the research conducted by Allen and Casbergue (1997), it was observed that reflection took place in the long term. Another finding of their research was that experienced teachers' remembering skills were fluent, stable, precise and consistent compared to the inexperienced and less experienced teachers. Yiğit Kır (2014), on the other hand, found that the participants who had the most knowledge about reflective thinking in her research, were the ones who just graduated from university. Individuals who had knowledge about reflective thinking stated that they learned this information during their higher education or on their own curiosity. Ocak, Ocak and Saban

(2014) and Dolapçıoğlu (2007) concluded in their research that there was no relationship between professional seniority and reflective thinking.

In the present study, it was determined that participant teachers developed reflection-in-action (relatively few), reflection-on-action, and reflection-for-action. Congruent with the findings of the present study, Moallem (1997) examined the reflection behaviors of a science teacher in her study and found that reflective thinking emerged to be one of the basic components of the teacher's thinking process, and that the teacher developed reflection-in-action, reflection-on-action, and reflection-for-action.

When the reflective thinking skills of the teachers regarding learning objectives of course were examined, the teachers stated that they made a change in the lesson plan because they thought that a lesson plan for the learning objectives could not be applied unless the students' prior knowledge was completed. This finding of the study is similar to Koç and Yıldız's (2009) study titled "Reflectors of Teaching Practice: Diaries" which determined that the teacher candidates had problems in the planning dimensions of the teaching practice based on their diaries and they made reflections on course learning objectives. Another finding of the present study revealed that the number of learning objectives was high and some learning objectives were difficult to reach. In this context, it is seen that some of the teachers emphasized the need to include learning objectives that cover different functions of the language and that can encourage language learning. Considering the views of the participant teachers in their reflective diaries, it was determined that the depth of their explanations varied from technical level to critical level and they focused on the relations of the learning objectives with the subject, material, method and techniques. These findings of the study overlap with the findings of the study conducted by Töman (2015) and Gencer (2008). In Töman's (2015) study, teacher candidates used superficial expressions only to describe what they did while explaining their teaching experiences and they used interpretative expressions on the relationships of learning objectives with different variables. On the other hand, in the context of reflective thinking at the practical level, it was observed that they questioned the relationships of the learning objectives with different variables in a systematic way. With regard to critical reflection, they used questioning expressions in a moral, ethical and systematic perspective. These findings of the research in the context of reflection at a critical level is supported by Valli (1990) who informs that effective responsible teaching is based on taking moral responsibility and not on having technical skills and Burgess (1999) underlines that teachers with principles of moral subjects have reflective teacher characterictics.

When reflective thinking skills of participant teachers regarding course content are examined, they stated that the content consisted of similar topics and was very intense and at the same time it was heavily based on vocabulary teaching. In addition, teachers stated that they prepared content for the learning objectives in which different daily language structures were included by taking into account the student levels, and that spelling rules

were underrated in the content and they made some arrangements on this point. This finding of the study is similar to the result of the study of Köksal and Demirel (2008) and Özbek (2014) in which pre-service teachers determined some contents based on learning objectives, and took into account student characteristics while choosing and organizing the content. The fact that the participants made the content selection and arrangement by taking into account course learning objectives, the characteristics of the students and also the development levels of the students is similar to the findings of this study. Considering the views of the participant teachers in their reflective diaries, it was found out that participant teachers generally focused on the relationship of the sequence of content with teaching methods, teaching materials, subject content and student behavior in order to determine the sequence of content. Their explanations in their reflective diaries were of reflection in the technical level based on descriptive expressions, of reflection in the practical level based on detailed comments. This finding of the research is supported by the studies conducted by Töman (2015) and Gencer (2008).

When reflective thinking skills of teachers regarding the learning-teaching of course were examined, it was revealed that they reflected on teaching methods and techniques, activities and materials, student motivation, classroom atmosphere, ensuring participation in the lesson, Similar to these findings of the study, it was determined in Özbek (2014) and Köksal and Demirel's (2008) studies in which pre-service teachers prepared interesting and diverse activities, and while reflecting, they emphasized teaching in order to achieve the determined learning objectives, especially taking into account previous teaching practices. Erginel (2006), in her research titled "Developing reflective teachers: A study on perception and improvement of reflection in pre-service teacher education", determined that pre-service teachers focused on subjects such as teaching methods and student motivation while thinking reflectively in the application process which is parallel to the results of the present study. Based on the opinions of the participant teachers in their reflective diaries, it was revealed that the participant teachers generally associated the teaching approaches, methods, techniques and materials they used in their course with student behavior, teaching skills, the duration of the course and the learning objectives of the course. Similar to these findings of the study, in the studies conducted by Töman (2015) and Gencer (2008), as the number of teaching practices increased, teacher candidates made more conscious, consistent and effective comments and reflected at technical, practical and critical levels, respectively.

When reflective thinking skills of teachers regarding the measurement and evaluation of course were examined, it was underlined that the efficiency of measurement tools and the need to prepare measurement tools according to the learning objectives should be realized. In fact, Özbek (2014) and Ünver (2001) emphasized that conducting measurement and assessment with regard to reflective thinking provides a reorganization in education, which can be thought to support the results of the present study. Considering the views of the participant teachers in their reflective diaries, it was determined that the participant teachers generally reflected at technical, practical and critical levels in which they associated

the assessment methods of the course with the learning objectives, duration, student behavior, materials, alternative assessment methods made individually and as a group. Similar to these findings of the study, in the studies conducted by Töman (2015), as the reflective applications increased, teacher candidates did not see their assessment practices as sufficient and produced alternatives. In the final stages of reflective practices, they made original inferences and presented educational generalizations. As a result, the development of reflective thinking skills contributed to their professional development.

### *Recommendations*

The study is simply based on a relatively small number of participants, and the findings cannot be generalised. This can be acknowledged as a limitation of the study. Therefore, more studies including a large number of participants need to be carried out. It is thought that providing teachers with in-service training courses such as thinking skills, problem solving and decision making techniques, risk and crisis management that will contribute to overcoming their shortcoming and mistakes will further improve their reflective teaching and reflective thinking skills. In-service training activities can also be organized in order to increase the awareness of teachers about the dimensions of learning objectives, content, learning and teaching process and measurement and evaluation.

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Research

# An Investigation of Preservice Teachers' Academic Self-Efficacy and Academic Motivation

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**Abstract:**

*The purpose of this study is to determine the academic self-efficacy and motivation levels of preservice teachers and to investigate these cognitive aspects in terms of various variables. The participants of the current study consist of 621 preservice teachers studying at Necmettin Erbakan University Ahmet Keleşoğlu Faculty of Education in the 2020-2021 academic year. The study adopted a single survey model. Research data were collected using Academic Self-Efficacy Scale and Academic Motivation Scale. Independent sample T-test and one-way ANOVA were used to analyze the data. The findings of the study revealed that the academic self-efficacy and academic motivation levels of the preservice teachers were high; academic self-efficacy did not reveal any significant difference according to gender and year of study variables. It was found out that the academic motivations of the participants revealed significant differences according to gender, year of study, academic achievement, and career expectation variables.*

**Keywords:** Preservice teachers, academic self-efficacy, academic motivation

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## INTRODUCTION

With the COVID-19 pandemic, the teaching practices of preservice teachers are interrupted. This situation may affect the professional competency and self-efficacy perception of preservice teachers. Having little or no face-to-face interaction with students caused preservice teachers not to get the necessary data to self-evaluate their teaching competencies. In this case, it is wondered that how their self-efficacy shaped. Moreover, preservice teachers start a new learning environment with the pandemic and they have to face this new situation and problems. While this situation positively affects the learning motivation of some, others may be affected negatively

The sudden change in schools from traditional learning environments to online education models because of the COVID-19 pandemic, novel technologic situations and problems caused tasks of teachers and students to become increasingly harder and thus to increase their negative affective experiences. During this process, many tasks that required time and patience for students emerged in addition to their many demands about their professional applications and proficiencies. In this process, the competencies, skills, and motivations of in-service and preservice teachers have become an important factor in overcoming these novel problems.

Preservice teachers in Turkey are entitled to enter the university after a challenging competition. The most important goals of the students entering the university are to successfully graduate by acquiring the necessary competencies and to stay motivated in the department they enter, and to fulfill their academic and professional expectations. It is expected that a teacher candidate who wishes a better status than his / her current status to have higher academic competence and motivation. In this respect, it can be said that the students at a faculty of education, who are at the center of education and training activities, achieve a better status in their professional field, that is, there is a relationship between their career and their academic self-efficacy and motivation.

## THEORETICAL FRAMEWORK

Academic self-efficacy is one of the important factors affecting academic performance. It describes the beliefs and attitudes of students towards their ability to achieve academic success, as well as their ability to perform academic tasks and their ability to successfully learn (Bandura, 1997; Hayat et al., 2020; Koyuncuoğlu, 2021; Schunk & Ertmer, 2000). Bandura's social cognitive theory argues that individuals have the ability to control their actions through self-regulation (Bandura, 2000). According to this theory, individuals can overcome the difficulties of the tasks they face with their self-efficacy and determination. Self-efficacy can increase self-regulated behavior through motivation. At this point, past mastery performance contributes to an increase in learning and positive behavior by strengthening the expectation of future success.

Self-efficacy beliefs underlie academic self-efficacy perception. Self-efficacy beliefs contribute to the excellent performance of individuals by increasing commitment, effort, and perseverance (Pintrich, 2003). While students with high self-efficacy attribute their failures mostly to lower initiatives than low abilities, those with low self-efficacy attribute their failure to low abilities (Kurbanoglu & Akim, 2010). Therefore, self-efficacy can affect task selection and motivation, which is an important source of power in their fulfillment. In other words, students with low self-efficacy are more likely to show hesitation in completing their tasks, delaying them, avoiding their duties, and giving up easily (Bandura, 1997, Schunk & Ertmer, 2000). While those with a high level of self-efficacy, in addition to being self-confident to find a solution when faced with complex problems, are patient, spend more effort, and strive to overcome the problem for a longer time (Hayat et al., 2020; Bandura, 1997 ). Chemers and Garcia (2001) state that students' self-efficacy in the first year of university is a strong indicator of their future performance (Chemers, Hu & Garcia, 2001). Also, the researcher argues that self-efficacy beliefs are manifested in human behavior through four processes which are listed as cognitive, motivational, affective and selection processes which are in harmony with each other (Balcı, Şanal, & Durak Üğüten, 2019, p.2). For this reason, self-efficacy is seen as one of the most important factors in the academic achievements of students.

There exist many qualitative, quantitative, and mixed-method studies in countries as Australia (Hemmings, 2015), Mexico (Reyes-Cruz & Perales-Escudero, 2016), and the USA (Morris & Usher, 2011) to investigate the relationships with academic self-efficacy beliefs. While some studies indicate that there are no gender differences in self-efficacy (Bailey, 1999; Schoen & Wincour, 1988), there exist studies revealing that male faculty members have higher levels of self-efficacy for research and service than females (Zhao, McCormick & Hoekman, 2008). In some of the studies, academic self-efficacy beliefs specific to a particular discipline (Morris & Usher, 2011; Wyatt & Dikilitaş, 2016) have been examined and findings revealed that academic self-efficacy levels are relatively problematic in certain disciplines (Bailey, 1999; Hemmings et al., 2012; Zhao, McCormick & Hoekman, 2008).

Another important concept in the transformation of self-efficacy into a product is motivation. Motivation is an important factor in students' learning and teachers' teaching processes (Ait Maalem Lahcen & Mohapatra, 2020; Asigigan & Samur, 2021; Landicho, 2020). Motivation is the direct reason to cause, inspired system some sort of human behavior and people can be divided into three categories achievement, social and impression (Omar, Drewsh & Ahmed, 2018, p.36). It was found out that between motivational variables and self-efficacy perceptions and productivity, performance (Hammond, 1994); and perceived competence (Hardré et al, 2011) were consistently associated in post-secondary education faculties. However, apart from recent cross-sectional studies investigating the relationships between self-efficacy and emotional well-being variables (emotions related to teaching (Hall, Lee & Rahimi, 2019; Zhang et al, 2019), and perceived stress level (Sharma, 2013); it is seen that the studies examining the relationship of self-efficacy with psychological health in

post-secondary faculties at the level of secondary education are insufficient. It is claimed that academic motivation and student participation are factors that affect the learning outcomes of university students (Chen & Lu, 2015; Roksa & Whitley, 2017). The variables that enable them to start learning willingly are explained by learning motivation and academic motivation (Eccles & Roeser, 2009; Koyuncuoğlu, 2021). Academic motivation is defined as the desire or interest of students to be interested in learning and school experiences (Hulleman, Barron, Kosovich, & Lazowski, 2016). Studies reveal that academically motivated students tend to perceive school and learning as valuable, love learning, and enjoy activities related to learning (Zimmerman & Dale, 2012).

Motivation plays an important role in the academic performance of students due to the intensive structure of education faculties. For instance, following a specifically defined path to become a teacher requires practicing in addition to university courses (Kusurkar et al, 2011; Kara, 2020). Although the types of motivation vary, they are generally divided into two categories. The first category is intrinsic motivation (e.g. being interested in becoming a teacher or pursuing the intellectual challenges of educational science). The second is extrinsic motivation and is result-oriented. For example, being motivated to find a job or pursue a career as a teacher is related to extrinsic motivation (Cook & Artino, 2016; Linnenbrink & Pintrich, 2001; Wu, Li, Zheng & Guo, 2020). In addition to the two motivation categories, self-efficacy also attracts great attention from researchers in the field of education. Self-efficacy is the subjective assessment of an individual's ability to complete a specific task (Doğru, 2020). In success-oriented educational environments, self-efficacy is related to a student's perceived confidence in achieving certain goals. Self-efficacy helps students determine what choices they make, how much mental effort they put in, and how much they persist in a task (Kaleli, 2020). Ryan and Deci (2000) stated that when students experience the satisfaction of competence, autonomy, and psychological needs in a learning task, they tend to be more intrinsically motivated. According to Ryan and Deci (2000), competence refers to a person's need and motivation to be effective in environmental interactions. Therefore, there is a significant relationship between students' need for competence and their motivation (Skinner & Belmont, 1993; Zaccoletti et al, 2020). However, few studies have examined how different motivational components affect the performance and academic career of education faculty students together, using a large sample size (Koyuncuoğlu, 2020). Motivation is a mutual product of an individual's personality and external environment (Schunk & Pajares, 2005). This reveals that the motivation of education faculty students should be examined in a way that takes into account their characteristics, the academic tasks they face, and the expectations or situations. It is frequently emphasized in the relevant literature that pre-service teachers' affective characteristics, as well as their cognitive characteristics, play an effective role in maintaining their individual development and adapting to new situations.

In this context, the ability of preservice teachers to achieve successful results in reaching the objectives of the teaching-learning processes is related to their competence

perceptions, academic, and general motivations, as well as their other characteristics. Within the framework of this general purpose, in this study, the answers for the following research questions will be sought:

What are the academic motivations and academic self-efficacy levels of the preservice teachers?

Do the academic motivation levels of preservice teachers differ based on the variables such as a) gender, b) year of study, c) academic achievement level, d) academic career expectancy?

Do the academic self-efficacy levels of preservice teachers differ based on the variables such as a) gender, b) year of study, c) academic achievement level, d) academic career expectancy?

## METHOD

### *Participants*

The population of the current study is composed of preservice teachers studying at faculties of education in Turkey. Reaching all of the students in the target population requires serious time and teamwork. For this reason, the convenience sampling method was preferred in the study. In this respect, 621 preservice teachers studying at Necmettin Erbakan University Ahmet Keleşoğlu Faculty of Education participated in the study. The data were collected was based on voluntary participation. Demographic variables and the distribution of preservice teachers according to these variables are shown in Table 1.

**Table 1**

*Distribution of Preservice Teachers by Demographic Characteristics*

| | | f | % |
|---|---|---|---|
| Gender | Female | 448 | 72. 1 |
| | Male | 173 | 27.9 |
| Year of Study | 1.0 | 163 | 26.2 |
| | 2.0 | 157 | 25.4 |
| | 3.0 | 147 | 23.7 |
| | 4.0 | 154 | 24.8 |
| Academic Achievement | Lower | 24 | 3.9 |
| | Moderate | 410 | 66.0 |
| | Higher | 187 | 30.1 |
| | Total | 621 | 100,0 |

When the table is considered, it is obvious that the ratio of male preservice teachers is 27.9% and the ratio of female preservice teachers is 72.1%. As for the year of the study 26.2% of the preservice teachers were freshmen, 25.4% of them were sophomores, 23.7% of them were juniors, and 24.8% were seniors. In terms of academic achievement, 3.9% of the participants had a lower level of success, 66% of them were moderately successful, and 30.1% of them were highly successful preservice teachers.

### *Research Design and Data Collection Tools*

In the current study, a single survey model was adopted. The single survey model was used to describe the academic self-efficacy and academic motivation levels of preservice teachers. The study is planned to be carried out in four stages. In the first stage, data collection tools were prepared for implementation. After preparing the academic self-efficacy and academic motivation scales, whose sample forms are attached, were prepared for application, validity and reliability tests were conducted by the researcher. In the second phase of the study, to implement the data collection tools to the preservice teachers, the necessary permissions were obtained from the relevant dean's office and the data collection tools were implemented on the dates shown in the calendar. In the third stage of the study, the data obtained were transferred into a computer after being subjected to technical analysis. The data were subjected to statistical analysis with relevant analysis techniques. At the last stage of the study, the analyzed data were interpreted comparatively based on the relevant literature. In the light of the results, suggestions were made for preservice and in-service training for preservice teachers.

Academic Self-efficacy Scale

The 5-point Likert-type "Academic Self-efficacy Scale" developed by Kandemir (2010) aims to determine the academic self-efficacy levels of students. Principal Component Analysis (PCA) was conducted to determine the factor structure of the scale. As a result of the PCA, it was found out that the scale had a three-factor structure. The first factor included 11 items (m6, m7, m8, m9, m10, m14, m15, m16, m17, m18, m19). The factor loading values of the items in this factor ranged between .54 and .78. This factor was named "self-efficacy to cope with academic problems". The second factor included 4 items (m1, m3, m4, m5). The factor loading values of the items in this factor ranged between .59 and .78. This factor was named "self-efficacy towards academic effort". The third factor also included 4 items (m2, m11, m12, m13). The factor loading values of the items in this factor range between .66 and .78. This factor was named "self-efficacy for academic planning". Cronbach alpha internal consistency coefficients were examined for the reliability of the scale. In this sample, the coefficients were .87 for the first factor, .77 for the second factor, .75 for the third factor, and .99 for the whole scale.

Academic Motivation Scale

The 7-point Likert-type "Academic Motivation Scale" developed by Vallerand et al. (1992) and adapted by Karagüven (2012) was used to collect the data of the study. According to the EFA and CFA analyzes performed, the scale consisted of 28 items with seven factors, four items each. These factors were intrinsic motivation-to know (IMK), intrinsic motivation - toward accomplishment (IMTA), intrinsic motivation-to experience stimulation (IMES), extrinsic motivation – identified (EMI), extrinsic motivation-introjected (EMI), extrinsic motivation-external regulation (EMER), and amotivation (A). The 7-point Likert scale was arranged as "does not correspond at all, corresponds a little, corresponds moderately, corresponds a lot, corresponds exactly". The Cronbach Alpha reliability coefficient for the scale ranged from .71 to .88 for the sub-dimensions. In the analysis performed on the sample of this study, the reliability coefficient for the whole scale was determined as 0.85.

### *Data Analysis*

Before analyzing the academic self-efficacy and academic motivation scores of the preservice teachers in the study, the normal distribution of the data was tested. In determining the distribution, skewness and Shapiro Wilk test results were taken as a basis. According to Tabachnick and Fidell (2007), the fact that these values are in the range of ± 1 indicates that the data do not reveal excessive deviations from the normal distribution. The values obtained from the scale scores in this study indicated that the attitude and self-efficacy scores were distributed quite close to the normal distribution. It was observed that the data of the two scales belonging to the study sample were in the range of ± 1 and the Shapiro Wilk test results indicated a normal distribution (Yurt & Sünbül, 2012). Considering this situation, parametric tests were used in the analysis of academic self-efficacy and academic motivation scores of preservice teachers.

In the present study, independent samples t-test and one-way ANOVA were used. A t-test is used to find out the source of difference in the parametric distributions in which the independent variables can have two values. ANOVA is used to find out the source of difference in parametric distributions in which independent variables can have more than two values.

### *Research Ethical Consent*

In this study, all rules stated to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions stated under the title "Actions Against Scientific Research and Publication Ethics", which is the second part of the directive, have not been carried out. The research was approved by the decision of Necmettin Erbakan University Ethics Committee with the number of 2021/204

## RESULTS

In this section, first the descriptive findings then the correlational statistics are given in tables.

**Table 2**

*Descriptive Values of Scores Obtained in Academic Self-Efficacy and Academic Motivation Scales*

| Variables | n | Mean | Std. Deviation |
|---|---|---|---|
| Coping with Academic Problems | 621 | 3,68 | 0,70 |
| Academic Efforts | 621 | 3,89 | 0,74 |
| Academic Planning | 621 | 3,63 | 0,77 |
| Academic Self-efficacy Total Score | 621 | 3,71 | 0,67 |
| Intrinsic Motivation – to Know | 621 | 5,38 | 1,42 |
| Intrinsic Motivation – toward Achievement | 621 | 5,03 | 1,40 |
| Intrinsic Motivation – to experience stimulation | 621 | 4,86 | 1,47 |
| Extrinsic motivation-introjected | 621 | 3,93 | 1,47 |
| Extrinsic motivation-external regulation | 621 | 4,16 | 1,21 |
| Extrinsic motivation – identified | 621 | 5,56 | 1,28 |
| Amotivation | 621 | 1,97 | 1,28 |
| Academic Motivation Total Score | 621 | 4,41 | 0,89 |

When Table 2 was examined, it was understood that preservice teachers' academic motivation scale total mean score is calculated as 4.41 ± 0.89. The academic self-efficacy mean score was found as 3.71 ± 0.67. According to the mean scores obtained, it was observed that the academic self-efficacy and academic motivation of the preservice teachers, in general, were high.

**Table 3**

*Comparison of Scores Obtained from Academic Self-Efficacy and Academic Motivation Scales by Gender*

| | Gender | n | Mean | Std. | t | P | Cohen's d |
|---|---|---|---|---|---|---|---|
| Coping with Academic Problems | Female | 448 | 3,66 | 0,71 | -1,14 | 0,25 | |
| | Male | 173 | 3,73 | 0,66 | | | |
| Academic Efforts | Female | 448 | 3,87 | 0,74 | -1,11 | 0,27 | |
| | Male | 173 | 3,94 | 0,74 | | | |
| Academic Planning | Female | 448 | 3,63 | 0,78 | -0,28 | 0,78 | |
| | Male | 173 | 3,65 | 0,75 | | | |
| Academic Self-efficacy Total Score | Female | 448 | 3,70 | 0,68 | -1,02 | 0,31 | |
| | Male | 173 | 3,76 | 0,63 | | | |
| Intrinsic Motivation – to Know | Female | 448 | 5,49 | 1,34 | 3,35 | 0,00 | 0.2888 |
| | Male | 173 | 5,07 | 1,56 | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Intrinsic Motivation – toward Achievement | Female | 448 | 5,16 | 1,35 | 3,76 | 0,00 | 0,3330 |
| | Male | 173 | 4,69 | 1,47 | | | |
| Intrinsic Motivation – to experience stimulation | Female | 448 | 4,96 | 1,44 | 2,50 | 0,01 | 0,2228 |
| | Male | 173 | 4,63 | 1,52 | | | |
| Extrinsic Motivation-Introjected | Female | 448 | 4,03 | 1,45 | 2,76 | 0,01 | 0,2449 |
| | Male | 173 | 3,67 | 1,49 | | | |
| Extrinsic Motivation-External Regulation | Female | 448 | 4,17 | 1,22 | 0,21 | 0,84 | |
| | Male | 173 | 4,15 | 1,16 | | | |
| Extrinsic Motivation – Identified | Female | 448 | 5,69 | 1,23 | 4,08 | 0,00 | 0.3533 |
| | Male | 173 | 5,23 | 1,37 | | | |
| Amotivation | Female | 448 | 1,87 | 1,18 | -3,00 | 0,00 | 0.2604 |
| | Male | 173 | 2,22 | 1,49 | | | |
| Academic Motivation Total Score | Female | 448 | 4,48 | 0,86 | 3,10 | 0,00 | 0.2664 |
| | Male | 173 | 4,24 | 0,94 | | | |

When Table 3 was examined, no significant difference was found in the academic self-efficacy mean scores of the preservice teachers according to their genders (p> 0.05). However, significant differences were found in each of the academic motivation dimensions' mean scores except for the Extrinsic Motivation-External Regulation dimension scores. Considering the mean scores of the groups, it was seen that female preservice teachers had significantly higher academic motivation compared to male preservice teachers. Amotivation levels of male preservice teachers were found to be high.

**Table 4**

*Comparison of the Scores Obtained from Academic Self-Efficacy and Academic Motivation Scales by Achievement Level*

| | Achieveme | n | Mean | Std. D. | f | Sig. |
|---|---|---|---|---|---|---|
| Coping with Academic Problems | Lower | 24 | 3,06 | 0,87 | | |
| | Moderate | 410 | 3,55 | 0,66 | 46,330 | ,000 |
| | Higher | 187 | 4,04 | 0,61 | | |
| Academic Efforts | Lower | 24 | 3,23 | 1,12 | | |
| | Moderate | 410 | 3,78 | 0,70 | 34,672 | ,000 |
| | Higher | 187 | 4,21 | 0,62 | | |
| Academic Planning | Lower | 24 | 3,01 | 0,82 | | |
| | Moderate | 410 | 3,50 | 0,76 | 41,949 | ,000 |
| | Higher | 187 | 4,01 | 0,63 | | |
| Academic Self-efficacy Total Score | Lower | 24 | 3,09 | 0,87 | | |
| | Moderate | 410 | 3,59 | 0,63 | 50,831 | ,000 |
| | Higher | 187 | 4,07 | 0,56 | | |
| Intrinsic Motivation – to Know | Lower | 24 | 4,05 | 1,87 | | |
| | Moderate | 410 | 5,28 | 1,44 | 19,298 | ,000 |
| | Higher | 187 | 5,76 | 1,16 | | |
| Intrinsic Motivation – toward Achievement | Lower | 24 | 3,86 | 1,61 | | |
| | Moderate | 410 | 4,93 | 1,39 | 16,040 | ,000 |
| | Higher | 187 | 5,38 | 1,28 | | |
| Intrinsic Motivation – to Experience Stimulation | Lower | 24 | 3,60 | 1,56 | | |
| | Moderate | 410 | 4,78 | 1,48 | 15,650 | ,000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Higher | 187 | 5,22 | 1,30 | | |
| Extrinsic Motivation - Introjected | Lower | 24 | 3,60 | 1,37 | | |
| | Moderate | 410 | 3,86 | 1,48 | 2,844 | ,059 |
| | Higher | 187 | 4,13 | 1,44 | | |
| Extrinsic Motivation- External Regulation | Lower | 24 | 4,17 | 1,44 | | |
| | Moderate | 410 | 4,12 | 1,21 | ,704 | ,495 |
| | Higher | 187 | 4,25 | 1,17 | | |
| Extrinsic Motivation – Identified | Lower | 24 | 4,84 | 1,24 | | |
| | Moderate | 410 | 5,48 | 1,31 | 9,335 | ,000 |
| | Higher | 187 | 5,84 | 1,16 | | |
| Amotivation | Lower | 24 | 2,97 | 1,68 | | |
| | Moderate | 410 | 2,00 | 1,24 | 10,019 | ,000 |
| | Higher | 187 | 1,77 | 1,24 | | |
| Academic Motivation Total Score | Lower | 24 | 3,87 | 0,90 | | |
| | Moderate | 410 | 4,35 | 0,91 | 10,909 | ,000 |
| | Higher | 187 | 4,62 | 0,80 | | |

When Table 4 was examined, significant differences were found in the five dimensions of the academic self-efficacy and academic motivation scales and the total mean scores of participants based on their achievement levels ($p < 0.05$). However, no significant difference was found in the extrinsic motivation-introjected and extrinsic motivation-external regulation dimensions. According to the Tukey test analysis, it was found out that students with higher and moderate achievement levels had significantly higher academic self-efficacy and academic motivation compared to the participants with lower academic achievement. It was observed that students with lower academic achievement exhibit higher amotivation.

**Table 5**

*Comparison of Scores Obtained from Academic Self-Efficacy and Academic Motivation Scales by the Year of Study*

| | Year of Study | n | Mean | Std. Deviation | f | Sig. |
|---|---|---|---|---|---|---|
| Coping with Academic Problems | Freshmen | 163 | 3,67 | 0,75 | | |
| | Sophomores | 157 | 3,61 | 0,67 | 1,218 | ,302 |
| | Juniors | 147 | 3,69 | 0,62 | | |
| | Seniors | 154 | 3,76 | 0,75 | | |
| Academic Efforts | Freshmen | 163 | 3,83 | 0,74 | | |
| | Sophomores | 157 | 3,87 | 0,69 | 1,059 | ,366 |
| | Juniors | 147 | 3,89 | 0,66 | | |
| | Seniors | 154 | 3,97 | 0,84 | | |
| Academic Planning | Freshmen | 163 | 3,62 | 0,75 | | |
| | Sophomores | 157 | 3,51 | 0,82 | 2,331 | ,073 |
| | Juniors | 147 | 3,66 | 0,73 | | |
| | Seniors | 154 | 3,74 | 0,77 | | |
| Academic Self-efficacy Total Score | Freshmen | 163 | 3,69 | 0,70 | | |
| | Sophomores | 157 | 3,64 | 0,65 | 1,507 | ,212 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Juniors | 147 | 3,72 | 0,60 | | |
| | Seniors | 154 | 3,80 | 0,72 | | |
| Intrinsic Motivation – to Know | Freshmen | 163 | 5,66 | 1,34 | 3,729 | ,011 |
| | Sophomores | 157 | 5,36 | 1,37 | | |
| | Juniors | 147 | 5,33 | 1,44 | | |
| | Seniors | 154 | 5,14 | 1,49 | | |
| Intrinsic Motivation – toward Achievement | Freshmen | 163 | 5,24 | 1,42 | | |
| | Sophomores | 157 | 4,93 | 1,38 | 2,407 | ,066 |
| | Juniors | 147 | 5,08 | 1,41 | | |
| | Seniors | 154 | 4,85 | 1,37 | | |
| Intrinsic Motivation – to Experience Stimulation | Freshmen | 163 | 5,13 | 1,49 | | |
| | Sophomores | 157 | 4,87 | 1,43 | 3,155 | ,024 |
| | Juniors | 147 | 4,82 | 1,49 | | |
| | Seniors | 154 | 4,63 | 1,43 | | |
| Extrinsic Motivation - Introjected | Freshmen | 163 | 4,07 | 1,50 | | |
| | Sophomores | 157 | 3,94 | 1,57 | 2,782 | ,040 |
| | Juniors | 147 | 4,07 | 1,50 | | |
| | Seniors | 154 | 3,65 | 1,25 | | |
| Extrinsic Motivation- External Regulation | Freshmen | 163 | 4,34 | 1,23 | | |
| | Sophomores | 157 | 4,10 | 1,19 | 1,594 | ,190 |
| | Juniors | 147 | 4,07 | 1,22 | | |
| | Seniors | 154 | 4,14 | 1,17 | | |
| Extrinsic Motivation – Identified | Freshmen | 163 | 5,91 | 1,18 | | |
| | Sophomores | 157 | 5,63 | 1,22 | 7,515 | ,000 |
| | Juniors | 147 | 5,35 | 1,42 | | |
| | Seniors | 154 | 5,33 | 1,23 | | |
| Amotivation | Freshmen | 163 | 1,69 | 1,11 | | |
| | Sophomores | 157 | 2,03 | 1,18 | 3,831 | ,010 |
| | Juniors | 147 | 2,04 | 1,32 | | |
| | Seniors | 154 | 2,14 | 1,46 | | |
| Academic Motivation Total Score | Freshmen | 163 | 4,58 | 0,89 | | |
| | Sophomores | 157 | 4,41 | 0,90 | 3,255 | ,021 |
| | Juniors | 147 | 4,39 | 0,90 | | |
| | Seniors | 154 | 4,27 | 0,85 | | |

When Table 5 is examined, a significant difference was not found in the academic self-efficacy scores of preservice teachers according to the year of study variable. However, it was observed that there were significant differences in the academic motivation levels of the participants in terms of the year of study variable. According to further analysis, the total scores of 'Intrinsic Motivation-to Know', 'Intrinsic Motivation-to Experience Stimulation', 'Extrinsic Motivation-Introjected', 'Extrinsic Motivation-Identified', and academic motivation total scores of freshmen students were found to be significantly higher than the senior students. On the other hand, amotivation of sophomores, juniors, and seniors was higher than the freshmen.

**Table 6**

*Comparison of Scores Obtained from Academic Self-Efficacy and Academic Motivation Scales by Academic Career Expectations*

| | Academic Career Expectations | n | Mean | Std. Deviation | f | Sig. |
|---|---|---|---|---|---|---|
| Coping with Academic Problems | No | 96 | 3,47 | 0,80 | 24,73 | 0,00 |
| | Perhaps | 281 | 3,55 | 0,64 | | |
| | Yes | 242 | 3,92 | 0,66 | | |
| Academic Efforts | No | 96 | 3,78 | 0,78 | 20,48 | 0,00 |
| | Perhaps | 281 | 3,73 | 0,74 | | |
| | Yes | 242 | 4,12 | 0,65 | | |
| Academic Planning | No | 96 | 3,42 | 0,87 | 20,16 | 0,00 |
| | Perhaps | 281 | 3,51 | 0,73 | | |
| | Yes | 242 | 3,87 | 0,70 | | |
| Academic Self-efficacy Total Score | No | 96 | 3,53 | 0,75 | 26,62 | 0,00 |
| | Perhaps | 281 | 3,58 | 0,63 | | |
| | Yes | 242 | 3,95 | 0,61 | | |
| Intrinsic Motivation – to Know | No | 96 | 4,26 | 1,74 | 42,77 | 0,00 |
| | Perhaps | 281 | 5,51 | 1,19 | | |
| | Yes | 242 | 5,69 | 1,27 | | |
| Intrinsic Motivation – toward Achievement | No | 96 | 4,09 | 1,66 | 28,35 | 0,00 |
| | Perhaps | 281 | 5,16 | 1,22 | | |
| | Yes | 242 | 5,26 | 1,32 | | |
| Intrinsic Motivation – to Experience Stimulation | No | 96 | 3,88 | 1,70 | 33,27 | 0,00 |
| | Perhaps | 281 | 4,91 | 1,30 | | |
| | Yes | 242 | 5,24 | 1,34 | | |
| Extrinsic Motivation - Introjected | No | 96 | 3,42 | 1,64 | 7,26 | 0,00 |
| | Perhaps | 281 | 4,06 | 1,35 | | |
| | Yes | 242 | 4,00 | 1,50 | | |
| Extrinsic Motivation- External Regulation | No | 96 | 3,86 | 1,10 | 5,41 | 0,00 |
| | Perhaps | 281 | 4,31 | 1,19 | | |
| | Yes | 242 | 4,13 | 1,23 | | |
| Extrinsic Motivation – Identified | No | 96 | 4,93 | 1,43 | 14,88 | 0,00 |
| | Perhaps | 281 | 5,69 | 1,18 | | |
| | Yes | 242 | 5,69 | 1,26 | | |
| Amotivation | No | 96 | 2,36 | 1,41 | 5,60 | 0,00 |
| | Perhaps | 281 | 1,93 | 1,26 | | |
| | Yes | 242 | 1,86 | 1,23 | | |
| Academic Motivation Total Score | No | 96 | 3,83 | 1,05 | 27,75 | 0,00 |
| | Perhaps | 281 | 4,51 | 0,80 | | |
| | Yes | 242 | 4,55 | 0,82 | | |

When Table 6 was examined, a significant difference was found in the academic self-efficacy and academic motivation mean scores according to the prospective teachers' expectations of starting postgraduate education. It was observed that preservice teachers who expected to attend graduate education had significantly higher 'Intrinsic Motivation-

to Know' academic motivation and career determination compared to those who did not. University students with lower academic career prospects have a higher level of amotivation.

## DISCUSSION AND CONCLUSION

According to the findings obtained from the study, there is no significant difference in the academic self-efficacy of the preservice teachers according to their gender. The findings of this study on gender support the results of many other studies in the literature. The current study revealed similar findings to Epstein et al.'s (2017), Klibert et al.'s (2011), Klibert et al.'s (2016), and Ozer et al.'s (2009) studies on teachers at all school levels, preservice teachers, and university students. Duckworth and Seligman (2005, 2006) found out in their studies that females revealed higher academic performance than their male peers, but they do not differ in terms of self-efficacy perceptions due to their strong academic self-discipline and control.

According to another finding obtained from the study, the academic self-efficacy of preservice teachers differs according to their academic achievements and career expectations. It was observed that preservice teachers with a higher achievement at the university had higher academic self-efficacy. This finding revealed similarities with the research results in the relevant literature (Gasco J., Villarroel, 2014; Guo et al., 2015; Kim & Park, 2001; Koyuncuoğlu, 2021; Lee & Jeon, 2015; Nagengast et al., 2011; Yu, Chae & Chang, 2016). According to Domenech (2013), academic self-efficacy affects students' performance in multiple ways. It is also seen as an individual variable that significantly affects academic achievement. In this respect, academic self-efficacy is explained as a general judgment that includes the ability to manipulate and perform a series of academically related tasks (Chemers, Hu & Garcia, 2001; Yu, Chae & Chang, 2016). Individuals with higher academic self-efficacy can choose a challenging task and complete the task successfully, they spend more effort, they continue to fulfill the tasks despite the obstacles and be successful when faced with difficult obstacles. In addition, it was observed in this study that the academic self-efficacy of preservice teachers with higher career expectations was strong and positive. These findings are similar to various research results in the literature (Doménech, 2013; Doménech-Betoret, Gómez-Artiga and Lloret-Segura, 2014; Chemers et al., 2001; Lent et al., 2008). Students' expectation-value beliefs may have been formed from their previous experiences before the courses start, and this situation is closely related to their academic self-efficacy (Doménech, 2013). Research has also revealed the significant and direct effects of students' self-efficacy on academic expectations (Chemers et al., 2001; Lent et al., 2008). According to the mentioned researchers, students with higher self-efficacy have higher academic expectations and higher career expectations compared to students with lower self-efficacy.

According to the findings obtained from the research, preservice teachers generally have high academic motivation and low amotivation. According to Koçak (2002), prospective teachers and teachers attach more importance to internal motivation processes. This is an important factor in having strong professional and academic motivation.

According to another finding obtained from the current study, a significant difference was found in the academic motivation of the preservice teachers according to their genders. In general, it was found that female preservice teachers had significantly higher academic motivation than male prospective teachers. The findings of this study on gender support the results of many other studies in the literature (Arlı, 2007; Çelik, 2015; Ergen, 2009; Kurt, 2013; Warren, Fox, & Pascall, 2009). In the study conducted by Handayani (2016) in Indonesia, it was concluded that male teachers have significantly higher external motivation compared to female teachers. This is understandable, according to Warren, Fox, and Pascall (2009) because in many cultures males tend to be more active than females. As with the division of gender roles, females focus more on feminine roles such as looking after, educating, and nurturing. In this respect, the higher academic motivation of females can be explained by cultural, environmental, and local factors.

According to the findings obtained from the present study, the academic motivations of the preservice teachers differ according to their years of study. According to the findings of the research, freshmen preservice teachers have a higher academic motivation level, while senior preservice teachers have amotivation. These findings were found to be similar to the findings of other studies (Ergen, 2009; Gömleksiz & Serhatlıoğlu, 2013; Gürşimşek, 2002) which revealed that younger teachers' motivation levels were higher than older teachers. In another study measuring pre-service teachers' self-efficacy perception and learning motivation, it was determined that freshmen students had higher motivation levels (Gürşimşek, 2002). Nagy and Davis (1985) and Esther and Marjon (2008) declared similar results in their studies with prospective teachers and teachers. In these studies, it was figured out that academic motivation decreased with the problems occurring in years and revealed a significant decrease over the years. Esther and Marjon (2008) found in their study that negativity in perceptions of self-efficacy and the learning-teaching process decreased individuals' motivation over time.

According to the findings obtained from the current study, the academic motivation of preservice teachers varied according to their academic achievement levels and career expectations. Academic motivation and participation are claimed to be factors affecting the learning outcomes of university students (Allen, Robbins, Casillas & Oh, 2008; Bong, 2005; Chen & Lu, 2015; Kriegbaum, Becker & Spinath, 2018; Koyuncuoğlu, 2021; Luo, Chau & Lam, 2019; Roksa and Whitley, 2017; Ryan and Deci, 2020; Trolian, Jach, Hanson, & Pascarella, 2016). In all these studies, it was found that there is a significantly high relationship between academic motivation, academic achievement, and career expectations in different fields and education levels. In studies conducted with university students, it was

observed that especially intrinsic academic motivation was associated with higher success, on the other hand, it was observed that amotivation had negative effects on academic performance. Bassi et al. (2007) found that students with strong self-efficacy and motivation exhibited higher academic expectations, attitudes, and career determination. It was observed that the academic performance of students with strong career expectancy and academic motivation was at a high level (Koyuncuoğlu, 2021).

## RECOMMENDATIONS

In this study, the academic motivation and academic self-efficacy of preservice teachers were investigated and as a result, it was found out that their academic motivation and self-efficacy were at a high level. In the comparative analysis, it was found that the academic self-efficacy of preservice teachers did not differ significantly according to gender and year of study variables. It was observed that academic motivation varied according to gender, year of study, academic achievement, and career expectations variables.

Recommendations in the light of the findings of the current study are listed below:

- Within the scope of the study, it was observed that the rate of participant female preservice teachers was higher than their male peers. From this point of view, academic self-efficacy and motivation of preservice teachers can be examined with more homogeneous distributions in terms of gender.

- Considering the findings of this study, the factors that promote the increase of self-efficacy and motivation in the training of preservice teachers can be discussed.

- Qualitative studies can be conducted to explore the reasons why the academic motivation levels of the preservice teachers decrease as their years of study increase, and to obtain in-depth information on the factors affecting their academic achievement levels.

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Research

# Addictive behaviors: An analysis of support type and relapse rates among college students

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**Abstract:**

*Addictions can be classified as any substance, habit or behavior that one has come to depend upon. These can include a variety of habits or behaviors outside of the traditional illicit drug realm. We studied substances, behaviors and habitual addictions to determine if relapse rates are negatively correlated with positive or negative support. We used a mixed-methods design that examined undergraduate psychology students who were asked to give up an addictive substance, behavior or habit of their choice for 30 days. In addition to investigating data using qualitative measures, two independent samples t-tests found that there were significant differences between relapse rates and support levels, p=.002, and relapse rates and gender p=.011.*

**Keywords:** 3 - 7 words, Palatino, 9.5 fonts, Only the first letter of the first word must be capital.

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## INTRODUCTION

Addictive behaviors can expand beyond the traditional scope of illicit substances, and can include mental and physical characteristics. According to Maisto et al., (2015) an addiction is classified as involvement with a substance and compulsion to use it. There are a variety of substances, behaviors and habits (SBH) that can be classified as addictive. Some of these may evoke similarities in withdrawal symptoms, which may increase relapse rates. These include, but are not limited to the consumption of caffeine, food, sugar, and habitual behaviors. Although these are not considered illegal, there are commonalities associated with relapse, and the understanding of psychopharmacology associated with these areas. Relapse rates and support types were explored in an undergraduate Substance Abuse course, and were specifically utilized to demonstrate the addiction process within the realm of the course.

### Support

Support related to any addiction is a key measure to success in any type of recovery program (Maisto et al., 2015). According to the American Addiction Center (2020), the first step in recovery is to begin speaking about the problem, seek counseling, get a sponsor, and tell someone that you are powerless over the substance. The twelve steps of Alcoholics Anonymous include letting go of the negative support, or those that are current drug or alcohol users (American Addiction Centers, 2020). The goal is to foster the development of healthy relationships with family, friends, sponsors and groups. Support is a major factor in successful cessation of the substance, behavior or habit.

Social exchange theory suggests that there are costs and rewards associated with social relationships (Cropanzano et al., 2017). There are two types of support, negative and positive. Positive support is associated with encouraging behaviors or actions. Negative support can be classified as harmful interactions or the lack of support in general; these actions can be counter to desired outcomes and behaviors. Research has shown that social support is associated with mental health, self-esteem, worth and value. The type of support, the closeness of relationship with the individual and the types of interactions within these relationships are key factors to positive or negative outcomes (Lincoln, 2000). Positive support is a type of social reward, that is often associated with healthy relationships in the exchange process. Positive support is conducive to success in a variety of programs, not just those associated with addictions.

### Relapse

Relapse is considered a negative action that an individual takes after a period of abstinence from a given substance or behavior. Effective treatment modalities include, but are not limited to: medication, cognitive behavioral therapy and 12-step programs (Maisto et al., 2015). In almost every one of the therapies designed to treat addictions, support is an area of interest. In order to prevent relapse of controlling substances or behaviors,

individuals may engage in the termination of lifestyle habits-including friends, family, hangouts and certain behaviors that encourage relapse. For purposes of this research, relapse will be defined as engaging in the use of a substance, behavior or habit that the individual agreed to give up for a period of 30 days.

## Substances, behaviors and habits

### Caffeine

Caffeine addiction is very common. Regular caffeine use is reported by 80-90% of Americans, and remains as one of the most prevalent forms of addictions (Ozsungur et al., 2009). Among college students, the percentage is estimated to be even higher, as youth are often the targeted consumers of energy drinks, which have higher levels of caffeinated ingredients. However, if consumed alone, because there are little, if any, negative social stigmas regarding caffeine use, this is not typically noted as a problem behavior. In addition, the Diagnostic Statistical Manual 5th edition, does not have a classification specifically related to caffeine in terms of a mental addiction disorder, but there are items related to intoxication, anxiety, sleeping, and comorbidity in related disorders. Caffeine is a central nervous system stimulant, and is associated with alertness, energy, rapid heartrate and increased blood pressure, which can take between 30-45 minutes for these effects to be felt (Julien, Advokat, Comaty, 2011). Even though there are little to no stereotypes associated with caffeine addiction, there is extensive research regarding the withdrawal effects that occur with caffeine users. Caffeine tends to generate compulsions related to social desires in addition to addictive properties. Many people who consume caffeine do so in a social setting including: morning coffee, meals, breakroom conversations and study groups. Withdrawal from caffeine can be seen within one to two days after cessation, and can include feelings of agitation, lethargy and headaches (Julien, Advokat, Comaty, 2011). According to Spencer (2002), there are similarities between caffeine withdrawal and physical complaints related to migraine headaches; interestingly if caffeine is given, symptoms disappear. These withdrawal symptoms are usually only present with regular users who go cold turkey (Satel, 2006).

### Food and sugar

There is a substantial amount of research regarding the effects that food has on the brain, and the psychological reactions that can be similar to drug addictions (Pedram et al., 2013). Food in general is very powerful and can illicit physiological responses, which can be associated with emotional, social and environmental stimuli. Specifically, addictions related to food that are rich in sugar, can create similar neural mechanisms in the brain, when compared to illicit drug use. According to Fortuna (2010) the consumption of simple sugars can increase serotonin levels in the brain. Likewise, with some illicit substances, there is an increase in dopamine turnover (Fortuna, 2010). Natural pleasure neurotransmitters like serotonin and dopamine help regulate mood, and when sugar is ingested, both humans and

animals crave more. In 2007, a medication called Rimonabant was prescribed to patients who were obese, it was taken off of the market shortly after its debut, because patients were at risk for clinical depression, suicidal ideation and some committed suicide. The drug blocked the individuals desire towards food, by removing the pleasurable sensations associated with eating, and although beneficial for weight loss, it was not beneficial for overall wellbeing (Stapleton, 2009). This goes to show, that the natural pleasure associated with foods are there for a reason, and of course has roots associated with human survival. However, there is a difference between foods that are considered life sustaining and foods that are considered hyperpalatable foods (Avena & Gold, 2011). Hyperpalatable foods are considered to be associated with ingredients that are favorable, such as sugar, fat and foods that are high in sodium. There is also a link between adult children of alcoholics and sugar cravings. According to Fortuna (2010) "individuals with a parental history of alcoholism were three times more likely to prefer stronger sweet solutions" (p. 149). Food can also provide comfort during high stress situations, and there is an overlap between the association of comfort needs met in relation to food and illicit substances.

### Habitual behaviors

Habits are considered as repetitive behaviors that are often completed without having to think about the task (Kruglanski & Szumowska, 2020). There are all kinds of habitual behaviors that can be difficult to stop. Online shopping, cursing, skipping class, snoozing one's alarm, internet and social media scrolling can be considered habitual behaviors.

The use of social media and the internet has dramatically increased, and with this emerges a new diagnosis of "internet addictions" (Li et al., 2015). Advancements in technology have created drastic changes within our global society related to addictive social media behaviors. Mahamid and Berte (2018) found that 47% of university students reported addictive behaviors associated with social media usage. During 2019-2020, it was reported that the average person spent approximately 145 minutes per day using social media (Statista, 2021). This number has increased by an additional 55 minutes from the year 2012 (Statista, 2021). Li et al., (2015) found that excessive use of social media has addictive tendencies. Social media addiction has been found to be directly related to emotional exhaustion, stress and problems related to time management. Social media addiction is one that consumes time, energy and conveys quite a bit of negative compulsions (Sriwalai & Charoensukmongkol, 2016). In addition, there are new findings related to social media addictions and a loss of time (Turel & Vavagnaro, 2019). Primarily, users have low awareness that they have indeed been using social media as much as they have. There has been a lot of media discussion regarding the similarities of social media addiction and illicit drug use, but to our knowledge no comparison studies have been conducted. Rehab Center (2019) states that there are some major similarities in social media addiction and illicit drugs including: "social isolation, preoccupation with the next "fix", increasing use, filling time with the addiction instead of hobbies or work, and hiding use" (para. 1).

While there is significant research regarding illicit drugs and habitual use of non-illicit substances such as sugar, caffeine, and social media, there is little research available that addresses these with relapse and support. This study was related to an undergraduate Substance Abuse course, and this project was developed to assist with the transformational learning experience, which allows the student to understand the material in a deeper way. According to Schnepfleitner and Ferreira (2021), some of the key benefits are reflection and individual experience related to the information they learn within the course. The results of this study may be used for the comparison of habitual addictions in future studies. We hypothesized that SBH addictions would result in similar relapse rates, as other drug related substances. This is in response to previous research that indicates that non-illicit addictions show similar addictive brain activity as illicit drug addictions (Kuss & Griffiths, 2017; Ridder et al., 2016). In addition, we hypothesized that support levels would be negatively correlated with relapse rates. Previous research has found that social support directly correlates with relapse rates in illicit drug use (Walter et al., 2006; Snow & Anderson, 2000).

## METHOD

### *Research participants*

Participants were 24 undergraduate students at a rural state university, who took an upper level advanced Psychology course. There were 8 males and 16 females that completed the assignment requirements. These students participated in this assignment as a part of their course credit, although they could choose whether or not their data were included in the results.

### *Materials*

The materials consisted of electronic or hard copy journals and discussion board postings that were to be completed during the course. Specifically, students were required to complete a journal to document the experience of giving up a substance, habit or behavior over 30 days. Journaling allowed us to assess qualitative descriptive aspects over the 30-day cessation period.

### *Procedure*

The students were not recruited for this study; they were enrolled in an upper level special topics Substance Abuse course. This class was an upper level elective option for students in a Psychology program. Students that completed the assignment for the class were notified that we would report items in a deidentified format, and that if at any point they wanted to withdraw their work from the study, there would be no penalty related to their grade on the assignment. To analyze the data, we read the journal entries and discussion posts, and then coded the reported symptoms and behaviors to assess patterns.

For the assignment, students were prompted to give up something that would be very difficult for them to refrain from, for a period of 30 days. The most common choices were caffeine and food related items. Each student was required to complete a minimum of 10 journal entries discussing their struggles associated with giving up their substance, behavior or habit. The journaling portion was a free writing format, and the discussion

board was a guided process (See Appendix). After the journal entries were submitted, they were coded across multiple categories including gender, withdrawal behaviors, number of relapses, substance given up, and positive or negative support. Students in this course were concurrently learning about drug addictions and the process, so this served a dual purpose associated with transformational learning.

### *Research Ethical Permissions*

In this study, all rules were followed within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive". No actions or directives stated under the second portion, titled "Actions Against Scientific Research and Publication Ethics" were taken.

This study was approved by the Tarleton State University Institutional Review board, under review number: 2017-042617-17077.

## RESULTS

### *Quantitative results*

The common themes of relapse rates and support levels were analyzed to determine if there were differences present. Relapse rates for each level of support were normally distributed as assessed by Levene's test (Levene, 1960) for equality of variances (p=.400). An independent samples t-test was conducted to determine if there were differences in relapse rates associated with positive (M=.73, SD=1.10) and negative (M=2.77, SD=1.58) support levels. There was a significant difference in relapse rates and support; t(22) =3.587, p= 0.002 (See Figure 1).

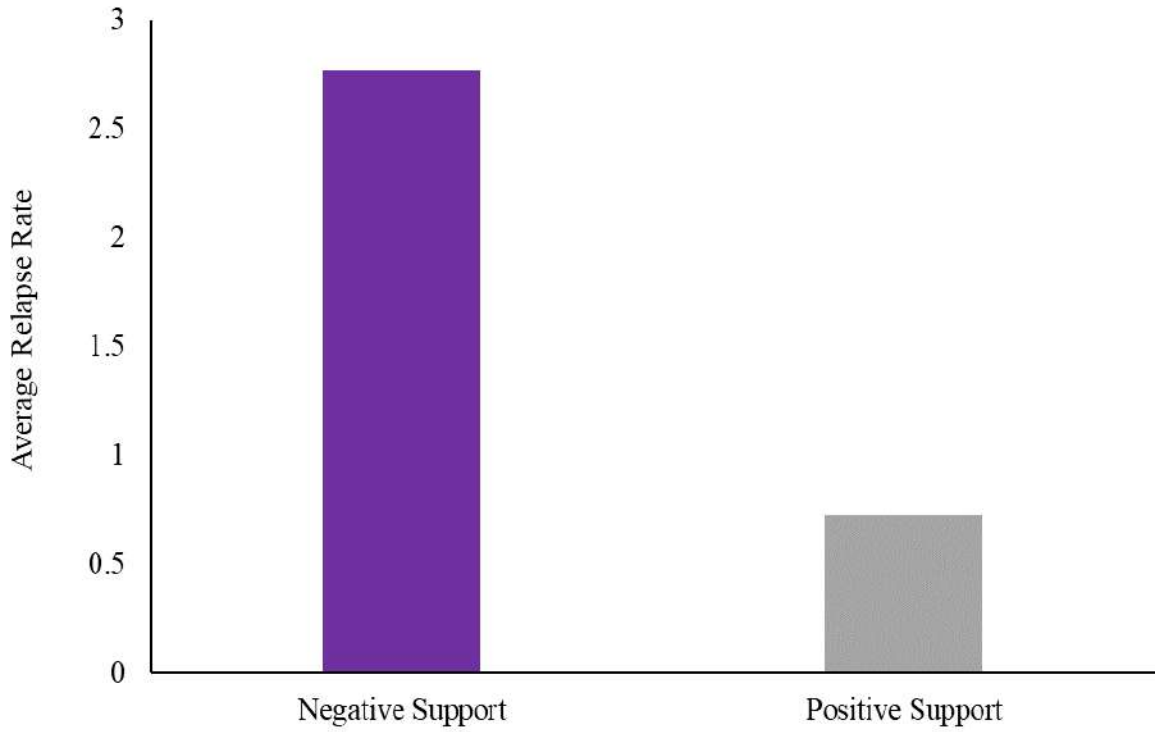


Figure 1: The mean difference between negative and positive support and average relapse rates.

We also compared the differences between males and females and the number of relapses. An independent samples t-test was conducted to determine if there were differences in relapse rates associated with males and females. It was determined that males N=8 (M=.63, SD=.744) had lower relapse rates than females (N=16), (M=2.44, SD=1.75). There was a significant difference in the number of relapses and gender; t(22)=-2.782, p=.011.

In addition, we reported information related to the difficulty of the item given up, plans to go back to the substance, behavior or habit, the amount of times that they relapsed and support networks as determined by the guided discussion board posting (See figure 2).

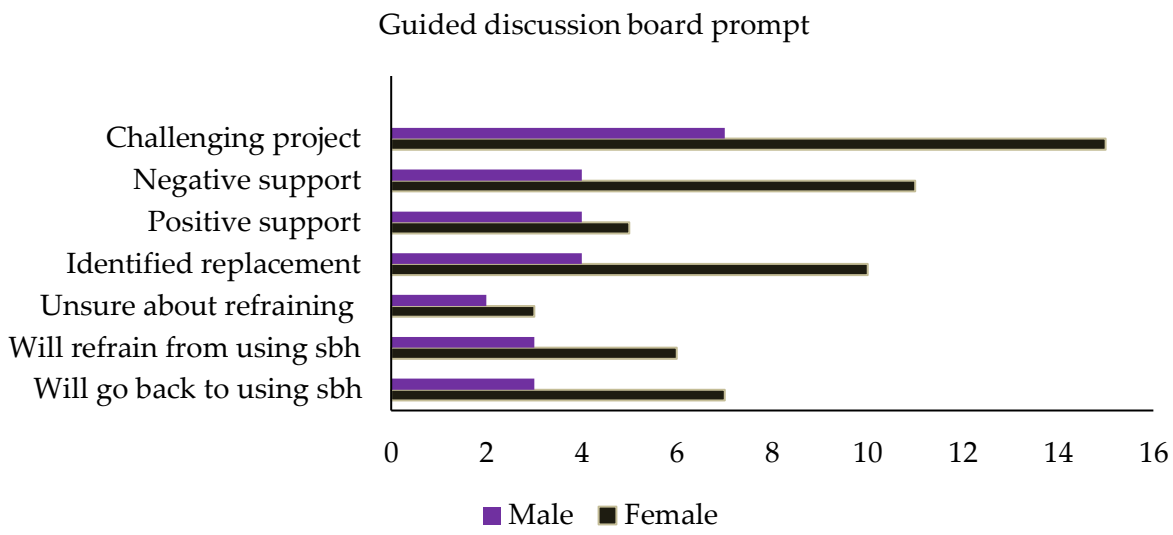


Figure 2: Gender differences related to the guided discussion board prompts. Note: SBH is substance, behavior or habit. These are the differences reported from male and female participants that came directly from the discussion board posting responses.

Qualitative results

When participants were asked to give up a substance, behavior or habit of their choice for the 30-day period, participants expressed their struggles, frustrations, and moments of satisfaction in a free-stream writing format.

A common topic of participant discussion was regarding the number of times they relapsed during the 30-day period. Those who had few relapses reported that they were extremely proud, and noted how positive their overall experience was. For example, some participants who gave up caffeine or junk food noted that they had saved money, felt better, lost weight and had higher energy levels after a two-week period. In contrast, some participants who had reported relapses over the 30-day period interpreted them as learning experiences. For example, some participants reported that they were able to see how difficult it was to give up something that they love or enjoy. They stated that it made the information in the class more relatable. In the beginning of the process, many students expressed their belief that the assignment would not be a challenge for them, but as time progressed addictive tendencies were reveled upon the cessation of the behaviors, habits or substances. In fact, 22 participants ended up reporting that this assignment was very challenging. Participants with three or more relapses seemed to give up on the challenge, and had often noted that they were unable to continue without the substance, habit or behavior that they had given up.

Another common theme discussed by participants, was support. Two clear groups appeared from the data; those who experienced positive support, and those who experienced negative support. Positive support is defined for this study, as a support system who expresses encouraging phrases such as, but not limited to: "you can do it," "I will do it with you" or "keep going, you are doing great". These support systems also include family and friends who act in ways that encourage the participant to complete their goal, using affirmative and up-lifting communication.

Negative support is defined for this study, as a support system that expresses no form of support, or directs phrases such as "why are you trying to do that," "you can just do it this one time, it won't hurt you" or "you'll never be able to do that". Negative support

includes friends and family members who act in non-supportive ways towards the participant. We saw a significant difference regarding negative and positive support levels. Those who received negative or no support were almost twice as likely to relapse, then those who received positive support.

Quite a few of our participants gave up caffeinated beverages. Many of the participants referred to headaches, mood swings, and low energy during the first few weeks. One individual stated that at the two-week mark, she was still experiencing these symptoms. She relapsed on day 16, and reported that she felt awful and very strange the rest of the day. One individual reported that he had replaced sodas with water, and that he was feeling very tired of the bland and boring taste of water on a regular basis. Another participant stated on day 19, that he went to a restaurant and someone beside him ordered a soda, and all he could do was concentrate on the bubbles and fizzle of the soda beside him. Another participant stated that she had convinced herself that there was something wrong with the water in this town due to the taste.

The vast majority of our participants gave up something related to a food item. Some of the statements made by our participants included things like: I always eat this food item during football games, I am very nervous about this upcoming game. I hate it when my coworkers are eating fast food during lunch. One participant noted that she did not want to go out to eat with friends, as it was so disturbing watching them enjoy their food and drinks. Most of our relapses occurred with food related items.

For the individuals who gave up internet or social media, we saw replacement behaviors. For example, one individual believed that she could simply occupy her time with online videos, and gave herself permission to do so because it was not really considered social media. Behaviors such as sending more text messages to fill the void of notification and checking, scrolling through phone pictures to get the feeling of swiping were reported. There were feelings of frustration and disappointment that included disconnect with others and feeling lost. Positive behaviors related to giving up social media included, sleeping better, less stress and feeling more connected to individuals who were in front of them.

## DISCUSSION

The purpose of this study was to further understand the role of positive and negative support and relapse rates in individuals dealing with SBH addictions. Using the self-evaluated discussion board postings together with the ten journal entries, we coded the findings to analyze withdrawal symptoms and relapse rates. Using previous research regarding the addictive properties and symptoms of illicit drug use, a comparison of behaviors showed similarities of SBH addictions and illicit drug addictions.

Eleven participants reported receiving positive support in the journal entries, and had significantly lower relapse rates than the thirteen individuals who reported negative support. In addition, we compared the differences between male and female relapses. Males reported a significantly lower number of relapses than women. Females were 1.81 times more likely to relapse than males in our study. Walton, Low and Booth (2001) reported that males typically report higher support levels while in treatment facilities than do their female counterparts. This is an interesting finding, because males have also reported lower coping skills, and higher exposure to substances than women in substance abuse treatment facilities. It is possible that "women are more likely to use substances alone or with intimate

partners" (Walton, Low & Booth, 2001, p. 236). This is consistent with our study, for example, a female reported that her significant other bought her candy, even when he knew she was giving up sugar.

It is interesting to note that the addictive properties of that particular SBH and their individual support system may be directly linked to social rewards. Caffeine and food for example, provide social opportunities for the individual; therefore, our participants may have found it difficult to abstain from these areas, and maintain their social network. Although we did not ask this directly, individuals may be more likely to relapse with caffeine because of the social aspect related to drinking coffee or grabbing a soda. Often times, the consumption of caffeine is a social networking opportunity (Sriwalai & Charoensukmongkol, 2016). In our population, those that received negative social support related to caffeine might have had higher relapse rates in order to maintain that social desire related to belonging, although more research is needed to confirm this hypothesis. Coffee groups in particular have been studied, and it has been found that these groups can provide a feeling of social connectedness. Being part of this group is good for a variety of behaviors related to social and emotional well-being (Broughton, Payne & Liechty, 2017).

Food is another social activity. Almost everything we do socially, revolves around the consumption of food. Therefore, it seems to be another area related to social support. If a person attempts to give up a particular type of food, being in a situation where that food is available or offered on a regular basis, has the potential to set the person up for failure. This is similar to what individuals face when giving up alcohol, tobacco or drugs. In addition, these items go back to the research conducted on food and pleasurable sensations.

Social media addiction has quite a bit of similarities to illicit drug use, but there really isn't the same type of social aspect related to using social media compared to the food and drinks above. Individuals often do this in the comfort of their own home in isolation, therefore more research is needed in this area.

## CONCLUSION

Overall, this study was beneficial in addressing some similarities between giving up substances, behaviors and habits. Some of the struggles that individuals faced during this 30-day cessation were similar to what we might see with people giving up other illicit substances. This study could provide some insight as to how social support is necessary for not only the cessation of illicit substances, but all substances, habits and behaviors. Individuals who had positive social support were less likely to relapse. In addition, differences in relapse rates between males and females should be considered when treating addictions as a whole.

This assignment was able to help students engage in the transformational learning process, where they were able to directly relate the information in the textbook to the activities in their daily life. This is one of the best types of learning, as it not only engages the learner, but it provides a hands-on experience that fosters encoding in long term memory.

Future studies should look at gathering more individuals from a variety of age groups, as this population was very small. In addition, it would be beneficial to ask specific questions regarding the way that the participants were feeling on a regular basis. It would be valuable to have individuals journal on a daily basis, and have specified prompts about

relapse, support, behaviors and feelings. Even though our participants reported ten times, it would have been beneficial to see the gradual changes taking place more often.

In addition, instead of allowing participants to choose any substance, habit or behavior, a future study should look at one area more in depth to search for patterns. Social media and internet addiction would be an area of interest to investigate further, as this appears to be an ongoing issue with the amount of screen time increasing on a yearly basis.

The takeaway is that support networks are very valuable in any cessation program, no matter what the substance, behavior or habit is associated with. This research has contributed to the body of literature related to addictions, and can be further used to encourage positive support in any form of addictive behavior and cessation programs.

*Declarations of interest: No conflict of interest associated with either author*

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). A waiver of informed consent was requested from all participants included in the study. Participants had the right to remove their data from the research report, and all information was deindividualized.

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## Appendix

### Discussion Board Prompt

I'm giving this up for 30 Days!

Your assignment is to give up something that would be relatively difficult to give up. Choose something that takes some effort to work with (e.g. don't give up going to eat at Panda Express if you only go every 45 days, as this will not benefit you at all, give up something that will be hard and hopefully beneficial). The purpose of this assignment is to allow you to experience some of the issues that one might face in the realm of addiction. This is by no means a way to accurately show you what giving up an illicit substance is actually like (as it may be much more difficult to give up an illicit drug than to give up social media for example). One reason in particular is the fact that withdrawal from an illicit drug is associated with physical withdrawals and often times has a deep-rooted psychological issue.

You will need to tell me what you are giving up and why. I would like this section to be at least one paragraph in length. Address questions such as: What are you giving up? Why would you benefit in giving this up? What potential issues might you face in giving this up? What benefits could come of this? What has it been like for you thus far? Have you relapsed? When do you think about this item the most? Have your friends or family members been supportive? These questions will need in depth discussion related to each entry.

You will need to journal at least 10 times during the course of the 30 days. The entries will be added to this discussion board as an attachment. (Please note, if you are sensitive about your journal entries, come see me, and you can turn this portion in to me alone). For this section of the discussion post, simply tell us about a few of your journal entries within the discussion board posting.

Finish up the discussion board posting with a paragraph explaining your overall thoughts about the project. Was it difficult? What were your expectations going into this compared to the outcome? What are your thoughts if you did indeed relapse? How did you keep yourself on track? Finally, you will need to relate your experience to the substance abuse realm in some form or fashion. You will need to use your textbook as a reference. Please use in text and at the end of the paragraph citations for this section.

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Research

# Investigation of Prospective Preschool Teachers' Digital Literacy and Teacher Readiness Levels

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**Abstract:**

*The aim of this study is to examine the relationship between prospective preschool teachers' digital literacy and teaching readiness levels. The research was conducted with the correlational survey model, one of the quantitative research methods. The sample of the study consisted of 349 prospective preschool teachers studying in third and fourth year in four state universities in Turkey during the academic year 2020-2021. Data on digital literacy levels of prospective preschool teachers were collected with the "Digital Literacy Scale", and data on their readiness to teach were collected with the "Teaching Readiness Scale". The data were analyzed with the SPSS 22 software program. As a result of the analysis of the data, it was determined that prospective preschool teachers' digital literacy and teaching readiness levels were high, and that their levels of digital literacy and teaching readiness did not differ according to gender or grade level variables. It was revealed that there was a moderate, positive relationship between the digital literacy and teaching readiness levels of prospective teachers.*

**Keywords:** Preschool, prospective teachers, digital literacy, teaching readiness

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## INTRODUCTION

In the current century, there has been a rapid growth and change in information and communication technologies. In 21st century societies, individuals are expected to have the skills to communicate successfully, to use information to solve complex problems, to adapt to new demands and changing conditions, to innovate, to generate new knowledge, and to use the power of technology to increase human capacity and productivity (Binkley et al., 2012). In the digital world, where technology shapes the lives of individuals, having the skills to use technology is seen as a necessity as much as literacy. Digital literacy, which is also considered as the ability to use technology in the digital age we are in, is defined as the ability to survive (Eshet, 2004), and adapt to changes and development. Gilster (1997) defined digital literacy as understanding information and presenting digital information obtained from multiple sources in different forms through information technologies. Jones and Hafner (2012) evaluated digital literacy as a competence in the use of digital tools. Digital literacy is developmental; in other words, it is built gradually on basic and acquired skills and knowledge. In this sense, the digital literacy skill of individuals is measured by their capacity to adapt mentally, socially-emotionally and technically to changes in technology. The more digitally literate an individual is, the easier it will be to adapt to new developments (Ng, 2012). In this direction, digital literacy is related to the skills of accessing and using digital information correctly.

The concept of digital literacy has begun to be widely used in many fields, including education today (Bawden, 2001; Chase & Laufenberg, 2011). The evolving potential of information, education and communication technologies and digital tools require digital literacy to take place in all learning areas, both formal and informal (Meyers, Erickson & Small, 2013). The inclusion of educational technologies in the learning process has profoundly affected pedagogical approaches to the nature of learning and teaching. Pedagogical knowledge is information about teaching and learning processes and practices that cover the aims, objectives, values and strategies of education. Pedagogical knowledge enables teachers to understand how students construct knowledge and acquire different skills (Loughran, Berry & Mulhall, 2012). Teachers' connection between content, pedagogy and technology for effective teaching and their effective use are also considered as technopedegogical competence (Koehler, Mishra, Kereluik, Shin & Graham, 2014). Studies have shown that information and communication technologies should be widely used in higher education (Bullen, Morgan & Qayyum, 2011), and that efforts to increase digital competence in teacher training programs and to use information and communication technologies in the classroom have a positive effect on teacher competencies (Røkenes & Krumsvik, 2014). This situation reveals the necessity of training digitally literate teachers who have the skills to use technology in learning-teaching processes.

The most important task of teacher training institutions is to prepare prospective teachers for professional life. In many countries, teacher training programs are based on the

national curriculum, and various contents such as digital competence or technological pedagogical content knowledge are not sufficiently included (Lund, Furberg, Bakken & Engelien, 2014). Studies reveal the importance of using technology for the development of digital competences in teacher education programs (Gudmundsdottir & Hatlevik, 2018; Instefjord & Munthe, 2017; Maderick, Zhang, Hartley & Marchand, 2016; Tondeur et al., 2012). Therefore, it should be ensured that teacher training programs include using digital tools and resources for teaching purposes and guiding children in using digital tools (Harris, Mishra & Koehler, 2009; Koehler, Mishra, Akcaoglu & Rosenberg, 2013). In order for prospective teachers to be prepared for professional life in the digital world, it is expected that digital competencies will be included in teacher training programs more, and that different applied contents for the development of digital competencies of prospective teachers will be included in the program.

Prospective teachers are expected to feel professionally ready and competent to use technology resources as meaningful pedagogical tools and to create positive learning and teaching opportunities (Ertmer & Ottenbreit-Leftwich, 2010). Self-evaluations and self-efficacy perceptions are necessary for organizing one's abilities and managing possible situations, and these affect the choices and actions of individuals (Bandura, 1986). Teachers' perception of professional competence also determines their goals, behavior in the classroom and the effort they make to teach (Lauermann & König, 2016; Murkatik, Harapan & Wardiah, 2020). In other words, professional preparation and competence affect academic performance. Research findings reveal that the professional competence level of prospective teachers affects the teaching process when they become teachers (Hatlevik, 2017) and teachers' pedagogical knowledge, teaching motivation and self-regulation skills have positive effects on teaching quality (Kunter et al., 2013; McLoughlin & Lee, 2010). Classroom, school management and school characteristics and teaching resources may also affect teachers' self-preparedness and competence perception (Fackler, Malmberg & Sammons, 2021; Uslu & Çeliköz, 2020). Prospective teachers gain experience and become ready to teach by improving teaching competencies through hands-on teaching opportunities and teachers' observation (Brown, Lee & Collins, 2015). Studies show that being ready for teaching is related to having teaching competencies (Balcı, Şanal & Üğüten, 2019; Caires, Almeida & Vieira, 2012; Leung, Wong & Wong, 2013; Pendergast, Garvis & Keogh, 2011). The fact that teachers' sense of professional readiness and professional competence affect the teaching and learning process raises the issue of what qualifications prospective teachers should have in teacher training programs and how they will be supported in this process.

Teacher training programs should have certain standards in order to train teachers with the desired qualifications. Each country determines these standards in line with teacher competencies studies, and these qualifications have the feature of being a reference in the regulation of education programs in higher education institutions, in the process of teachers' admission to and candidacy for the profession, as well as in teachers' professional development studies (GDTTD, 2017). In today's world, where digitalization is inevitable in

teacher education, there is a need to implement different practices in the teaching-learning process in order to improve the ability to use information and communication technologies, which are among the teacher competencies, and to make prospective teachers digitally literate (Gruszczynska, Merchant & Pountney, 2013). In order to understand the innovations and changes in education and technology and to reflect them in the classroom environment, digital literacy is expected to be added to the professional competencies of prospective teachers by performing a digital innovation in teacher training programs. Thus, educational models that are open to pedagogical innovations, using flexible, creative digital technologies can be created and applications that will make the teaching learning process more meaningful can be implemented (Hepp, Fernández & García, 2015; Ligocki & Sturgis, 2021). Research results show the importance of digital literacy skills in teacher education (Gruszczynska & Pountney, 2013), the necessity to support teacher education in terms of technology use and digital literacy in teaching (Burnett, 2011), and the requirement for digital competence among prospective teachers to maintain their instructional self-efficacy in technology-rich classrooms (Elstad & Christophersen, 2017). It is seen that new generation teachers need to have enough equipment to feel ready for the profession and to complete their learning processes in such a way that they possess the competencies that include digital literacy.

As a result of the reflection of the great change in technology in the 21st century, the qualifications that prospective teachers should possess also differed and it became necessary for teachers to possess digital literacy, also known as the ability to use technology, for their professional readiness. In teacher training programs, there is a need for good quality studies to be made in this field in order to ensure the professional readiness of teachers by supporting teacher competencies in the dimensions of knowledge, understanding, skill and ability with technology and new approaches. In the light of the studies in the literature, this study aims to determine the extent to which prospective teachers consider themselves competent to have digital literacy skills and feel ready for the teaching profession. Digital literacy skills can contribute to prospective teachers' creating an online learning environment, feeling more competent, using appropriate teaching-learning methods, and increasing interaction among students. Considering that prospective teachers frequently use technology in daily life, it is thought that knowing how to use digital skills in developing professional teaching competencies will contribute to the improvement of the quality of teacher education, and the graduation of prospective teachers who are more professionally equipped and ready for teaching.

In the aim of this study is to examine the relationship between prospective preschool teachers' digital literacy and teaching readiness levels. Accordingly, answers to the following questions were sought in the study:

1: What are prospective teachers' digital literacy and teaching readiness levels?

2: Do digital literacy and teaching readiness differ significantly according to gender and grade level variables?

3: Is there a significant relationship between digital literacy and teaching readiness?

4: Is digital literacy a predictor of teaching readiness?

## METHOD

### *Research Model*

This study, which examines the digital literacy and teaching readiness levels of prospective preschool teachers, was carried out using the quantitative research method. Quantitative research is a research method that focuses on qualities such as beliefs, opinions, attitudes, motivation and behavior and requires collecting numerical data to explain a phenomenon (Muijs, 2010). The correlational survey model, one of the quantitative research designs, was used in the study. Correlational research is used to test the existence of relationships between variables (Fraenkel, Wallen & Hyun, 2012). In the study, an attempt was made to determine whether the dependent variables differed significantly according to the independent variables, the relationship between digital literacy and teaching readiness levels, and whether digital literacy predicted teaching readiness.

### *Research Sample*

The sample of the study consisted of 349 prospective preschool teachers studying in the third and fourth year at four state universities in Turkey during the academic year 2020-2021. While determining the sample of the study, the criterion sampling method was preferred among the purposeful sampling methods. Criterion sampling helps to provide in-depth and rich data for a specific purpose (Teddlie & Tashakkori, 2015). The criteria determined at this stage were that the participants should be educated in the third and fourth grade and have taken the information technologies and instructional technologies courses for their suitability for the teaching profession. Demographic information regarding the research sample is given in Table 1 below.

Table 1

*Demographic Information Regarding the Research Sample*

| Variable | Group | f | % |
|---|---|---|---|
| Gender | Female | 290 | 83.1 |
| | Male | 59 | 16.9 |
| Grade level | 3rd grade | 162 | 46.4 |
| | 4th grade | 187 | 53.6 |

When Table 1 is examined, it is seen that 290 (83.1%) female and 59 (16.9%) male prospective teachers were included in the study. Of the prospective teachers, 162 (46.4%) students were in the 3rd grade and 187 (53.6%) students were in the 4th grade.

### *Data Collection Tools and Data Collection*

The research data were collected by using the 'Digital Literacy Scale' and 'Teaching Readiness Scale'. The independent variables of the research were determined as gender and grade level of education; the dependent variables were determined as digital literacy and teaching readiness.

Digital Literacy Scale (DLS): Developed by Ng (2012), the Digital Literacy Scale, which consists of 17 items and 4 sub-dimensions (attitude, technical, cognitive and social), was adapted into Turkish by Hamutoğlu, Güngören, Uyanık and Erdoğan (2017) and validity and reliability studies were made. A 5-point Likert type rating is used as "strongly agree" (5), and "strongly disagree" (1) on the scale, in which there are no reverse-scored items.

The internal consistency coefficient of the scale (Cronbach alpha) was calculated as .93 for the whole scale, .88 for the attitude sub-dimension, .89 for the technical sub-dimension, .70 for the cognitive sub-dimension and .72 for the social sub-dimension. In this study, the Cronbach's alpha coefficient was found to be .89 for the reliability of the whole scale, .83 for the attitude sub-dimension, .81 for the technical sub-dimension, .59 for the cognitive sub-dimension and .65 for the social sub-dimension. These values can be interpreted as that the scale gives reliable results for the data obtained from the sample group. The KMO sample fit coefficient for the construct validity of the scale was determined to be .90, and the Bartlett sphericity test value was 2993.427 ($p < .001$). With factor analysis, it was determined that the scale has a four-factor structure, explaining 59.50% of the total variance, and that the factor loadings vary between .38 and .81.

Teaching Readiness Scale: The Teaching Readiness Scale, adapted to Turkish by Yıldırım and Kalman (2017), is a 5-point Likert-type scale consisting of 20 questions and 4 sub-dimensions: "creating an effective learning environment", "designing the teaching process", "technopedagogical competence" and "understanding the learner". The scale, which does not contain any items that need to be coded in reverse, ranges from 1 = very insufficient to 5 = very sufficient, and at least one and at most five points can be obtained from each item.

Yıldırım and Kalman (2017) determined the value of the Cronbach's alpha reliability coefficient as .92 for the whole scale, and .82 for the creating an effective learning environment dimension, .80 for the designing of the teaching process dimension, .83 for the technopedagogical competence dimension, and .73 for the understanding the learner dimension that constitute the scale. In this study, the Cronbach's alpha coefficient was found

to be .94 for the reliability of the whole scale, .86 for the creating an effective learning environment dimension, .89 for the dimension of designing the teaching process, .74 for the technopedagogical competence dimension and .81 for the understanding the learner dimension. These values can be interpreted as that the scale gives reliable results for the data obtained from the sample group. The KMO sample fit coefficient for the construct validity of the scale was determined as .94, and the Bartlett Sphericity test value was 4309.843 ($p < .001$). With factor analysis, it was determined that the scale has a four-factor structure, explaining 61.38% of the total variance, and that the factor loadings vary between .47 and .76.

The implementation of this research was carried out online in the 2020-2021 academic year with the voluntary participation of prospective preschool teachers. The necessary explanations were given to the participants about the questionnaire and the participants were informed about the confidentiality of personal information. No personal information about the prospective teachers was collected, and the data collected from the scales were used only for research purposes.

### *Data Analysis*

In the analysis of the data, firstly, the missing data in the data set were examined and the questionnaire forms belonging to persons who completed them without due care were removed from the data set. In the analysis of the data, 349 questionnaire forms were evaluated. The data obtained within the scope of the research were analyzed using the IBM SPSS 22 software program. In order to examine the normal distribution of the data in the study, kurtosis and skewness values were examined and it was determined that the data were distributed normally. In the interpretation of the data, the significance level was accepted as .05 (Creswell, 2012). In the analysis process, independent samples t-test was used when the normality assumption was met for the data; the relationship between the two dependent variables of the study was calculated using the Pearson correlation coefficient, one of the correlation techniques. Multiple linear regression analysis was conducted to find out whether digital literacy predicted teaching readiness.

### *Research Ethical Permissions*

In this study, all rules stated to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions stated under the title "Actions Against Scientific Research and Publication Ethics", which is the second part of the directive, were not taken.

Ethical review board name: Nevşehir Hacı Bektaş Veli University Ethics Committee

Date of ethics review decision: 03.02.2021

Ethics assessment document issue number: 36

## RESULTS

In this section, the findings obtained as a result of the analysis of the research data are included. Descriptive statistics on digital literacy levels of prospective teachers are given in Table 2.

Table 2
*Descriptive Statistics on Prospective Teachers' Digital Literacy Levels and Sub-Dimensions*

| | Variables | N | $\bar{X}$ | sd | Med | Mod | Ky | SE (Ky) | Bs | SE (Bs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Digital Literacy** | Digital Literacy | 349 | 3.65 | .60 | 3.70 | 3.59 | 1.385 | .260 | -.710 | .131 |
| | Attitude | 349 | 3.67 | .71 | 3.71 | 3.71 | .1.246 | .260 | -.847 | .131 |
| | Technical | 349 | 3.70 | .65 | 3.83 | 3.67 | .806 | .260 | -.275 | .131 |
| | Cognitive | 349 | 3.71 | .84 | 4 | 4 | 1.074 | .260 | -.877 | .131 |
| | Social | 349 | 3.32 | .85 | 3.50 | 4 | -.083 | .260 | -.273 | .131 |

When Table 2 is examined, it is seen that the mean digital literacy score of the participants is $\bar{X}$=3.65. Accordingly, it can be said that the digital literacy levels of prospective teachers were high. When the means of the digital literacy scale sub-dimensions are examined, it is seen that attitude is $\bar{X}$=3.67, technical is $\bar{X}$=3.40, cognitive is $\bar{X}$=3.71 and social is $\bar{X}$=3.32. It can be said that the digital literacy levels of the participants were also high in the sub-dimensions. Descriptive statistics on prospective teachers' readiness for teaching are given in Table 3.

Table 3
*Descriptive Statistics on Prospective Teachers' Levels of Teacher Readiness and Sub-Dimensions*

| | Variables | N | $\bar{X}$ | sd | Med | Mod | Ky | SE (Ky) | Bs | SE (Bs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Teaching Readiness** | Teaching Readiness | 349 | 3.68 | .61 | 3.82 | 4 | 1.261 | .260 | -.889 | .131 |
| | Understanding the Learner | 349 | 3.64 | .75 | 3.89 | 4 | 1.329 | .260 | -.929 | .131 |
| | Creating an Effective Learning Environment | 349 | 3.64 | .69 | 3.83 | 4 | 1.292 | .260 | -.905 | .131 |
| | Designing the Teaching Process | 349 | 3.76 | .67 | 4 | 4 | 1.292 | .260 | -.871 | .131 |
| | Technopedagogical Competence | 349 | 3.65 | .67 | 3.80 | 4 | 1.039 | .260 | -.795 | .131 |

When Table 3 is examined, it is seen that the participants' mean scores for readiness for teaching are $\bar{X}$=3.68. Accordingly, it can be said that prospective teachers had a high level of teacher readiness. When the means of the sub-dimensions of the scale of readiness for teaching is examined, it is seen that understanding the learner is $\bar{X}$=3.64, creating an effective learning environment is $\bar{X}$=3.64, designing the teaching process is $\bar{X}$=3.76 and technopedagogical competence is $\bar{X}$=3.65. It can be said that the readiness level of the participants for teaching was also high in the sub-dimensions.

When Tables 2 and Table 3 are examined, it is seen that the mean, median and mode values obtained from the digital literacy and teaching readiness scales converge and that the distribution does not diverge from the normal. The digital literacy scale skewness value was found to be 1.385 and the kurtosis value was -.710, the readiness to teach scale skewness value was found to be 1.261 and the kurtosis value was -.889. It was determined that kurtosis and skewness values varied within the range of ± 1.5 in all variables. The fact that kurtosis and skewness values are within the limits (± 1.5) indicates that the distribution of the data is normal (Tabachnick & Fidell, 2012). Accordingly, it was determined that the data obtained from the digital literacy scale and the readiness for teaching scale were distributed normally. In Table 4 below, the findings regarding the analysis of prospective teachers' mean scores on digital literacy and teaching readiness according to the gender variable are given.

Table 4

*T-test Results on Digital Literacy and Teacher Readiness Levels of Prospective Teachers According to Gender*

| | Variables | N | $\bar{X}$ | sd | Med | Mod | Ky | SE (Ky) | Bs | SE (Bs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Teaching Readiness** | Teaching Readiness | 349 | 3.68 | .61 | 3.82 | 4 | 1.261 | .260 | -.889 | .131 |
| | Understanding the Learner | 349 | 3.64 | .75 | 3.89 | 4 | 1.329 | .260 | -.929 | .131 |
| | Creating an Effective Learning Environment | 349 | 3.64 | .69 | 3.83 | 4 | 1.292 | .260 | -.905 | .131 |
| | Designing the Teaching Process | 349 | 3.76 | .67 | 4 | 4 | 1.292 | .260 | -.871 | .131 |
| | Technopedagogical Competence | 349 | 3.65 | .67 | 3.80 | 4 | 1.039 | .260 | -.795 | .131 |

* p>.05

When Table 4 was examined, it was determined that the digital literacy levels of the participants did not differ significantly according to the gender variable [$t_{(347)}$=.462, p>.05]. Similarly, it was seen that there was no significant difference between the teachers' readiness levels for teaching and the gender variable [$t_{(347)}$= -1.009, p>.05]. In this case, it can be said that the digital literacy and teaching readiness levels of female and male prospective teachers did not differ significantly. In Table 5 below, the findings regarding the analysis of the mean scores of the prospective teachers regarding their digital literacy and teaching readiness levels according to the grade level variable are given.

Table 5

*T-test Results Regarding the Digital Literacy and Teaching Readiness Levels of Prospective Teachers According to Grade Level Variable*

| Variable | Group | N | $\bar{X}$ | sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Digital | 3rd grade | 162 | 3.61 | .57 | 347 | -1.071 | .285 |
| Literacy | 4th grade | 187 | 3.68 | .62 | | | |
| Teaching | 3rd grade | 162 | 3.63 | .60 | 347 | -1.389 | .166 |
| Readiness | 4th grade | 187 | 3.72 | .62 | | | |

* p>.05

When Table 5 was examined, it was determined that the digital literacy levels of the participants did not differ significantly according to the grade level variable [$t_{(347)}$= -1.071, p>.05]. Similarly, it is seen that there was no significant difference between the teachers' readiness levels for teaching and the grade level variable [$t_{(347)}$= -1.389, p>.05]. In this case, it can be said that the digital literacy and teaching readiness levels of prospective teachers studying in the third and fourth grades did not differ significantly. Table 6 below includes findings related to Variance Inflation Factors (VIF) and Tolerance Values (Tolerance = 1 / VIF) to determine multiple relationships between predictor variables.

Table 6

*Tolerance and VIF Values of Digital Literacy Dimensions*

| Predictive Variables | Tolerance | VIF |
|---|---|---|
| Attitude | .474 | 2.109 |
| Technical | .450 | 2.222 |
| Cognitive | .578 | 1.729 |
| Social | .525 | 1.904 |

When Table 6 is examined, it is seen that the VIF values of the predictor variables are lower than 10 and that the tolerance values are higher than 0.20. In line with these results, it can be said that there is no multicollinearity problem in terms of tolerance values and VIF values among the predictive variables (Hair, Anderson, Tatham & Black, 1998) and that there is no perfect linear relationship between variables. Table 7 below includes the findings of the correlation analysis conducted to examine the relationship between the digital literacy and teaching readiness levels of the participants.

Table 7
*Relationship between Prospective Teachers' Digital Literacy and Teaching Readiness Levels*

| | **Understanding the Learner** | **Creating an Effective Learning Environment** | **Designing the Teaching Process** | **Technopedagogical Competence** | **Mean Teaching Readiness Score** |
|---|---|---|---|---|---|
| Attitude | .38** | .38** | .26** | .42** | .40** |
| Technical | .26** | .30** | .26** | .34** | .33** |
| Cognitive | .32** | .28** | .25** | .38** | .34** |
| Social | .28** | .25** | .23** | .34** | .30** |
| Mean Digital Literacy Score | .39** | .39** | .31** | .45** | .42** |

**p<.01

When Table 7 is examined, it is seen that there is a positive and significant relationship between the digital literacy and teaching readiness mean scores of the participants at the level of .42 (p <.01). The highest correlation between the mean score of being ready to teach and digital literacy sub-dimensions is with the attitude sub-dimension (.40) (p <.01). The lowest correlation between the mean score of being ready for teaching and digital literacy sub-dimensions was found to be with the social sub-dimension (.30) (p <.01). The highest correlation between the digital literacy mean score and the readiness for teaching sub-dimensions is with the technopedagogical competence sub-dimension (.45) (p <.01). The lowest correlation between the digital literacy mean score and the readiness for teaching sub-dimensions is with the sub-dimension of designing the teaching process (.31) (p <.01). In Table 8 below, the findings related to Multiple Linear Regression analysis regarding the predictive value of the digital literacy levels of the participants for teaching readiness are given.

Table 8
*Regression Analysis Results Regarding the Predictive Effect of Digital Literacy on Teacher Readiness*

| **Variable** | **B** | **Standard Error B** | **β** | **t** | **p** | **Paired r** | **Partial r** |
|---|---|---|---|---|---|---|---|
| Constant | 2.116 | .190 | - | 11.165 | .000 | - | - |
| Attitude | .201 | .061 | .234 | 3.318 | .001 | .401 | .176 |
| Cognitive | .088 | .047 | .120 | 1.888 | .061 | .340 | .101 |
| Social | .072 | .048 | .100 | 1.487 | .138 | .305 | .080 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Technical | .071 | .069 | .075 | 1.036 | .301 | .330 | .056 |

$R=.436$ $R^2=.190$ $F_{(4,345)}=20.133$ $p=.000$

When Table 8 is examined, it is seen that there is a moderately significant relationship (R =.436) between the digital literacy attitude, technical, cognitive and social sub-dimensions and the readiness for teaching scores. The four dimensions together explain 19% of the total variance in the level of teaching readiness ($R^2$=.190). According to the standardized regression coefficient (β), the relative importance of predictor variables on teaching readiness is attitude (β=.234), cognitive (β=.120), social (β=.100) and technical (β=.075). According to the t-test results regarding the significance of the regression coefficients, among all predictor variables, the attitude sub-dimension (t = 3.318, p = .001) is a significant predictor of the level of teaching readiness. Accordingly, there is a low level positive relationship between the readiness level of the participants for teaching and attitude, which is one of the sub-dimensions of the digital literacy scale. From the digital literacy sub-dimensions, it is seen that cognitive (t=1.888, p=.061), social (t=1.487, p=.138) and technical (t=1.036, p=.301) are not significant predictors of teaching readiness.

## DISCUSSION

The digitalization of education provided by universities today has revealed the necessity of developing new competencies in terms of adapting to changing needs for prospective teachers in universities. Digitalization has brought a new dimension to teachers' pedagogical skills and competencies, making it necessary to add digital knowledge and skills within pedagogical competencies. Prospective teachers' development of digital skills in using technology by integrating technology into the learning-teaching process and gaining experience in this field support teacher competencies and teacher readiness. In this study, the relationship between prospective preschool teachers' digital literacy and teaching readiness was examined.

When the findings regarding the determination of digital literacy levels of prospective teachers' in the study were examined, it was found that the digital literacy levels of the participants were high. When the results of the digital literacy sub-dimensions were evaluated, it was determined that the digital literacy levels of the participants were high in the attitude, technical, cognitive and social sub-dimensions. Based on these results, it can be said that prospective teachers find themselves competent in digital literacy and that the digital experiences of prospective teachers in daily life have a positive effect on their digital competence. In similar studies, it was found that prospective teachers' digital literacy levels were high (Çetin, 2016; Ocak & Karakuş, 2019; Kim, Hong & Song, 2018; León-Pérez, Bas, Escudero-Nahón, 2020; Üstündağ, Güneş & Bahçivan, 2017; Şad & Nalçacı, 2015). The results of the digital competence of the participants obtained in this study are similar to the other research results. Accordingly, it can be suggested that various applied training courses

are organized in order to professionally develop the digital competencies of prospective teachers.

When the findings of the study regarding the determination of digital literacy levels of prospective teachers according to the gender variable were examined, it was found that in terms of gender veriable, digital literacy levels of prospective teachers do not differ significantly. In this case, it can be said that there was no difference between the digital literacy levels of female and male prospective teachers. In similar studies, it was determined that gender did not affect the frequency of internet use (Dikmen & Tuncer, 2018; Kozan & Bulut-Özek, 2019; Kul, 2020; Tondeur, Aesaert, Prestridge & Consuegra, 2018). Those research results are parallel with the findings of this study regarding the gender variable. On the other hand, research findings exist which reveal that male prospective teachers' digital literacy levels were significantly higher than those of female prospective teachers (Esteve-Mon, Llopis & Adell-Segura, 2020; Owens & Lilly, 2017; Yazıcıoğlu, Yaylak & Genç, 2020; Yontar, 2019). This may be due to the interest of male teacher candidates in technology. Accordingly, it can be said that digital competencies of female prospective teachers should be developed with various strategies in order to eliminate gender inequalities in education.

When the findings of the study regarding the determination of digital literacy levels of prospective teachers according to the grade level variable were examined, it was found that the digital literacy levels of the participants did not differ according to the grade level variable. It is seen that prospective teachers studying in the third and fourth grades had similar characteristics in terms of digital literacy levels. It can be said that there was no difference according to grade level, since all prospective teachers frequently used digital tools in daily life and all candidates had taken information technologies and instructional technologies courses. The use of technology by prospective teachers in teacher training programs plays a decisive role in the professional preparation of prospective teachers. Prospective teachers are expected to develop their digital literacy skills through applied studies from the first year of the teaching process (Mouza, 2016). When similar studies were examined, it was determined that there was no significant difference in digital literacy levels of prospective teachers according to grade levels (Dedebali, 2020; Özerbaş & Kuralbayeva, 2018; Law, 2018). In the study conducted by Can, Çelik, and Çelik (2020), it was found that the class level variable affected the digital literacy level and that the level of literacy increased as the class level increased. It can be said that there was no difference in this study because the prospective teachers who took part in the study were in the third and fourth grades.

When the findings on the determination of prospective teachers' level of teaching readiness in the study were examined, it was found that the participants' level of teaching readiness was high. When the data on the sub-dimensions of teaching readiness were examined, it was determined that the participants' level of teaching readiness was high in the sub-dimensions of understanding the learner, creating an effective learning

environment, designing the teaching process and technopedagogical competence. It can be said that the prospective teachers perceived themselves as competent and that they were ready to teach. Prospective teachers' feeling ready for the profession can positively affect the learning and teaching process. In similar studies, it was determined that prospective teachers had a positive perception of their professional performance (Caires, Almeida & Vieira, 2012; Colson, Sparks, Berridge, Frimming & Willis, 2017; Khalid, Dukmak & Dweikat, 2017) and showed a positive attitude towards the teaching profession. (Doğrul & Kılıç, 2020; Ismail & Jarrah, 2019). The results obtained in this study are similar to the results of the research in the literature.

When the findings regarding the determination of prospective teachers' level of teaching readiness according to the gender variable were examined, it was found that the participants' level of teaching readiness did not differ according to the gender variable. It can be said that male and female prospective teachers had a positive attitude towards the teaching profession and felt themselves competent. In similar studies, it was revealed that gender did not affect the level of teaching readiness (Karakaya, Uzel, Gül & Yılmaz, 2019; Kula, 2015), and that female and male prospective teachers had similar characteristics regarding professional preparation (Specht & Metsala, 2018; Subbaye & Vithal, 2017). It can be said that it is a positive result that female and male prospective teachers evaluated themselves as ready for the profession.

When the findings regarding the determination of prospective teachers 'level of teaching readiness according to the class level variable were examined, it was found that the participants' level of teaching readiness did not differ according to the class level variable. In similar studies, it was revealed that the level of teacher readiness did not differ according to the class level variable (Karatekin, Merey & Keçe, 2015; Tuncer & Bahadır, 2016). In education faculties, theoretical and practical studies are carried out to improve the performance of prospective teachers from the first year onwards in order for them to have the necessary professional knowledge and skills (Bastian, Lys & Pan, 2018). As pedagogical competencies develop in prospective teachers, the process of transformation from student to teacher begins and an increase in feeling ready to teach occurs (Welsh & Schaffer, 2017). In this respect, it can be said that prospective teachers' professional preparations start from an early period and that prospective teachers who have a positive attitude towards the teaching profession feel themselves ready for the profession.

In the study, when the findings on the determination of the relationship between digital literacy and teaching readiness levels of prospective teachers were examined, it was found that there was a positive and significant relationship between the participants' mean scores of digital literacy and teaching readiness at the level of .42 ($p<.01$). According to Can (2019), there is a weak correlation or no correlation between 0.0 and 0.4, there is a moderate correlation between 0.4 and 0.6 and a high correlation between 0.6 and 1. It was determined that the highest correlation between the mean score of being ready to teach and the digital

literacy sub-dimensions was with the attitude sub-dimension (.40) (p <.01). In this respect, it can be said that there is a relationship between the attitudes of prospective teachers towards using technology in the learning process and their competencies for being ready for teaching. Similar studies have revealed that there is a strong relationship between prospective teachers' digital competencies and their instructional self-efficacy (Bond, Marín, Dolch, Bedenlier & Zawacki-Richter, 2018; Elstad & Christophersen, 2017; Ng, 2012). Supporting teacher training programs with digital learning experiences (Ally, 2019; Mourlam, Strouse, Newland & Lin, 2019; Wetzel, Buss, Foulger & Lindsey, 2014) is seen as a structure that affects teaching readiness. On the other hand, in some research studies, digital competence is still not seen as an important component of teachers' professional competence (Instefjord & Munthe, 2016) and digital literacy is not included in the process as part of academic literacy in universities (Bakir, 2015; Guzmán-Simón, García-Jiménez & López-Cobo, 2017; Gudmundsdottir & Hatlevik, 2018). Developing digital competencies in teacher training programs is important for prospective teachers' professional readiness. According to the results of the study, it was determined that the highest correlation between the digital literacy average score and the sub-dimensions of being ready for teaching was with the technopedagogical competence sub-dimension (.45) (p <.01). In line with these results, it can be said that prospective teachers associated technopedagogical competence with digital literacy and that digital literacy positively affected technopedagogical competence. Similar studies show that digital competencies in teacher education are important for teachers' professional development (Instefjord & Munthe, 2017; Kopcha, 2012; List, 2019). The pedagogical use of technology, which is called technological pedagogical content knowledge in teacher education, and the integration of technology into the teaching process are necessary for the professional development of teachers (Mishra & Koehler, 2006; Tarling & Dick, 2016). In this regard, the development of digital competence should be encouraged so that prospective teachers can use technology correctly, access the information they need and reflect this knowledge in the teaching process.

When the findings of the relationship between the predictivity of digital literacy for teaching readiness were examined, it was determined that there was a moderately significant relationship between the digital literacy attitude, technical, cognitive and social sub-dimensions and the readiness for teaching scores, and that the four dimensions together explained 19% of the total variance in the level of teaching readiness. According to the t-test results regarding the significance of the regression coefficients, it was observed that among all the predictive variables, the attitude sub-dimension was a significant predictor of the level of teaching readiness, while the cognitive, social and technical sub-dimensions were not significant predictors of the level of teaching readiness. The fact that attitude sub-dimension of the digital literacy scale is related to the learning process and that the prospective teachers had a positive attitude towards digital literacy may be effective in their finding themselves professionally ready for teaching. The attitude towards digital literacy can also be evaluated as a result of the increased use of digital resources in teacher

education. In similar studies, it was revealed that students thought that digital literacy courses were effective for academic development (Buzzetto-Hollywood, Elobeid & Elobaid, 2018; Hsu, 2012; McGarr & Gavaldon, 2018), and that university students used digital technologies for learning and social purposes (Margaryan, Littlejohn & Vojt, 2011). It has been determined that students' digital literacy and positive attitudes contribute to their self-perception in professional development (Gill & Dalgarno, 2017; Prior, Mazanov, Meacheam, Heaslip & Hanson, 2016; Tondeur, Pareja Roblin, van Braak, Voogt & Prestridge, 2017). Raising innovative and creative prospective teachers with digital literacy skills is seen as one of the ways to easily overcome the problems that may occur in the future teaching process. In this respect, it is important to ensure that digital competencies are included among professional teacher competencies for the professional preparation of future teachers.

## LIMITATIONS AND RECOMMENDATİONS

In today's education system, where digital literacy is more accepted as a basic skill to support professional readiness, evaluating the digital literacy of prospective teachers after starting university and providing them with continuous support and training can contribute to their professional development. In line with the results of the research, it may be suggested that the practices aimed at improving the digital literacy and teaching readiness of prospective teachers in teacher training programs are increased, and that digital skills are added to teacher competencies. The fact that the study was conducted with prospective preschool teachers in the universities included in the sample is the limitation of this study.

## CONCLUSION

When the results of the research were examined, it was determined that prospective preschool teachers had high digital literacy levels. It was revealed that the digital literacy levels of prospective teachers were also high in the sub-dimensions of the digital literacy scale. In the study, it was determined that digital literacy level did not differ according to gender or grade level variables. As a result of the research, it was determined that prospective preschool teachers had a high level of teacher readiness. In the sub-dimensions of the teaching readiness scale, it was revealed that the prospective teachers' level of teaching readiness was high. In the study, it was determined that the level of teaching readiness did not differ according to the variables of gender or grade level. In the study, it was determined that there was a positive and significant relationship between the digital literacy and teaching readiness scores of the prospective teachers. It was determined that the highest relationship between the mean score of being ready for teaching and the sub-dimensions of digital literacy was with the attitude sub-dimension, while the highest correlation between the mean digital literacy score and the sub-dimensions of teaching readiness was with the technopedagogical competence sub-dimension. In the study, it was

revealed that the digital literacy scale attitude sub-dimension was a significant predictor of the level of teaching readiness.

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Research Article

# The Effect of Digital Activities on the Technology Awareness and Computational Thinking Skills of Gifted Students (eTwinning Project Example)

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**Abstract:**

*The aim of this study was to examine the effect of interdisciplinary activities organised online within the scope of an eTwinning project carried out with gifted students on the students' technology awareness and computational thinking (CT). However the research was not' funded by eTwinning. The study was carried out through web-based tools for a period of 3 months in the year 2020. These Web 2.0 tools were: Canva, Zoom, Google Classroom, Jamboard, Tinkercad, Telegram, Facebook, Kahoot!, Instagram, StoryJumper, Padlet, etc. The research was designed with an explanatory design which is one of the mixed models. While in the quantitative aspect of the study, a quasi-experimental design with pretest posttest control group was carried out, a case study was carried out in the qualitative aspect of the study. The participants were 50 gifted students continuing their education at Science and Art Centres affiliated to the National Education Ministry in 6 different provinces of Turkey. Quantitative and qualitative methods were used together in the study. A technology awareness and computational thinking scale was chosen as the quantitative data collection tool, while mind maps were used as the qualitative data collection tool. As a result of the research, a significant increase in the participants' technology awareness and computational thinking was determined in favour of the posttest, while this increase was verified through the mind-mapping technique applied to the students. At the end of the study, the findings were discussed, and recommendations were made for future studies. In addition, a great limitation of this research was the effectiveness of activities that had to be carried out entirely remotely due to the COVID-19 pandemic. In the distance education, in which the teacher's control was weak, the skills intended to be fostered in students remained at a lower level.*

**Keywords:** Gifted students, mixed method, technology awareness, computational thinking, eTwinning

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## INTRODUCTION

In this section, the literature A gifted (talented) individual is defined as an individual with special academic ability, who displays high-level performance, who is ahead of his/her peers in terms of art, leadership and creativity, who can grasp abstract ideas, who likes to act independently, and who learns faster than his/her peers (Ministry of National Education [MoNE], 2019). Gifted students' characteristics can be listed as: in terms of their emotional characteristics, having the ability to take risks and empathise, being a perfectionist, having high creativity, a leadership spirit and interest in nature; while regarding their cognitive characteristics, possessing high observation skills, and having the ability to retain information in the memory for a long period, to work independently and individually, and to quickly learn complex and abstract concepts (Renzulli et al., 2002). The process of identifying gifted individuals is carried out with a procedure in which information about individual characteristics such as achievement, intelligence and creativity is gathered, and, in line with the information gathered, decisions are made about students' potential and mental capacity (Sak, 2016), together with the steps outlined by the Ministry of National Education (MoNE) in the directive for Science and Art Centres (BILSEM), published in the December 2019 Bulletin, for the process of identifying gifted students in Turkey:

- First of all, students studying in first, second and third grades of primary school are nominated by having an observation form filled in by their class advisor.
- Nominated students are taken for examination with a group screening test (tablet application) implemented via the host system by the MoNE.
- Students who display a performance meeting or above the criterion specified in the group screening application are taken for individual assessment.
- In line with the criteria specified by the Ministry's provincial identification commission, individual assessment is made in the general mental ability domain by the counselling and research centre using objective and standard measurement tools.
- Assessment of students nominated in the fields of music and visual arts is made by the provincial identification commission in line with the specified criteria.
- As a result of the assessments, students who are above the criteria specified by the Ministry are identified as gifted (MoNE, 2019).

In a globalising world, the importance of access to information is steadily increasing, both for gifted individuals and for others. It is an inescapable fact of our age that we can always access information independently of time and space. In this context, technology comes into play. Generally defined as equipment and materials, technology is defined as "the whole of the materials developed for controlling and changing humans' material

environment, and knowledge related to these" (Turkish Language Institute, 2009). If we look at the nature of technology and the awareness processes in society, technology began after the Middle Ages, especially during the "Industrial Revolution". At the beginning of the 20th century, ideas expanded to encompass the transition to various vehicles and machines. When we reached the middle of the 20th century, however, technology then began to be defined as all the activities carried out through investigation by humans for transforming their environment. Technology awareness began with the rapidly developing technology of the present age, which is known as the age of science and technology. Of course, it cannot be considered that this awareness does not have an impact on today's education processes. It is stated that the development of technology has an effect on the structure of the education system and, moreover, on the educational activities carried out in education environments (Pala, 2006). Since students, who are the essential element of education, are individuals who learn in the age of science and technology, their awareness regarding the use of technology in lessons is of great importance. Combining technology with lessons has become indispensable for effective and permanent learning. Students with a traditional understanding of education take part in activities in class in a passive position, whereas, together with the use of technology in lessons, students assume more active roles by participating in the learning environment rather than merely listening (Demirci, 2008).

With the advancement of technology in every area in the 21st century, the skills expected from students are also steadily increasing. One of these skills is computational thinking (CT) skill. When the literature related to computational thinking skills is examined, it is seen that the term "computational thinking" was first used by Papert (1996). The concept is given various names in the Turkish literature, corresponding to such terms as "computational thinking", "data processing thinking", "calculative thinking", "algorithmic thinking" and "thinking like a computer scientist" in English. Computational thinking is defined as the thinking process required to convert problems encountered in daily life into a formula by a human or computer (Kirmit, Dönmez & Çataltaş, 2018), and according to Thomas, Odemwingie, Saunders and Watlerd (2015), "involves identifying and understanding a problem, articulating an algorithm or set of algorithms in the form of a solution to the problem, implementing that solution in such a way that it solves the problem, and evaluating the solution based on some set of criteria". The International Society for Technology in Education (ISTE) (2015) expresses computational thinking as a problem-solving approach supported by technology. The subskills of computational thinking are creative thinking, problem solving, algorithmic thinking, critical thinking, collaborative learning and communication skills (ISTE, 2015).

The stages of computational thinking stated by the International Society for Technology in Education (ISTE) are as follows:

1. Understanding problems by utilising the power of technological methods;
2. Formulating the problem by using models and algorithmic thinking;
3. Presenting datasets through data collection and digital tools;

4. Developing descriptive models to facilitate problem solving;
5. Using algorithmic thinking to generate and test solutions.

The stages expressed for computational thinking show similarity with the process for creating project products using Web 2.0 tools at the implementation stage of projects conducted by using digital platforms. As Peachey (2009) stated, the use of Web 2.0 tools encourages working jointly on a subject and participants' higher-order thinking skills such as creativity, problem solving, analytical thinking, and establishing cause-effect relationships.

Especially since the internet began to be used in education, it has become possible to conduct the instructional processes in education synchronously or asynchronously. Particularly the use of digital platforms like Web 2.0 tools continues to progress rapidly. Nowadays, numerous activities can be carried out via distance learning. One of the project activities that are widely used in all countries of the world are eTwinning projects.

eTwinning is defined as a web-based network created for schools in Europe. eTwinning consists of two words: "e" for "electronic" and "twinning" for "mutual partnership" (Başaran et al., 2020). It is a network which aims to establish communication between teachers and teachers and teachers and students, enable them to carry out projects in cooperation, increase personal and professional development, and increase the use of technology. This communication network plans to increase teachers' and students' knowledge and skills. The eTwinning European Online Platform was initiated in 2005 as an e-learning programme affiliated to the European Commission. It was integrated into the Lifelong Learning programme in 2007, and since 2014, it has been conducted within the framework of the Erasmus+ programme of the Education, Audiovisual and Culture Executive Agency (EACEA).

With the coordination of the Central Support Service affiliated to the European Schools Network created with the Education Ministries of 44 countries from Europe and beyond, 901,751 teachers have taken part in eTwinning activities, and 118,219 eTwinning projects have been conducted in 218,508 schools (eTwinning Turkey, 2021c; eTwinning Turkey, 2021d). The eTwinning Turkey National Support Service began its activities in 2009 within the scope of the General Directorate of Innovation and Education Technologies of the Ministry of National Education (eTwinning Turkey, 2021a). In Turkey, 270,863 teachers have been involved in eTwinning activities, and 47,389 eTwinning projects have been conducted in 55,315 schools (eTwinning Turkey, 2021b).

Through eTwinning, teachers in the 44 participating countries can share their experiences with teachers in different schools and countries, engage in an exchange of ideas by communicating online, and conduct projects suitable for their own curricula. In eTwinning activities, it is expected that technology will be used in the process by integration in education. By providing technological equipment (interactive boards, tablet computers,

broadband internet infrastructure, etc.) through the Fatih project, and in collaboration with EBA (Educational Informatics Network), eTwinning is conducted as a positive activity.

If we express eTwinning activities in the form of beneficial items for teachers, these are

1. Acquiring ideas about educational practices carried out in different schools or European countries,
2. Improving their foreign language practice,
3. The possibility to use information technologies in their lessons effectively,
4. The possibility to make their lessons more enjoyable by enabling students to become more motivated,
5. The possibility to develop themselves professionally (eTwinning Turkey, 2021e).

As well as its benefits for teachers, eTwinning also offers students new learning opportunities. According to the views of teachers, the new learning that takes place in students who take part in eTwinning projects can be summed up as follows:

1. Being more motivated towards lessons,
2. Becoming acquainted with different cultures by communicating with their peers from other schools or countries,
3. The possibility to communicate in foreign languages,
4. Being aware that web technologies can also be used for educational purposes,
5. More active participation in lessons due to involvement in projects (eTwinning Turkey, 2021e).

It is possible to come across some studies in which gifted individuals are included in eTwinning projects in Turkey. For this, the eTwinning coordinator has also determined some criteria under the heading of inclusive education (eTwinning, 2017). Although there are projects organized by Science and Art Centres such as "Gifted People Volunteer", "M.A.R.S.", and "Art Fellowship in Special Education", there are no studies in which the outputs of these projects are scientifically reported. There are limited studies in the literature reporting the CT skills of gifted students (Avcu & Er, 2020; Çakır & Bayraktar, 2019; Kirmit, Dönmez & Çataltaş, 2018). In addition, there are studies reporting on technology awareness in gifted people such as Cırık (2016), Çubukçu and Tosuntaş, (2018) Özmen and Kömürlü (2011) and Pereira Coutinho and Rocha (2007). However, no research has been encountered that examines the effects on these mentioned skills as a result of the digital activities they perform using remote Web 2.0 tools such as eTwinning. Hook (2004) states that it is important to implement collaborative projects and include rich online programs, which include various activities, created in cooperation with informatics teachers, observant teachers, school administrators, and other interested parties. In this context, it is considered

that the research subject is important in the context of closing the gap in the relevant field and literature.

### Aim of the Study

In scientific research studies made on the subject of eTwinning in the literature, it is seen that there are studies related to various levels and perspectives of integration of teaching programmes that include eTwinning projects, views of teachers about the effects and educational needs of eTwinning in teaching practices, professional implications for teachers and administrators in new and developing types of professional development using Web 2.0 tools, how national and local teachers' professional development plans form an interaction with eTwinning, effects on multiculturalism, and benefits with regard to communication and collaboration, as well as meta-analysis studies (Başaran, Kaya, Akbaş & Yalçın, 2020; Crisan, 2013; Gajek, 2018; Orava & Worrall, 2011; Vuorikari et al., 2011; Yılmaz & Yılmaz Altun, 2012). However, no research studies can be found in the literature on the subject of eTwinning studies conducted with gifted students. Therefore, it is seen that in the literature, the number of research studies made with regard to how eTwinning projects affect gifted students' technology awareness, and what kind of contributions are made to their computational thinking, is limited and insufficient. In this respect, it is expected that this study will fill this gap. In particular, the importance of computational thinking, which is regarded as one of the basic skills of our age, and of the technology awareness that today's individuals need to possess, has made conducting research into these subjects, and making up this deficiency in the literature, imperative. Accordingly, in this study, an attempt is made to seek answers to the following questions:

1. Do digital activities carried out remotely have an effect on gifted students' technology awareness?

1.1. Does gifted students' technology awareness differ significantly according to the variables of gender, school type and parental education levels?

2. Do digital activities carried out remotely have an effect on gifted students' computational thinking?

2.1. Does gifted students' computational thinking differ significantly according to the variables of gender, project experience and parental education levels?

3. Do digital activities carried out remotely have an effect on gifted students' perceptions of the concept of technology?

## METHOD

### Research Design

This study was constructed in a mixed model in which quantitative and qualitative data tools were used to identify the impact of the eTwinning project carried out with gifted

students on the students' technology awareness and CT. Creswell (2012) describes the mixed model as collecting and analysing both quantitative and qualitative data. The research was carried out with an explanatory design from mixed models. In explanatory mixed method research, quantitative data are collected first and then qualitative data are collected to explain the quantitative data (Creswell & Plano Clark, 2014). This method makes it possible to eliminate the limit in terms of the results obtained from a single data collection tool, as well as providing strong evidence (Suhonen, 2009). The reason for preferring this design is that the data collected by the quantitative method should be examined by the qualitative method in accordance with the research purpose. In this regard, the research was carried out in two stages. The first stage is the quantitative dimension of the research. In the quantitative section of the research, in which a holistic single-case design was chosen, a single-group pretest-posttest model, one of the pre-experimental designs, was preferred. This model includes no randomness or matching. The symbolic representation of the model is shown below (Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz & Demirel, 2014).

| Group | Pretest | Process | Posttest |
|---|---|---|---|
| G | $M_1$ | X | $M_2$ |

The second stage of the research was carried out in a qualitative dimension. Data collected by the qualitative method can further deepen and elaborate the quantitative results (Patton, 2014). In the qualitative stage, one of the non-random sampling methods, the confirming or disconfirming sampling method was used. In this context, in order to determine the pattern between the data collected in the quantitative stage and reveal the backgrounds on which the quantitative data were based, the confirming or disconfirming sampling method was used. The main feature of a qualitative case study is in-depth investigation of one or several cases (Yıldırım & Şimşek, 2016). The factors related to a case (environment, individuals, events, processes, etc.) are investigated with a holistic approach, and focus is placed on how they affect the relevant case and how they are affected by the relevant case. Within the scope of the holistic single-case design, a mind-mapping technique was used in the qualitative section.

### *Study Group*

The participants of the study were determined with the convenience sampling approach, one of the non-probability sampling types. In convenience sampling, the researchers select the participants from volunteer individuals who are easily accessed and suitable for the research (Gravetter & Forzano, 2012). The following procedures were followed in the selection of the participants:

1. Being a volunteer and willing to do the research,

2. Never participating in an eTwinning project before,

3. Not using Web 2.0 tools too much or too little,

4. Being a BILSEM student and in the age range of 9-16 years,

5. Students allowed by their parents were included in the project.

6.Science and art centres that could find students under these conditions and obtain permission from the school administration were included in the project. Within this scope, volunteer students who responded to the announcement of an eTwinning project were included in the project. The participants who applied for the project consisted of 50 gifted students continuing their education at Science and Art Centres in 6 different provinces in Turkey during the 2020-2021 academic year. These students also comprised the participant group of the research. In this context, descriptive characteristics of the study group are given in Table 1.

**Table 1**

*Information related to descriptive characteristics of participants*

| | | **Frequency** | **Percentage (%)** |
|---|---|---|---|
| Gender | Female | 34 | 68 |
| | Male | 16 | 32 |
| Grade Level | 4th grade | 13 | 26 |
| | 5th grade | 33 | 66 |
| | 6th grade | 4 | 8 |
| School Type | State | 41 | 82 |
| | Private | 9 | 18 |
| Possession of a Personal Computer | Yes | 45 | 90 |
| | No | 5 | 5 |
| Project Experience | Yes | 20 | 40 |
| | No | 30 | 60 |
| TOTAL | | 50 | 100 |

In the study group, 34 (68%) of the participants were female, while 16 (32%) were male. The participants consisted of 13 students (26%) from primary school level (4th grade) and 37 students (74%) from secondary school level (5th and 6th grade). The majority of participants attended state schools, and the percentage of them who owned a personal computer was very high (90%). 20 of the participants (40%) had previously taken part in a project, while 30 (60%) had not been involved in any projects before.

### *Data Collection Tools*

During the data collection process, a parental or guardian permission form was requested from each participant in the project. A meeting was held on Zoom with the parents of the participants who had received permission and detailed information about the project was given. During the project process, it was explained that they would also take part in some activities in this project from time to time. Later, the parental or guardian

permission forms were submitted to school administrations. At the end of all these processes, the project schedule was started and the data collection tools were applied with the approval of the ethics committee. Detailed information on the qualitative and quantitative research tools is given below.

### *Awareness Scale for Technology Use in Courses*

Developed by Dağtekin and Artun (2016), the "Awareness Scale for Technology Use in Courses" was used after obtaining the necessary permission. The scale is of the five-point Likert type. Likert-type ratings are "Totally Agree," "Agree," "Unsure," "Disagree," and "Totally Disagree." The validity and reliability processes of the scale were repeated, and values close to those of the developed scale were determined. For validity, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed again. In this regard, the KMO value of .85 and Bartlett's sphericity value of .00 for the scale were found to be significant. The scale items explain 59% of the total variance. The higher the variance rates that are obtained as a result of factor analysis, the more powerful is the factor structure of the scale (Tavşancıl, 2002). Following the EFA, as in its original form, the scale consists of 2 factors and 22 items. These two factors that emerged are "Benefits of Using Technology" (17 items) and "Harms of Using Technology" (5 items). Goodness-of-fit indices of the scale revealed that the model was confirmed and that this structure was valid for measuring technology awareness ($\chi$2= 249.426, d=186, p < .01, GFI= 0.91, AGFI=0.90, SRMR= 0.057, NFI= 0.91, NNFI= 0.90, CFI=0.91, IFI=0.92, RMSEA= .03). The awareness scale for technology use was administered to the 50 participants in online form through Google Forms. The Cronbach alpha coefficient of the "Benefits of Using Technology" factor was .95, while the Cronbach alpha coefficient of the "Harms of Using Technology" factor was .85, and the Cronbach alpha coefficient for the overall scale was calculated as .83. In this form, the scale is valid and reliable.

### *Computational Thinking Levels Scale*

This scale was developed for secondary school students by Korkmaz, Çakır and Özden (2015). The necessary permission was obtained for the scale, and validity and reliability studies were repeated for this research. The scale is of the five-point Likert type. For the validity studies, first of all, EFA was performed in SPSS 24.0, while CFA was carried out with AMOS 21.0. Before commencing the EFA, the KMO value of .80 and Bartlett's sphericity value of .00 were found to be significant, and the EFA was begun. The scale items explain 68% of the total variance. As in its original form, the scale consists of 22 items that can be grouped under 5 factors. These factors are "Creativity", "Algorithmic Thinking", "Collaboration", "Critical Thinking" and "Problem Solving". Goodness-of-fit indices of the scale revealed that the model was confirmed and that that this structure was valid for measuring computational thinking ($\chi$2= 353.310, d=186, p < .01, GFI= 0.90, AGFI=0.90, SRMR= 0.06, NFI= 0.91, NNFI= 0.90, CFI=0.90, IFI=0.90 ve RMSEA= .08). Fit values ranging between $\chi$2/d<3; 0<RMSEA<.05; 0≤S-RMR≤.05; .97≤NNFI≤1; .97≤CFI≤1; .95≤GFI≤1;

.95≤AGFI≤1 and .95≤IFI≤1 indicate excellent fit, while values ranging between $\chi 2/d<5$; .06≤RMSEA<.08; .06≤S-RMR≤.08; .90≤NNFI≤.96; .90≤CFI≤.96; .90≤GFI≤.96; .90≤AGFI≤.96 and .90≤IFI≤.96 indicate acceptable fit (Kline, 2005). The computational thinking levels scale was administered to the 50 participants in online form through Google Forms. A Cronbach alpha coefficient of .76 was calculated for the overall scale, while the Cronbach alpha values of the subscales were .77, .77, .80, .84 and .86, respectively. The scale in this form is valid and reliable.

### *Mind Maps*

Mind maps were first developed by Buzan (1976), based on the idea of making notes as short and specific as possible and making them eye-catching by using visual items. Mind maps (mental maps, arrow graphs, conceptual maps, communication diagrams) offer a means of systematic visualisation of the thinking process (Bystrova & Larionova, 2015). A mind map is a sketch in which major/large categories radiate from a central image and lesser categories are displayed graphically as sub-branches of larger branches (Budd, 2004). As is known, in qualitative studies, the special language, meanings and concepts used by the persons investigated are emphasised, and by understanding them, an attempt is made to reveal what the investigated individuals express (Ekiz, 2013). Therefore, in the study, by means of mind maps, the pretest-posttest method was used to observe the extent to which the concept of "Technology" developed in the students and to confirm the results obtained from the quantitative data. Mind mapping, which is practicable for discovering individual perceptions and knowledge related to complex concepts (Beckett, 2010), can be evaluated as a valid tool for analysis of qualitative data (Tattersall, Watts & Vernon, 2007).

### *Process*

The scope of the eTwinning project on which the research is grounded is described in Figure 1.

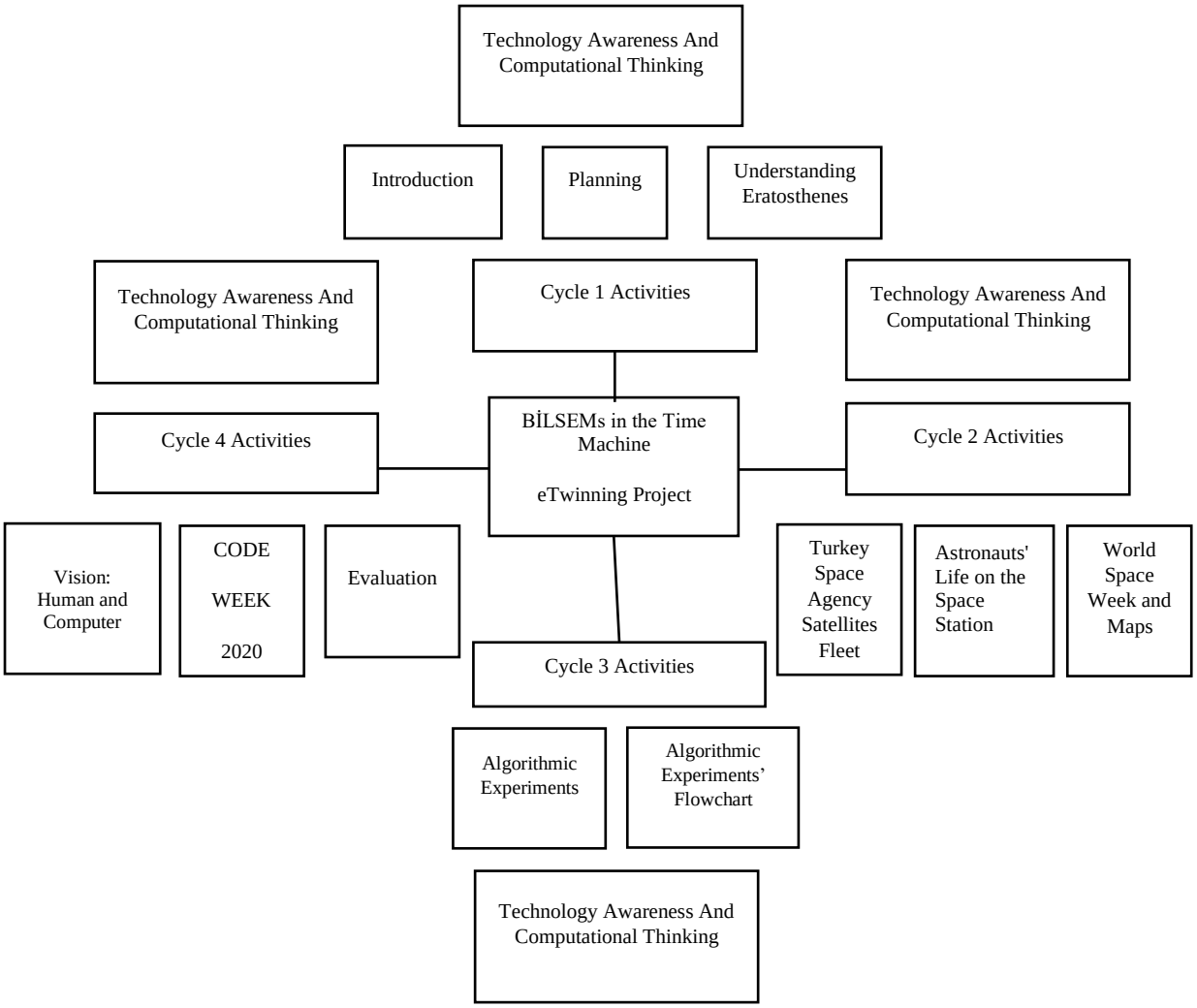


***Figure 1.***

*"BILSEMs in the Time Machine" Project Cycle*

Within the scope of the "BILSEMs in the Time Machine" eTwinning project carried out via interactive online activities as part of the Eratosthenes Experiment, Code Week 2020 and Space Week 2020, cycles lasting one week in three were planned. In these cycles, ballots for determining Web 2.0 tools, implementations with the selected Web 2.0 tools, virtual panels, and dissemination activities took place. A large part of the project activities were conducted with mixed teams made up of students attending different BILSEMs participating in the project. The activities in the project, which lasted about 3 months, were carried out in the form of 4 cycles. The contents of the cycles are shown in detail in Table 2.

**Table 2**

*Activities conducted in the project which was the subject of the research*

| | Cycle 1 – Introduction - Understanding Eratosthenes | Cycle 2 - Satellites Improve Life | Cycle 3 - Algorithmic Experiments | Cycle 4-Vision: Human and Computer Evaluation |
|---|---|---|---|---|
| | Receiving parental permission forms | Creation of questionnaire reports | Making additions to Code Week map | Performing Vision: Human and Computer activity |
| Month 1 | Student introductions webinar | Making additions to Space Week map | Additions to TwinSpace Cycle 3 activity pages | Additions to TwinSpace Cycle 4 activity pages |
| | Creation and implementation of questionnaires | Additions to TwinSpace Cycle 2 activity pages | Jamboard activities (Each BILSEM will perform its own trials) | Project dissemination activities (sharing on Haber, Facebook and blogs) |
| | Additions to TwinSpace introduction pages | 15 October 2020-15.00: Ali Kuşçu Space House online activity | Preliminary preparations for algorithm and flow diagram | Revisions of TwinSpace space |
| | Poster and logo designs | Satellite design activities (Each BILSEM will perform its own trials with Tinkercad) | Use of chat room | Forum discussions |
| Month 2 | Voting for and specifying poster and logo design | Preparations for joint satellite design activities (with Tinkercad) | Algorithmic Experiments: Preparation of joint activities and mixed country team activities (with Jamboard and Telegram) | Student, parent and teacher evaluation activities |
| | Student introductions webinar | Satellite design with mixed country team activities (with Tinkercad and Telegram) | Additions to TwinSpace Cycle 3 activity pages | Preparation of virtual project panel (with Linoit) |
| | Creation of mixed country teams | Additions to TwinSpace Cycle 2 activity pages | Project dissemination activities (sharing on Haber, Facebook and blogs) | Preparation of project publicity video |

| | | | | |
|---|---|---|---|---|
| | Creation of mixed country communication groups-Telegram groups | Project dissemination activities (sharing on Haber, Facebook and blogs) | Revisions of TwinSpace space | Conducting and reporting end-of-project questionnaires |
| | Conducting Understanding Eratosthenes experiment | Revisions of TwinSpace space | Forum discussions | Making mind maps and conducting posttests |
| | Allocation of tasks for Understanding Eratosthenes ebook activity | Forum discussions | Use of chat room | Online activity with Gizem Arıkan |
| Month 3 | Completion of Understanding Eratosthenes ebook joint activity | Completion of joint satellite design activities | Algorithmic Experiments: Completion of joint activities | Additions to TwinSpace Cycle 4 activity pages |
| | Additions to TwinSpace Cycle 1 activity pages | Additions to TwinSpace Cycle 2 activity pages | Additions to TwinSpace Cycle 3 activity pages | Project dissemination activities (sharing on Haber, Facebook and blogs) |
| | Project dissemination activities (sharing on Haber, Facebook and blogs) | Project dissemination activities (sharing on Haber, Facebook and blogs) | Project dissemination activities (sharing on Haber, Facebook and blogs) | Revisions of TwinSpace space |
| | Revisions of TwinSpace | Revisions of TwinSpace | Revisions of TwinSpace | Forum discussions |
| | Forum discussions | Forum discussions | Forum discussions | Use of chat room |
| | Use of chat room | Use of chat room | Use of chat room | Preparation of Cycle 4 diary |
| | Preparation of Cycle 1 diary | Preparation of Cycle 2 diary | Preparation of Cycle 3 diary | |

### *Data Analysis*

For the analysis of the quantitative data, first of all, the normality of the collected data was tested. The normality test was performed for the technology awareness and computational thinking overall scales and each of their subscales. In the normality test, skewness and kurtosis values were examined on the basis of the overall scales and all their subscales in the pretest-posttest context (Table 3).

**Table 3**

*Results of normality test for technology awareness and computational thinking overall scales and subscales in pretest-posttest context*

| Scales | Subscales | | Skewness | | Kurtosis | |
|---|---|---|---|---|---|---|
| | | | Statistical Value | Standard Error | Statistical Value | Standard Error |
| Technology Awareness Scale | Benefits of Using Technology | Pretest | -.46 | .34 | -.11 | .67 |
| | | Posttest | -.62 | .33 | .36 | .66 |
| | Harms of Using Technology | Pretest | -.18 | .34 | -.02 | .67 |
| | | Posttest | -.21 | .33 | -.71 | .66 |
| | Overall Scale | Pretest | -.27 | .34 | -.12 | .67 |
| | | Posttest | .02 | .34 | 1.0 | .66 |
| Computational Thinking Scale | Creativity | Pretest | -.78 | .34 | .34 | .67 |
| | | Posttest | -.10 | .33 | .93 | .66 |
| | Algorithmic Thinking | Pretest | -.71 | .34 | -.02 | .67 |
| | | Posttest | -.77 | .33 | -.38 | .66 |
| | Collaboration | Pretest | -.24 | .34 | 1.1 | .67 |
| | | Posttest | -.10 | .33 | .57 | .66 |
| | Critical Thinking | Pretest | -.58 | .34 | .26 | .67 |
| | | Posttest | -.10 | .33 | 1.3 | .66 |
| | Problem Solving | Pretest | .26 | .34 | -.83 | .67 |
| | | Posttest | .11 | .33 | 1.3 | .66 |
| | Overall Scale | Pretest | -.25 | .34 | -.53 | .67 |
| | | Posttest | .02 | .33 | 1.2 | .66 |

*p>.05*

As can be understood from the table, in the context of both the overall scales and their factors, the normality tests of the quantitative data collection tools ranged between +1.5 and -1.5 values. According to Tabachnick and Fidell (2013), it is stated that in cases where the sample group is greater than 50, when skewness and kurtosis values are between +1.5 and -1.5, it is accepted that the data are normally distributed. In this context, the distribution of the scales was accepted as normal and suitable for the use of parametric tests. Accordingly, arithmetic mean, standard deviation, t-test for dependent groups, one-way variance analysis (ANOVA) and effect value (eta-squared) analyses were made. For determining the degree of effect of the specified difference, the η2 (eta-squared) statistic was used. The η2 value expresses the proportion of variance of dependent variables that can be explained by independent variables. An η2 value between 0.01–0.05 is interpreted as a low effect size, between 0.06–0.13 as a medium effect size, and 0.14 and over as a strong effect size (Pallant, 2003). In both scales, the lowest score that can be obtained is 22, while the highest score is 110. For determining the arithmetic mean values, Table 4 was taken into consideration.

**Table 4**

*Values used for interpreting the arithmetic means of the scales*

| Score Range | Mean Score (Score Range X Number of Items) | Rating | Interpretation of Awareness |
|---|---|---|---|
| 1.00-1.78 | 22-39 | Totally disagree | Very low |
| 1.79-2.59 | 40-57 | Disagree | Low |
| 2.60-3.40 | 58-75 | Unsure | Average |
| 3.41-4.24 | 76-93 | Agree | High |
| 4.25-5.00 | 94-110 | Totally agree | Very high |

For the analysis of the qualitative data, the content analysis method was used. Content analysis is defined as a systematic, repeatable technique in which certain words of a text are summarised with smaller content categories with codings based on certain rules (Büyüköztürk, Çokluk & Köklü, 2010). Content analysis requires in-depth analysis by digitisation of the collected data. In content analysis, it is essential to gather similar data within the framework of certain concepts and themes and to organize them in a way that the reader can understand (Guba & Lincoln, 1994). In content analysis, the data obtained through interviews, observations or documents are analyzed in four stages: (1) coding the data, (2) finding codes, categories and themes, (3) organizing codes, categories and themes, (4) defining and interpreting the findings. (Eysenbach & Köhler, 2002; Miles & Huberman, 1994) The mind maps were implemented prior to the project and after the project. Students were informed before the mapping process. A meeting was held where they could find the answers to what a mind map is and how to design it. Some examples are shown, and detailed information about the procedure from scientific studies is given. All teachers working in the project also attended this meeting. The symbols drawn by the 50 students on their mind maps in the pretest and posttest were coded separately by three different domain experts (1 math and 2 science expert teachers in the project). The consistency between the symbols coded by the experts was examined. In the pretest, 32 different codes were found by the experts. Of these, 2 codes found by the first expert, 3 codes found by the second expert, and 3 codes found by the third expert were identified differently. The total number of common codes of the researchers was 24, while the total number of individual codes was 8. In this context, inter-rater reliability was calculated with the formula [(Number of Agreements / Number of Agreements + Number of Disagreements)*100] (Miles & Huberman. 1994). The inter-coder reliability for the pretest was found to be [(24/24+8)*100] = 75%. Next, the 8 differing codes were discussed and evaluated. It was then decided to also include these codes in the analysis. The codes were grouped according to themes and the data were presented in the form of frequencies and percentages. The same process was carried out for the posttest, and a total of 41 codes were found. Of these, 2 codes found by the first expert, 2 codes found by the second expert, and 3 codes found by the third expert were identified differently. The total number of common codes of the researchers was 34, while the total number of individual codes was 7. The inter-coder reliability for the posttest was found to be [(34/34+7)*100] = 82.9%.

For scientific research to be accepted, it must be valid and reliable at a certain level. In qualitative research, validity-reliability is considered differently from quantitative studies. There are a number of strategies that the qualitative researcher can use to increase the "credibility" of his findings. Guba and Lincoln (1994) pointed out that in qualitative research, there should be credibility rather than validity and reliability. Guba and Lincoln (1994) gathered the criteria for credibility under four main headings: credibility, reliability, approvability and transferability.

Credibility: There are many methods to increase credibility. These are prolonged involvement, member checking and peer debriefing (Holloway & Wheeler, 1996). The teachers working in the project responsible for collecting qualitative data within the scope of the research interacted with the students in the project for 3 months. Asking the participants whether the study findings reflect their own thoughts correctly is called participant confirmation (member checking). In line with this strategy, the participants were given information about mind maps, shown how they should be drawn, and given feedback related to their drawings . One of the precautions that can be taken in terms of credibility is the expert review (Creswell, 2012). In this context, feedback was received from an assessment and evaluation specialist, whose opinion was asked for about the mind maps collected. In terms of reliability, researcher triangulation was carried out. The opportunity was given for independent evaluations about the mind maps by means of different views by the inclusion of more than one researcher in the collection, analysis and interpretation of the data.

Verification: At this stage, drafts, procedures and questions referenced in the analysis process are written and reflected in full and carefully. The aim here is to show the thought process and evidence that lead to conclusions as much as possible (Houser, 2015; Streubert & Carpenter, 2011). Citations and stories are very important. For this, the findings should include the participants' own statements instead of the researcher's prejudices or opinions (Lincoln & Guba, 1985). In this context, direct quotations from mind maps are included.

Transferability: This stage is one of the main purposes of quantitative research and transferability, which is used as the equivalent of "generalization" in qualitative research, is used to judge the value of research. It is also called fittingness. Accordingly, the results of a study should be able to be transferred to situations in similar participants and environments (Houser, 2015; Streubert & Carpenter, 2011). In quantitative studies, generalization (external validity) is achieved by statistical results and showing that the data are collected from a sample representing the population (randomized, stratified, etc.) (Guba & Lincoln, 1982). In this context, in order to prove the transferability in qualitative research, the sample selection, the characteristics of the participants and the environment should be clearly stated (Sharts-Hopko, 2002). The participants of the study, how the process is run and how remote digital activities take place are given in detail in the method section.

### *Research Ethical Permissions*

*In this study, all rules stated to be followed within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions stated under the title "Actions Against Scientific Research and Publication Ethics", which is the second part of the directive, were taken.*

*Ethical review board name: Karamanoğlu Mehmetbey University Ethical Review Board*

*Date of ethics review decision: 13.04.2020*

***Ethics assessment document issue number:*** 95728670-044-E.10146

A Parental or Guardian Permission Form for Research Participation was obtained from the parents of the underage students who wanted to participate in the project study. These forms were submitted to the school administration. In the context of the content of the project, parents from time to time participated in the project activities with their children and they were provided with a diary with one of the Web 2.0 tools, "Padlet".

## RESULTS

The obtained findings are presented in line with the research questions.

1. The findings made based on the problem determined as "Do digital activities carried out remotely have an effect on gifted students' technology awareness?" are presented below.

**Table 5**

*Results of dependent groups t-test for technology awareness pretest and posttest mean scores and significance of difference between mean scores*

| | N | X | ss | Mean Score | Interpretation of Awareness | t-Test | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | t | sd | p |
| Pretest | 48 | 78.56 | 11.95 | 3.57 | High | | | |
| Posttest | 50 | 81.08 | 11.80 | 3.68 | High | -.97 | 47 | .33 |

**p<.05*

The participants' technology awareness before and after participating in the digital activities was high. Based on scores, an increase in mean scores for technology awareness occurred in favour of the posttest following the digital activities (78.56 < 81.08). This increase was not significant according to the results of the dependent t-test (t=-.97, p>.05). This situation was the same with regard to the subscales.

1.1. With respect to the digital activities carried out remotely within the scope of the research, the findings made in the context of the posttest with regard to the question

"Does gifted students' technology awareness differ significantly according to the variables of gender, school type and parental education levels?" are given below in Table 6, Table 7 and Table 8, respectively.

**Table 6**

*T-test results for subscales and overall scale posttest according to gender variable*

| Subscales and overall scale | Gender | N | X | ss | t | p |
|---|---|---|---|---|---|---|
| 1. Negative awareness | Female | 34 | 19.94 | 5.69 | -1.1 | .27 |
| | Male | 16 | 21.75 | 4.52 | | |
| 2. Positive awareness | Female | 34 | 62.23 | 14.32 | 1.3 | .19 |
| | Male | 16 | 57.00 | 10.09 | | |
| 3. Overall scale | Female | 34 | 82.17 | 11.89 | .97 | .33 |
| | Male | 16 | 78.75 | 10.90 | | |

*$p<.05$

Examination of Table 5 reveals that according to the gender variable, no significant difference was found between posttest mean scores of the overall technology awareness scale or its subscales ($t_{negative}$= -1.1, p> .05 $t_{positive}$= 1.3, p>.05, $t_{overall}$= .97, p>.05). The striking point here is that female participants' technology awareness was both higher and more positive than that of males.

**Table 7**

*T-test results for subscales and overall scale posttest according to school type variable*

| Subscales and overall scale | School type | N | X | ss | t | p |
|---|---|---|---|---|---|---|
| 1. Negative awareness | State | 41 | 20.80 | 5.33 | -.79 | .42 |
| | Private | 9 | 19.22 | 5.65 | | |
| 2. Positive awareness | State | 41 | 60.80 | 12.46 | .27 | .78 |
| | Private | 9 | 59.44 | 17.12 | | |
| 3. Overall scale | State | 41 | 81.60 | 11.44 | .68 | .49 |
| | Private | 9 | 78.66 | 12.64 | | |

*$p<.05$

As can be seen in Table 6, a significant difference was not found between posttest mean scores of the overall technology awareness scale or its subscales according to the school type variable ($t_{negative}$= -.79, p> .05 $t_{positive}$= .27, p>.05, $t_{overall}$= .68, p>.05).

**Table 8**

*One-way variance analysis (ANOVA) for subscales and overall scale posttest according to parents' (mother's) education level*

| Subscales and overall scale | Literacy | N | X | ss | sd | F | p | Scheffe Test | Levene's F Test | η2 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Negative awareness | Primary school (1) | 4 | 20.25 | 2.50 | 3 | 8.40 | .00* | 1-3<br>1-4 | P>05, $F_{negative}$=.89, sd=46<br>p=.44 | .34 |
| | High school (2) | 11 | 25.36 | 4 | | | | | | |
| | Bachelor's (3) | 25 | 20.40 | 4.77 | | | | | | |
| | Postgraduate (4) | 10 | 15.60 | 4.55 | | | | | | |
| 2. Positive awareness | Primary school (1) | 4 | 62.25 | 8.09 | 46 | .76 | .51 | | P>.05, $F_{positive}$=.34, sd=46,<br>p=.79 | |
| | High school (2) | 11 | 59.81 | 13.65 | | | | | | |
| | Bachelor's (3) | 25 | 58.48 | 13.90 | | | | | | |
| | Postgraduate (4) | 10 | 65.90 | 12.85 | | | | | | |
| Overall scale | Primary school (1) | 4 | 82.50 | 10.37 | 49 | .77 | .51 | | p>.05, $F_{overall}$=1.14, sd=46<br>p=.34 | |
| | High school (2) | 11 | 85.18 | 14.68 | | | | | | |
| | Bachelor's (3) | 25 | 78.80 | 10.71 | | | | | | |
| | Postgraduate (4) | 10 | 81.50 | 10.69008 | | | | | | |

*$p<.05$

No significant difference was determined in relation to the technology awareness scale posttest according to the education levels of gifted students' fathers. However, as seen in Table 8, a difference was found in the negative technology awareness subscale of the scale according to the gifted students' mothers' education levels. To determine whether this difference was significant, the ANOVA test was performed. To reveal the direction of the difference found as a result of the test, the post-hoc Scheffe test was performed. The Scheffe

method was developed to compare all possible linear combinations between groups, and in general terms, this method is discussed as a conservative post-hoc type which can keep the $\alpha$ margin of error under control in cases of large numbers of flexible groups to be compared, and which does not consider the assumption that observation numbers in the groups are equal (Scheffe, 1959). As a result of the test, in the negative technology awareness dimension of the scale, a statistically significant difference was found between mothers who were primary school graduates and mothers with bachelor's degrees, and also between mothers who were primary school graduates and mothers with postgraduate degrees, in the direction of those who were primary school graduates [$F_{negative}$ =.89, sd=46, p=.00]. No significant difference was found with respect to the overall scale or the positive technology awareness subscale [($F_{positive}$ =.34, sd=46, p=.51) ve ($F_{overall}$ =1.14, sd=46, p=.51)]. As education level decreased, technology awareness moved in a negative direction. To calculate the value of the effect of parents' education levels on gifted students' technology awareness, the eta-squared value was calculated. Accordingly, the eta-squared value, which was calculated as .34, shows that parents' education level had a large effect on negative technology awareness ($\eta 2>0.14$).

2. The findings made based on the problem determined as "Do digital activities carried out remotely have an effect on gifted students' computational thinking?" are shown below.

**Table 9**

*Results of dependent groups t-test for computational thinking (CT) pretest and posttest mean scores and significance of difference between mean scores*

| | N | X | ss | Mean Score | Interpretation of CT | t-Test | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | t | sd | p |
| Pretest | 48 | 78.39 | 8.72 | 3.56 | High | -.32 | 47 | .74 |
| Posttest | 50 | 79.00 | 9.24 | 3.59 | High | | | |

*$p<.05$

The participants' computational thinking before and after participating in the digital activities was high. Based on scores, an increase in mean scores for computational thinking occurred in favour of the posttest following the digital activities (78.39 < 79). This increase was not significant according to the results of the dependent t-test (t=-.32, p>.05). This situation was the same with respect to the subscales.

2.1. With regard to the digital activities carried out remotely within the scope of the research, the findings made in the context of the posttest with regard to the question "Does gifted students' computational thinking differ significantly according to the variables of gender, project experience and parental education levels?" are given below in Table 10, Table 11 and Table 12, respectively.

**Table 10**

*T-test results for subscales and overall scale posttest according to gender variable*

| Subscales and overall scale | Gender | N | X | ss | t | p |
|---|---|---|---|---|---|---|
| Creativity | Female | 34 | 17.58 | 2.95 | 1.29 | .20 |
| | Male | 16 | 16.50 | 2.30 | | |
| Algorithmic Thinking | Female | 34 | 16.14 | 3.38 | -.96 | .33 |
| | Male | 16 | 17.06 | 2.46 | | |
| Collaboration | Female | 34 | 18.11 | 2.64 | .23 | .81 |
| | Male | 16 | 17.93 | 2.40 | | |
| Critical Thinking | Female | 34 | 15.97 | 3.77 | .31 | .97 |
| | Male | 16 | 15.93 | 2.79 | | |
| Problem Solving | Female | 34 | 10.26 | 3.69 | -2.4 | 00* |
| | Male | 16 | 14.00 | 7.16 | | |
| Overall Scale | Female | 34 | 78.08 | 8.63 | -1.22 | .22 |
| | Male | 16 | 81.43 | 9.91 | | |

*$p<.05$

When Table 10 is examined, it is seen that according to the gender variable, there was a significant difference in mean scores of the CT overall scale and its subscales only in the "problem solving" subscale(t=--2.4, p<.05). This significance was in favour of males ($\underline{X}female = 10.26$, $\underline{\underline{X}}male = 14.00$).

**Table 11**

*T-test results for subscales and overall scale posttest according to project experience variable*

| Subscales and overall scale | Project Experience | N | X | ss | t | p |
|---|---|---|---|---|---|---|
| Creativity | Yes | 20 | 18.15 | 2.13 | 1.29 | .04* |
| | No | 30 | 16.63 | 3.03 | | |
| Algorithmic Thinking | Yes | 20 | 17.45 | 2.70 | -.96 | .04* |
| | No | 30 | 15.76 | 3.24 | | |
| Collaboration | Yes | 20 | 18.55 | 2.43 | .23 | .27 |
| | No | 30 | 17.73 | 2.61 | | |
| Critical Thinking | Yes | 20 | 16.90 | 2.61 | .31 | .11 |
| | No | 30 | 15.33 | 3.84 | | |
| Problem Solving | Yes | 20 | 10.15 | 4.86 | -2.4 | .15 |
| | No | 30 | 12.33 | 5.46 | | |
| Overall Scale | Yes | 20 | 81.20 | 6.31 | -1.22 | .19 |
| | No | 30 | 77.80 | 10.43 | | |

*$p<.05$

As can be seen in Table 11, with regard to the mean scores of the overall scale and its subscales according to the project experience variable, a significant difference was found in the "creativity" and "algorithmic thinking" subscales. This significance was in favour of those with project experience in both the creativity ($t_{creativity}$= 1.29, p<.05, $\underline{X}yes = 18.15$,

$\underline{\underline{X}}no = 16.63$) and algorithmic thinking dimensions ($t_{algorithmic\ thinking}$ = -.96, p<.05, $\underline{X}yes = 17.45$, $\underline{\underline{X}}no = 15.76$).

**Table 12**

*One-way variance analysis (ANOVA) for subscales and overall scale posttest according to parents' (mother's) education level*

| Subscales and overall scale | Literacy | N | X | ss | sd | F | p | Scheffe Test | Levene's F Test | η2 |
|---|---|---|---|---|---|---|---|---|---|---|
| Creativity | Primary school (1) | 4 | 16.25 | 2.87 | 46 | .66 | .58 | - | P>.05, $F_{creativity}$=.53, sd=46, p=.66 | |
| | High school (2) | 11 | 18.18 | 2.12 | | | | | | |
| | Bachelor's (3) | 25 | 17.16 | 2.62 | | | | | | |
| | Postgraduate (4) | 10 | 16.80 | 3.79 | | | | | | |
| Algorithmic Thinking | Primary school (1) | 4 | 16.50 | 3.00 | 46 | 1.97 | .13 | - | P>.05, $F_{algorithmic}$=.97, sd=46, p=.41 | |
| | High school (2) | 11 | 18.27 | 2.49 | | | | | | |
| | Bachelor's (3) | 25 | 15.60 | 3.30 | | | | | | |
| | Postgraduate (4) | 10 | 16.50 | 2.83 | | | | | | |
| Collaboration | Primary school (1) | 4 | 18.50 | 1.25 | 47 | 31 | .81 | - | p>.05, $F_{collaboration}$= 1.97, sd=46 p=.13 | |
| | High school (2) | 11 | 17.63 | 3.32 | | | | | | |
| | Bachelor's (3) | 25 | 17.96 | 2.42 | | | | | | |
| | Postgraduate (4) | 10 | 18.70 | 2.49 | | | | | | |
| Critical Thinking | Primary school (1) | 4 | 14.50 | 3.69 | 47 | 1.51 | .22 | - | p>.05, $F_{critical}$=1.44, sd=46 p=.13 | |
| | High school (2) | 11 | 17.81 | 2.48 | | | | | | |
| | Bachelor's (3) | 25 | 15.48 | 4.03 | | | | | | |
| | Postgraduate (4) | 10 | 15.70 | 2.16 | | | | | | |
| Problem Solving | Primary school (1) | 4 | 11.50 | 2.38 | 47 | 1.75 | .16 | - | p>.05, $F_{problem}$7.25, sd=46 p=.05 | |
| | High school (2) | 11 | 14.27 | 8.23 | | | | | | |
| | Bachelor's (3) | 25 | 11.12 | 3.95 | | | | | | |
| | Postgraduate (4) | 10 | 9.20 | 4.23 | | | | | | |
| Overall Scale | Primary school (1) | 4 | 77.20 | 6.63 | 47 | 3.18 | .03* | 2-1 | p>.05, $F_{overall}$=.55, sd=46 p=.64 | .41 |
| | High school (2) | 11 | 86.18 | 10.51 | | | | | | |
| | Bachelor's (3) | 25 | 78.32 | 8.57 | | | | | | |
| | Postgraduate (4) | 10 | 78.90 | 6.31 | | | | | | |

*p<.05

No significant difference was determined in relation to the computational thinking scale posttest according to the education levels of gifted students' fathers. However, as seen in Table 12, a difference was found in the overall computational thinking scale posttest according to the educational levels of the gifted students' mothers. To determine whether this difference was significant, the ANOVA test was performed. To reveal the direction of the difference found as a result of the test, the post-hoc Scheffe test was performed. As a result of the Scheffe test, a statistically significant difference was found between mothers who graduated from primary school and mothers who graduated from high school in favour of those who graduated from high school [$F_{overall}$=.64, sd=46, p=.03]. As mothers' education level increased, the computational thinking of gifted students increased. To calculate the value of the effect of parents' education levels on gifted students' CT, the eta-squared value was calculated. Accordingly, the eta-squared value, which was calculated as .41, shows that parents' education level had a large effect on students' computational thinking ($\eta 2>0.14$).

3. Findings related to the question "Do digital activities carried out remotely have an effect on gifted students' perceptions of the concept of technology?" are as follows:

The mind-mapping activity carried out in the qualitative dimension of the study was conducted before and after the implementation of the project. In the mind-mapping, the intention was to measure the effect of the project in terms of perceptions of the "technology" concept. The 50 participants were asked to draw mind maps on A3 papers, and drawings considered to be relevant to the main concept in the pretest and posttest were classified by 3 different domain experts (1 in mathematics and 2 in science) by coding them under themes (Figures 2 and 3).

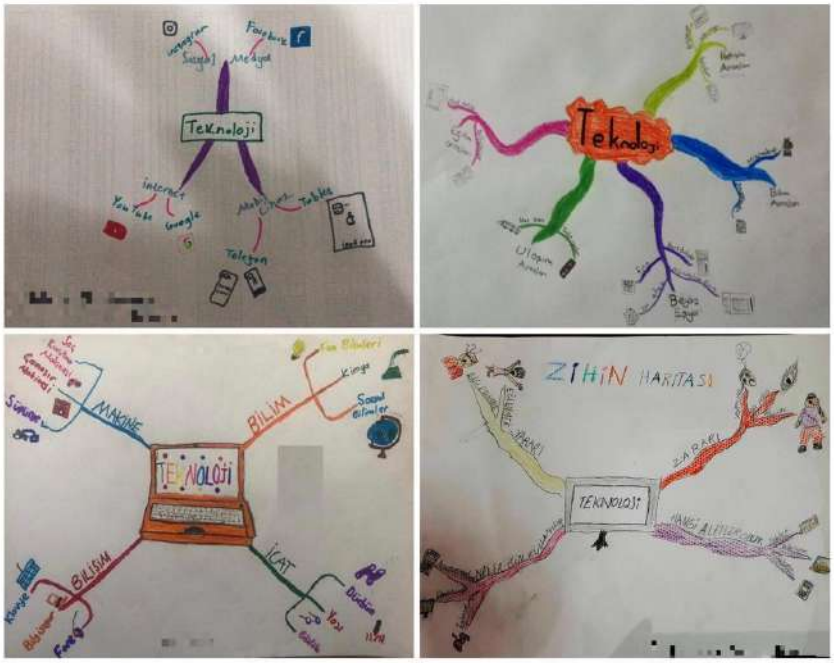


**Figure 2**

*Examples of mind maps drawn during pretest*

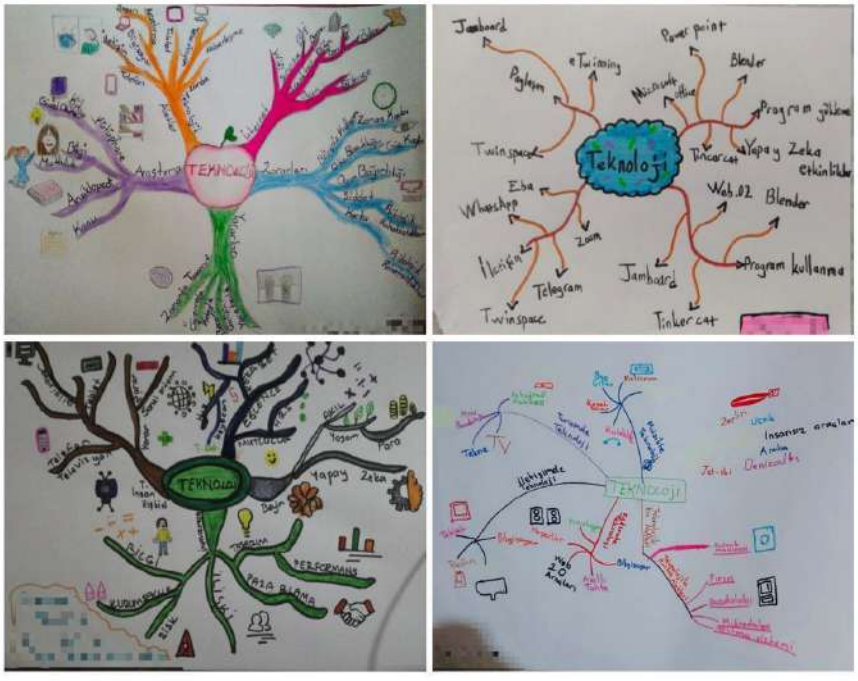


**Figure 3**

*Examples of mind maps drawn during posttest*

As can be understood from the examples of mind maps shown in Figure 2 and Figure 3, the use of branching and symbols for perception of the "technology" concept was much greater in the drawings in the posttest than in the pretest.

The codes and themes for the pretest and posttest are presented in Table 13.

**Table 13.**

*The codes and themes for the pretest and posttest*

| Themes | Codes | Pretest | | Posttest | | Themes | Codes | Pretest | | Posttest | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | f | % | f | % | | | f | % | f | % |
| Web 2.0 Tools | Canva | - | - | 10 | 9.8 | Health | MRI | 9 | 23.68 | 10 | 23.81 |
| | Zoom | 4 | 11.43 | 17 | 16.67 | | X-ray | 9 | 23.68 | 9 | 21.43 |
| | Google | 9 | 25.71 | 13 | 12.75 | | Stethoscope | 7 | 18.42 | 7 | 16.67 |
| | Tinkercad | - | - | 9 | 8.82 | | Vaccination | 5 | 13.16 | 4 | 9.52 |
| | YouTube | 8 | 22.85 | 5 | 4.90 | | Medicine | 4 | 10.53 | 4 | 9.52 |
| | Jamboard | - | - | 5 | 4.90 | | Dialysis | 2 | 5.26 | 2 | 4.76 |
| | Artificial intelligence | 3 | 8.57 | 5 | 4.90 | | Ultrasound | 2 | 5.26 | 2 | 4.76 |
| | Microsoft Office | - | - | 5 | 4.90 | | ECG | - | - | 1 | 2.38 |
| | WhatsApp | 2 | 5.71 | 4 | 3.92 | | Thermometer | - | - | 1 | 2.38 |
| | Telegram | 1 | 2.86 | 4 | 3.92 | | ePulse | - | - | 1 | 2.38 |
| | eTrade | 2 | 5.71 | 4 | 3.92 | | Stretcher | - | - | 1 | 2.38 |
| | eTwinning | 2 | 5.71 | 4 | 3.92 | | | | | | |
| | Bitmoji | - | - | 2 | 1.96 | Communication | Telephone | 39 | 26.35 | 34 | 26.36 |
| | StoryJumper | - | - | 2 | 1.96 | | Computer | 38 | 25.68 | 38 | 29.46 |
| | Instagram | - | - | 2 | 1.96 | | Tablet | 33 | 22.30 | 28 | 21.71 |
| | Facebook | 4 | 11.42 | 2 | 1.96 | | Television | 22 | 14.86 | 17 | 13.18 |
| | Skype | - | - | 1 | 0.98 | | Radio | 4 | 2.70 | 2 | 1.55 |
| | Google Assistant | - | - | 1 | 0.98 | | Satellite | 1 | 0.68 | 3 | 2.33 |
| | Kahoot! | - | - | 1 | 0.98 | | Headphones | 3 | 2.03 | 1 | 0.78 |
| | eGovernment | - | - | 1 | 0.98 | | Virtual glasses | 1 | 0.68 | 1 | 0.78 |
| | mBlock | - | - | 1 | 0.98 | | iOS | 1 | 0.68 | 1 | 0.78 |
| | Scratch | - | - | 1 | 0.98 | | Mouse | 3 | 2.03 | 1 | 0.78 |
| | Navigation | - | - | 1 | 0.98 | | SIM card | 2 | 1.35 | 2 | 1.55 |
| | PosterMyWall | - | - | 1 | 0.98 | | Android | 1 | 0.68 | 1 | 0.78 |
| | Yahoo | - | - | 1 | 0.98 | | | | | | |
| | | | | | | | | | | | |
| | Smartboard | 11 | 34.38 | 12 | 25.53 | | Bus | 5 | 12.5 | 6 | 9.68 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Education | Microscope | 2 | 6.25 | 3 | 6.38 | Transport | Car | 12 | 30 | 15 | 24.19 |
| | Eba | 6 | 18.75 | 7 | 14.90 | | Express train | 4 | 10 | 6 | 9.68 |
| | Telescope | 1 | 3.13 | 2 | 4.26 | | Motorcycle | 1 | 2.5 | 2 | 3.23 |
| | Smartwatch | 3 | 9.38 | 7 | 14.90 | | Drone | - | - | 2 | 3.23 |
| | Printer | 3 | 9.38 | 6 | 12.77 | | Combine harvester | - | - | 1 | 1.61 |
| | Projector | 2 | 6.25 | 5 | 10.64 | | Metro | 3 | 7.5 | 2 | 3.23 |
| | Camera | 1 | 3.13 | 1 | 2.13 | | Electric vehicles | 1 | 2.5 | 2 | 3.23 |
| | Photocopier | 1 | 3.13 | 2 | 4.26 | | Hoverboard | - | - | 1 | 1.61 |
| | eSchool | 2 | 6.25 | 2 | 4.26 | | Aeroplane | 6 | 15 | 9 | 14.51 |
| | | | | | | | | | | | |
| Home Tools | Dishwasher | 6 | 15.38 | 13 | 20.63 | | Helicopter | 4 | 10 | 3 | 4.84 |
| | Washing machine | 11 | 28.21 | 10 | 15.87 | | Traffic lights | 2 | 5 | 2 | 3.23 |
| | Refrigerator | 4 | 10.26 | 8 | 12.7 | | Zeppelin | - | - | 1 | 1.61 |
| | Vacuum cleaner | 5 | 12.82 | 5 | 7.94 | | Submarine | - | - | 1 | 1.61 |
| | Microwave oven | 2 | 5.13 | 7 | 11.11 | | Space shuttle | - | - | 3 | 4.84 |
| | Kettle | 1 | 2.56 | 3 | 4.76 | | Tractor | - | - | 1 | 1.61 |
| | Food mixer | 1 | 2.56 | 3 | 4.76 | | | | | | |
| | Hairdryer | 2 | 5.13 | 2 | 3.17 | | Visual impairment | 13 | 35.14 | 13 | 25.49 |
| | Iron | 1 | 2.56 | 1 | 1.59 | Harms of Technology | Curvature of spine | 4 | 10.81 | 5 | 9.80 |
| | Air conditioner | 1 | 2.56 | 2 | 3.17 | | Obesity | 4 | 10.81 | 6 | 11.76 |
| | Light bulb | 5 | 12.82 | 5 | 7.94 | | Addiction | 9 | 24.32 | 6 | 11.76 |
| | Power outlet | - | - | 1 | 1.59 | | Radiation | 1 | 2.7 | 2 | 3.92 |
| | Electric toaster | - | - | 3 | 4.76 | | Wasting time | 2 | 5.41 | 2 | 3.92 |
| | | | | | | | Violence | 1 | 2.70 | 3 | 5,88 |
| Benefits of Technology | Information research | 1 | 1.47 | 2 | 2.94 | | Fear | 2 | 5.41 | 3 | 5.88 |
| | Creativity | - | - | - | 2.94 | | Headache | - | - | 2 | 33.92 |
| | Time saving | - | - | 1 | 1.47 | | Anger | - | - | 1 | 1.96 |
| | Comfortable life | - | - | 2 | 2.94 | | Laziness | - | - | 2 | 3.92 |
| | Entertainment | - | - | 1 | 1.47 | | Being scammed | - | - | 1 | 1.96 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Shopping | - | - | 1 | 1.47 | | Mental health problems | - | - | 1 | 1.96 |
| | Communication | - | - | 14 | 20.59 | | | | | | |
| | Education | - | - | 9 | 13.24 | | | | | | |
| | Innovation | - | - | 1 | 1.47 | | | | | | |
| | Design | - | - | 1 | 1.47 | | | | | | |
| | Robot | - | - | 8 | 11.76 | | | | | | |

In order to determine the increase in the perceptions of the participants regarding the concept of technology through mind mapping, a pretest-posttest implementation was carried out. In both the pretest and the posttest, 8 themes were created by 3 experts in agreement. While a total of 270 codes were determined in the pretest, a total of 310 codes were detected in the posttest. Looking at these codes, it is seen that the theme with the highest increase in the posttest according to the pretest is related to the Web 2.0 tools. While it was 32 in the pretest, it is seen that the total number of concepts increased to 102 in the posttest. After Web 2.0 tools, the second-highest increase in perception in mind maps drawn for the concept of technology was in the theme of the benefits of technology. While there was 1 acceptable code in the pretest, 40 codes were detected in the posttest. The third-highest increase was in home technology. 39 codes were determined in the pretest, and this number increased to 69 in the posttest. This situation reveals that there was a general increase in students' perception of the concept of technology after the project, and this coincides with the findings in the quantitative part of the research.

## CONCLUSION AND DISCUSSION

The great majority of research studies aimed at the use of technology in the education process reveal the positive effects of technology on learning and achievement. eTwinning projects, in which technology is put to maximum use, are an important project approach for increasing students' academic success by developing their interest, attitudes and skills related to technology. By contributing to the use of digital technology for educational purposes, eTwinning is a platform which enables teachers and students in different schools to carry out projects with collaborative activities. In this context, in this study, the effect of digital activities conducted remotely within the scope of an eTwinning project, which is the focus of the research, on gifted students' technology awareness and computational thinking was investigated. As the first of the findings obtained in the light of the research questions, it was determined that this project, which was carried out digitally and remotely, made a positive contribution to students' technology awareness, but that the extent of this was not significant ($t=-.97$, $p>.05$). Considering the results of the pretest and posttest implementations, the students' technology awareness was high. This finding is in parallel

with the mind mapping technique carried out in the qualitative section of the study. When the related literature is examined, in the joint eTwinning projects conducted in the study made by Pereira Coutinho and Rocha (2007), it was stated that students made progress in their computer skills and use of technology. This finding corresponds with the results obtained in this research. Çalışkan (2017) reported that gifted students were faster and more productive than their peers in the use of information technologies and approaches towards information technologies, that they were more predisposed to technology, that they used information technologies more expediently, and that they were open-minded and forward-looking. It is possible to find a number of studies that support this view (Bayraktar, 2001; Diffly, 2002; Usta; 2016). At this point, it is seen that the use and awareness of information technologies is important for bringing out and developing gifted-talented students' potential (Chen, Yun Dai, ve Zhou, 2013; Pyryt, 2009; Shavinina, 2009). The need which is frequently stressed in the literature for individualisable and adaptable education technologies that are independent of time and space, and the efforts made for this purpose, especially online learning applications, can ensure that these technologies are also made utilisable and applicable in gifted education. Studies made on this subject stress the benefits of using podcasts and blogs (Siegle, 2007), flipped classrooms (Siegle, 2013), QR codes (Siegle, 2015a), online games (Siegle, 2015b), and STEM (Dieker, Grillo & Ramlakhan, 2012; Ülger & Çepni, 2017), the preference for up-to-date technologies (Çubukçu & Tosuntaş, 2018), and practices such as distance learning (Cırık, 2016) in the education of gifted children.

In the study, it is seen that no significant relationship was found between the digital activities carried out with the scope of the eTwinning project and gifted students' mean scores for technology awareness with regard to the gender variable ($t_{negative}$= -1.1, p> .05 $t_{positive}$= 1.3, p>.05, $t_{overall}$= .97, p>.05). The striking point here is that female students' technology awareness was higher than that of male students. It was reported by Köroğlu (2015) that gifted children's motivation for the use of social media, which is one of the information technologies, did not differ significantly in terms of gender. However, Master, Cheryan and Meltzoff (2017) reported that following a short programming activity, gifted female students became very motivated and felt competent. It can be said that the fact that gifted students' technology awareness was found to be high was due to the fact that these students wished to communicate with many other gifted students and used technology to carry out their identity development (Cross, 2004), and also considered technological tools to be vehicles for developing themselves and sharing their experiences (Özcan & Biçen, 2016)

Another finding made in the study was that gifted students' technology awareness did not differ according to the type of school they attended($t_{negative}$= -.79, p> .05 $t_{positive}$= .27, p>.05, $t_{overall}$= .68, p>.05). In contrast to this, it was revealed that their technology awareness moved in a negative direction as their mothers' education level decreased [$F_{negative}$ =.89, sd=46, p=.00]. It is reported in the literature that parents of gifted children have difficulty in

meeting their children's needs due to socio-cultural and socio-economic reasons, and that furthermore, they do not have the skills to cope with gifted children (Karakuş, 2011). According to Ersoy and Avcı (2000), gifted children ask questions very frequently and superficial answers given to these questions do not satisfy the students. These students' questions must be answered in depth and attention must be given to details. Adults must give these children the chance to present the products they have developed and motivation must be given for them to produce new products. In terms of enabling them to use their abilities, interests and capacities at the highest level, their parents should understand them very well (Dağlıoğlu & Alemdar, 2010). To achieve this, parents' education level must be high enough to overcome this problem. In the relationship between education level and parents' self-efficacy perception, it is reported that increasing the education level will have a positive effect on parents' self-efficacy perception (Söğüt & Çekiç, 2020). It should not be forgotten that parents with high self-efficacy will be able to give more support to their children regarding technology and other subjects.

Another finding made in the context of the second research question was that the digital activities carried out remotely made a positive contribution to gifted children's computational thinking (CT), but that the extent of this contribution was not significant($t=-.32$, $p>.05$). The students' CT was high in both the pretest and posttest. This result corresponds to those of some studies in the literature. Avcu and Er (2020) determined that as a result of a 74-hour programming instruction, gifted and talented students' digital thinking skills developed. Çakır and Bayraktar (2019) also achieved similar results. In their study, Kirmit, Dönmez and Çataltaş (2018) found that gifted secondary school students had high mean scores in the overall CT scale and its sub-dimensions, with the exception of the problem-solving sub-dimension. Galvin et al. (2007) reported that carrying out eTwinning projects in collaborative online learning environments and conducting education activities via distance learning enabled students to develop their digital skills. There are also studies which show that there is a significant relationship between students' CT and their computer programming skills (Avcu & Ayverdi, 2020; Çiftci, Çengel & Paf., 2018; Ünsal-Serim, 2019; Yıldız-Durak, Karaoğlan-Yılmaz & Yılmaz, 2019).

Gender is one of the variables that need to be discussed in the context of acquisition and development of computational thinking skills. Yıldız Durak and Saritepeci (2018) stated that gender may be important in the development of CT, which is used as a concept related to computer sciences. It is seen that in the digital activities carried out within the scope of the study, the students' mean scores in both the subdimensions of the CT scale and the overall scale were not significantly correlated with the gender variable, except that there was a significant relationship in the "problem solving" subscale($t=-2.4$, $p<.05$). This significance was in favour of male students. With regard to studies made with gifted and talented students, Kirmit, Dönmez and Çataltaş (2018) examined these students' computational thinking with respect to girls and boys, and found that there were significant differences in favour of boys in the creative thinking, algorithmic thinking and critical

thinking subfactors. On the contrary, Dönmez, Kirmit, Gürbüz and Birsen (2018) found that gifted and talented students' digital thinking skills did not differ according to gender. While some research results emphasised that computational thinking skills based on different variables based on gender differed significantly according to the research (Atmatzidou & Demetriadis, 2016; Roman- González et al., 2017), others concluded that there was no significant difference based on gender (Alsancak Sırakaya, 2019; Korucu, Gencturk & Gundogdu, 2017; Yağcı, 2018). In the literature, it was reported that gifted students' problem solving, algorithmic thinking and programming self-efficacy in digital activities (e.g., Scratch) was correlated with students' readiness for the designed activities (Yıldız-Durak, 2018). In this context, regarding the significance in favour of males in the problem solving subdimension of CT, it can be said that males were more prepared for these activities. Female students should be given support for CT.

Project studies are important enrichment strategies for differentiated education and meeting the needs of gifted and talented students (Calvert, 2010; Tortop, 2014). In this respect, the relationship between students' project experiences and their computational thinking was tested. According to the findings made, with regard to the mean scores of the overall scale and its subscales regarding the project experience variable, a significant difference was found in the "creativity" and "algorithmic thinking" subscales ($t_{creativity}= 1.29$, $p<.05$, $\underline{X}yes = 18.15$, $\underline{\underline{X}}no = 16.63$, talgorithmic thinking $= -.96, p < .05$ $\underline{X}yes = 17.45$, $\underline{\underline{X}}no = 15.76$).This significance was in favour of those with project experience in both the creativity and the algorithmic thinking dimensions. Project activities are important enrichment strategies for meeting the needs of gifted and talented students (Calvert, 2010; Tortop, 2014). In the literature, it was stressed that these students were highly motivated for project activities and that they derived pleasure from projects that enabled them to be independent (Delcourt, 1993; Johnsen, 2008; Johnsen & Goree, 2009). Project studies and artistic activities enable children to think critically, creatively and from various perspectives (Kaplan & Hertzog, 2016). Hill-Anderson (2008) argued that the potential of gifted children can be realised through projects. Diffily and Sassman (2002) stated that since products are produced after a process, projects increased children's ability to transfer knowledge and create new knowledge, and developed their problem-solving skills. The result obtained in the study and the findings reported in the literature correspond with each other. It can be said that the creativity, critical thinking skills and problem-solving ability that the students had acquired with their previous project experience contributed positively to their CT skills in this context.

The change in gifted students' CT was significant in the overall scale according to the mothers' education levels ($F_{overall}=.64$, sd=46, p=.03). This significance was in favour of mothers who were high school graduates. Therefore, one can say that as mothers' education level increased, CT in gifted students also increased. This significance that emerged with regard to mothers who were high school graduates is a result that was obtained only by measuring mothers' education levels in an academic sense. Parents might have also done

research or taken part in training other than academic education, and may have participated in activities with the aim of feeling more competent (Söğüt & Çekiç, 2020). Such a finding may have been made in this study for reasons such as these as well. It is seen that there are studies reporting a relationship between parents' education level and their children's levels of competence (Aksoy & Diken, 2009; Uysal & Akman, 2016). Parents' education level, the fact that they have developed themselves, is very important in terms of having high awareness in matters concerning their children and demonstrating competence to their children in all kinds of subjects. It is reported in the literature that parents of gifted children need more education than parents of children who show normal development (Davaslıgil, 2000). In this regard, educated parents are one of the most important factors in meeting the needs of gifted children concerning technology, since it is the parents who know what their children need and who can meet this need. Making up the deficiencies in areas like the internet, computer hardware and software, and use of social media platforms, and the correct guidance of children are only possible with the technology awareness of educated parents. The findings obtained by mind mapping, which is the qualitative part of the study, show an increase in the perceptions of the participants towards the concept of technology in favour of the posttest, supporting the quantitative results. Especially the formation of more concept perceptions in the Web 2.0 tools, benefits of technology and home tools themes is an indication of the contribution of remote digital activities carried out with the eTwinning project. This is because the technological tools and equipment used more especially in the activities have been covered by these themes.

## LIMITATIONS

In this study, the effects of digital activities used in the scope of an eTwinning project on 50 gifted students who took part in the project were investigated with regard to different variables. The low number of participants in the study group led to study being conducted with a single group design. Besides this, experimental studies can be conducted for technological awareness and computational thinking. These skills can also be tested by carrying out different projects or different digital activities related to the case of gifted students. Another characteristic that limited this research was the effectiveness of activities that had to be carried out entirely remotely due to the COVID-19 pandemic. In the distance education, in which the teacher's control was weak, the skills intended to be fostered in students remained at a lower level. It is recommended that the activities be carried out again digitally, but face-to-face under the teacher's control in a classroom environment. The persons responsible for education must meticulously implement processes such as motivation, observation, monitoring and assessment of gifted students, and the achievement potential of these students must be increased by direct intervention for students in the case of difficulties that may be experienced. Finally, the mind maps that were used as the qualitative data tool in the research were required to be drawn by the students

on paper, not by using digital programs. In other studies, the change in students' perceptions of the technology concept can be measured by using mind-mapping programs.

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