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Adaptation of the Turkish Language Version of the Inventory of New College Student Adjustment: The Roles of Resilience and Social Self-Efficacy in College Adjustment

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Abstract

Transition from high school to college can be a struggle for many students. To support the first-year college students during the transition, various factors can be taken into consideration. In this study, we focused on the role of resilience, social self-efficacy, college orientation, and student organization involvement in college adjustment among the first-year Turkish college students. Using snowball sampling, we distributed our online survey package across Turkey and recruited a total of 346 participants. To measure the concept of college adjustment, we developed and validated Turkish language version of the Inventory of New College Student Adjustment (INCA-T) due to the limitations of existing instruments. The confirmatory factor analysis results indicated that the 10-item INCA-T revealed a good fit with Turkish sample. Then, using INCA-T, we evaluated the relationship among college adjustment, resilience, social self-efficacy, attendance of a student orientation program, and involvement in student organizations. Multiple regression analysis results showed that resilience and social self-efficacy were significant predictors of college adjustment among the first-year students. Also, individuals participating in student orientation and student organizations reported significantly greater adjustment to college. Considering the findings of the present study, we discussed implications for faculty advisors and college counselors, then provided recommendations for future researchers.

Key words: College adjustment, Resilience, Social self-efficacy, Orientation, First-year student

Introduction

Higher education enrolments have increased globally (The World Bank, 2019) and the numbers are expected to grow continuously by 2030 (OECD, 2019). In 2017, 35% of individuals completing secondary education enrolled in higher education in OECD countries, while in 2018, this percentage increased from 35% to 44%. In the United States (USA) alone, 16.8 million students enrolled in an undergraduate program in 2017, and undergraduate enrolment is expected to increase by 3% (from 16.8 to 17.2 million students) between 2017-2028 (NCES, 2019). With numbers increasing each year, student retention and graduation rates become highly important for institutions (Haktanir et al., 2018). For instance, 40% of undergraduate students drop out of school at any time of their studies, and approximately 30% dropout within the first year in the USA (Bustamante, 2019). In order to prevent college dropouts and retain students, the concept of college adjustment has become a significant factor, not only in research, but also in practice through advising and counseling.

College adjustment is defined as a combination of an individual's academic, social, personal emotional, and institutional adaptation experiences to an academic institution (Baker & Siryk, 1984; 1986). In other words, to develop a positive college adjustment experience, individuals need to meet academic requirements while enhancing social interactions in campus life and having a sense of attachment to the institution (Baker & Siryk, 1984). In a recent study, the Inventory of New College Student Adjustment (INCA) was developed to measure addressing salient issues related to adjustment experiences of contemporary college students (Watson and Lenz, 2018). Researchers reported that being a first-year student can be stressful and challenging (Berardi et al., 2019). Settling a new life away from home, dealing with a new set of academic expectations, having emotional and relational problems may overwhelm first-year students (Bowman et al., 2019; Credé & Niehorster, 2012;

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Karaman et al., 2019) and these challenges may put students at risk of lower academic functioning, lower wellbeing, and even dropouts (Bruffaerts et al., 2018; Credé & Niehorster. 2012).

Various factors can be taken into consideration in promoting transition to college. Researchers examined the role of generational status (i.e., first-generation vs. continuing-generation of college students) (Asperlmeier et al., 2012; Yang, 2020), social support (Berardi et al., 2019; Quan et al., 2014), parental attachment (Bishop et al., 2019), familial factors (Karaman & Sari, 2020), and orientation attendance (Martin & Dixon,1994; Perrine & Spain, 2008) in relation to college adjustment. Although freshman orientation programs have become a norm at academic institutions, researchers (e.g., Martin & Dixon, 1994; Perrine & Spain, 2008) found no significant relationship among freshmen's orientation attendance, college adjustment, and retention. However, the most recent of these studies were conducted more than a decade ago during which college student orientation might have drastically transformed.

Taken all together, the literature provides information regarding the relationship between college adjustment and conceptually related factors (e.g., Bishop et al., 2019; Haktanir et al., 2018; Karaman & Sari, 2020). However, research results should not be overlooked, as results may change across regions and countries. In the present study, we aimed to examine college adjustment and its relationship with resilience, social self-efficacy, student involvement in college orientation and student organizations among first-year undergraduate students in Turkey. To assess the concept of college adjustment, a proper instrument was needed due to the limitations of existing instruments, which are comprehensive and not theory driven. Thus, we decided to translate the INCA (Watson & Lenz, 2018), which is a 14-item scale, into Turkish language and evaluate its psychometric properties instead of developing a new instrument, as the INCA is a practical, reliable and cross culturally validated instrument. Then, we utilized the INCA-T in analysis.

Resilience and Social Self-Efficacy

The term resilience means bouncing back from a negative emotional experience and adapting a stressful and challenging situation well (Masten, 2014). As college is a particularly stressful time for many young adults with leaving home and transitioning into a new chapter of life, resilience becomes a critical concept for college students. Haktanir and colleagues (2018) conducted a study to assess the relationship between resilience, academic self-concept and college adjustment among first-year students. The study results showed that students reporting higher resilience tended to report higher college adjustment. Banyard and Cantor (2004) examined college adjustment among trauma survivors and found that individuals making positive meaning from traumatic experience tend to report higher resilience and positive adjustment. According to Kim and Lee (2018), being a resilient student not only made college adjustment easier but also helped with college to work transition. Further, the results indicated that resilient students were likely to use more emotion regulation strategies and had higher career satisfaction compared to maladaptive students (Kim & Lee, 2018).

Individuals' abilities to engage in social relationships and perceived social support are also positively related concepts to adjustment to college (Azmitia et al., 2013; Kingery et al., 2019; Medina, 2018). However, individuals' belief in their abilities to develop and maintain a social relationship is different from an actual social interaction, and this is called social self-efficacy (Wright el al., 2013). The term social self-efficacy is based on the self-efficacy theory of Albert Bandura, which asserts that the expected outcome of a situation is greatly associated with individuals' perceived ability about the situation (Wright el al., 2013, p. 219). In other words, when a college student is confident going out with others and communicating with them, this student will likely to believe that talking and going out with others will enhance their social relationship. Although researchers found that self-efficacy positively related with college and life satisfaction (DeWitz & Walsh, 2002; Wright & Perrone, 2010), and mediated the association between attachment anxiety and feelings of loneliness and depression (Wei et al, 2005), there is scant literature available in regard to the relation between social self-efficacy and college adjustment among first year students.

Higher Education in Turkey

Higher education enrolment numbers have been increasing since 2005 in Turkey (Our World in Data, 2014), and 7.2 million students enrolled in an undergraduate program in 2019, while 1.1 millions of whom were freshmen students (CHI, 2019). In Turkey, admission to an undergraduate program is determined based on the central university entrance exam and placement (CUEEP) results. The CUEEP, which is the only criterion determining the university and program admission results, takes place once a year and may cause students to get stressed about their academic and professional lives. Since the admission is based solely on the CUEEP scores, changing majors in Turkey is quite strenuous. In order to change a major, students need to retake the exam and

wait at least a year to apply to a different program. Consequently, many students who had different interests or dreams feel trapped in a program they selected only because they could not score higher in the CUEEP. Therefore, first-year students in Turkey may experience unique stressors in the transition and may need extra support to develop positive adjustment to retain and graduate on time (Bülbül & Acar-Güvendir, 2014; Dogan, 2012; Mercan & Yıldız, 2011). Nevertheless, there are not yet sufficient support mechanisms designed at universities. For instance, the office of student affairs and faculty advisors are two main support resources, but they only provide assistance to first-year students with course enrolment. Although counseling centers could be another resource for freshmen, only limited numbers of universities have well-established counseling centers in Turkey and many university counseling centers are understaffed (Ulus et al., 2019). Therefore, professionals working in these centers serve all students with numerous problems in the university with their limited time (Erkan et al., 2011). Ultimately, not all universities provide orientation programs for first-year students. Therefore, not only we believe that further investigation on the topic is warranted, but we also believe that first-year students' needs may be overlooked in such circumstances.

College Adjustment Research in Turkey

Several studies investigated the role of numerous variables (e.g., coping styles, resilience, social support, optimism, problematic internet usage, etc.) in relation to first-year college adjustment in Turkey (İkiz et al., 2015; Rahat & İlhan, 2016; Soncu Buyukiscan, 2018; Yalim, 2007). Researchers reported positive relationships with college adjustment, social support, coping style (Rahat & Ilhan, 2016), and resilience as well as optimism (Yalim, 2007). A qualitative study conducted by Sevinc and Cem (2014) examined common factors negatively affecting college adjustment, and findings indicated that lack of support from faculty, campus friends, and family were some of the main factors of negative college adjustment. In the same study, a sense of limited connection to an academic institution and participation in social activities were also listed as additional negative factors. Additionally, while a limited number of universities provide an orientation program for freshmen students in Turkey, to our knowledge, only one study examined the effectiveness of a brief orientation program in a Turkish university (Sevim & Yalcin, 2006). Although student participants reported finding the orientation somewhat useful, the results showed no difference in college adjustment scores between individuals attending the program and those who did not attend (Sevim & Yalcin, 2006). In a recent study, researchers developed an online orientation system for international students to cultural adjustment and evaluated its effectiveness (Coskunserce & Bedir Eristi, 2017). However, this program was designed for international students, and no recent study was conducted with first-year domestic students to facilitate their adaptation through an online orientation program.

During our examination of research findings on college adjustment in Turkey, we noticed a few shortcomings. First of all, most researchers recruited participants from one institution (e.g. Bülbül, & Acar-Güvendir, 2014; Mercan & Yıldız, 2011; Rahat & İlhan, 2015; Soncu Buyukiscan, 2018). Additionally, the instruments that were used in studies were flawed as they appear to be long with a large number of items, not providing an overall total score, and not being theory driven. Therefore, we decided to translate and adapt the *Inventory of New College Students Adjustment* (INCA; Watson & Lenz, 2018), which is a 14-item and 2 factor scale, into the Turkish language to contribute literature by providing an alternative college adjustment instrument. Since the INCA is cross culturally validated (Pester et al., 2018) and a brief instrument assessing students' college adjustment, this instrument can be an asset to Turkish college adjustment literature.

Additionally, considering our review of global and national literature on adjustment to college, we aimed to contribute to the knowledge base by examining the relationship between resilience and social self-efficacy with college adjustment among first-year students by recruiting participants across Turkey. First-year students describe the transition as a stressful situation, therefore we decided to use resilience as a predictive factor for college adjustment. Also, researchers reported the importance of social support for college students in many studies (Bakioglu, 2019; Ozkan & Yılmaz, 2010; Rahat & İlhan, 2015); however, the relation between college adjustment and social self-efficacy remains unexamined (Zorlu Yam & Tüzel İşeri, 2019). Thus, we included social self-efficacy, resilience, college orientation attendance, and student organization involvement as study variables and examined their relationship with adjustment to college.

Method

Participants

Participants of the study were first-year college students who were enrolled in higher education programs in Turkey during the 2019-2020 academic year. A total of 346 first-year undergraduate students across Turkey

participated in the study. The mean age of participants was 19.4 years, range between 17 and 42 years (SD = 2.87). Eighty-nine participants were male (25.7%) and 257 were female (74.3%). Twenty-eight (8.1%) reported that they completed a one-year of English preparatory class before starting their freshman year and 318 (91.9%) reported that they started their freshmen year without preliminary coursework. In terms of orientation, 150 participants (43.4%) indicated that they attended the first-year student orientation program and 196 (56.6%) did not attend any orientation program to ease their transition from high school to college. Eighty-three (24%) indicated as being involved and a member of a student organization at university, while 263 (76%) reported no involvement. Fifty-nine of the participants (17%) reported that they lived with their families and 287 (83%) reported that they lived in a dorm or an apartment with their friends.

Measures

Inventory of New College Student Adjustment

The INCA was developed by Watson and Lenz (2018) in order to help college student personnel and college counseling staff in assessing first-year college students' adjustment difficulties. Watson and Lenz (2018) conducted their study with 474 freshmen enrolled in a public university in the USA. The INCA has 14-items, using 4-point Likert scale as 1 *strongly disagree* and 4 *strongly agree*. Total scores of the INCA range from 14 to 56 with higher scores indicating higher college adjustment levels of the first-year students.

As a theory driven instrument, the INCA initially was developed based on Tinto's (1988) theory of student departure considering 10 domains of student adjustment including (a) psychological health, (b) family/social support, (c) financial support, (d) academic expectations, (e) positive realistic expectations, (f) resiliency and coping skills, (g) relationships, (h) connectedness, (i) career maturity, and (j) life experiences (Watson & Lenz, 2018, p.6.) with 113 items. After completing exploratory factor analyses (EFA) and confirmatory factor analyses (CFA), Watson and Lenz (2018) found that 14-items INCA had two subscales. The first subscale was labelled as *supportive network* because items were assessing relationships with peers and family. The second subscale was labelled as *belief in self* because items in this factor were assessing self-perceptions of an individual's achievement in college (Watson & Lenz, 2018). The reliability coefficient alpha score for the full-scale was .86. Moreover, convergent validity was completed by the researchers between INCA Supportive Network and Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988), and INCA Belief in Self and Academic Self-Concept Scale (ASCS; Reynolds et al., 1980). The validity analyses showed that subscales were valid, α = .83 for supportive network and α = .77 for belief in self (Watson & Lenz, 2018, p. 11). Two studies used the INCA and reported high levels of reliability. A study conducted with 514 freshmen students in the USA reported the reliability coefficient alpha score as .86 (Haktanir et al., 2018). Another study with 696 Ghanaian students in Ghana, Africa reported the reliability coefficient alpha score for both subscales as .74 (Pester et al., 2018). The reliability analyses of the current study showed that the Turkish version of INCA was reliable. The Cronbach's alpha reliability coefficient of the full-scale was .74.

Social Efficacy and Social Outcome Expectations Scale - Turkish

Social Efficacy and Social Outcome Expectation Scale (SEOES) is an 18-item 5-point Likert scale (1 *strongly disagree* and 5 *strongly agree*) instrument developed by Wright, Wright, and Jenkins-Guarnieri (2013) for the purpose of measuring (a) social expectations of people in their relationships via assessing how they perform tasks in social relationships and (b) outcome expectations in regard to engagement of relational tasks (p. 220). The instrument's theoretical background is based on Bandura's social-efficacy theory. The SEOES has two subscales, namely as follows: "social efficacy expectations" and "social outcome expectations" (Wright et al., 2013, p. 223). The reliability coefficient alpha score for the full-scale was .96, social efficacy expectations was .96, and social outcome expectations was .91. The SEOES was translated into Turkish (SEOES-T) by Akin and Akkaya (2015). They found that the instrument had a high level of reliability and reported the reliability coefficient alpha for the full scale as .94, social efficacy expectations as .93, and social outcome expectations as .88 (Akin & Akkaya, 2015, p. 209). The current study also found that SEOES-T had a high level of reliability and reliability coefficient alpha of the full-scale was .92.

Brief Resilience Scale - Turkish

Brief Resilience Scale (BRS) was developed in order to assess the level of resilience (Smith et al., 2008). The instrument development study was conducted with four different samples of participants in the USA. The six-item 5-point Likert scale (1 *strongly disagree* and 5 *strongly agree*) instrument had a high level of reliability with all four samples, .84, .87, .80, and .91 respectively (Smith et al., 2008). The BRS was translated into

Turkish (BRS-T) by Haktanir and colleagues (2016). The psychometric properties of the BRS-T showed that the instrument was reliable ($a \geq .70$). The present study's reliability level was also sufficient for the full-scale ($a = .80$).

Procedure

Instrument Translation

The forward and backward translation methods were utilized during the translation process. The INCA was initially translated into Turkish by 2 experts in the field of counseling. After translating the instrument from English to Turkish, reverse translation was completed by 2 other experts in the field of education in order to compare the acceptability and accuracy of the Turkish translations. The final version of the instrument in Turkish was created by the lead researcher of the current study.

Data Collection and Participant Recruitment

The present study consists of four questionnaires including the demographic questionnaire, the Turkish version of INCA (INCA-T), the Social Efficacy and Social Outcome Expectations Scale - Turkish (SESOES-T), and the Brief Resilience Scale - Turkish (BRS-T). Upon receiving institutional review board approval from the first author's institution, the data were collected by utilizing an online survey created through an online data collection website. Based on the snowball sampling method, we shared the survey link with first year college students as well as first-year course instructors with a request to disseminate the survey link to their students. Participation was voluntary and the online data collection method was used as the only method to obtain data for the current study.

Data Analysis

Statistical Power Analysis

For confirmatory factor analysis, we followed Steven's (2009) criteria of $n/p \geq 15$ to determine the adequacy of the sample size. The INCA (Watson & Lenz, 2018) included a total of 14 items; thus, a minimum of 210 participants were required. Given that we obtained data from 346 freshmen, our *n/p* ratio was 24.71, indicating that our sample size was adequate for determining the quality of model fit. Additionally, we carried out a G*Power analysis to determine the minimum number of participants required to find a statistically significant difference for a multiple regression analysis with two predictor variables and a t-test when a medium effect size existed at .80 power and .05 alpha level. Our findings showed that we needed at least 82 participants to conduct these separate analyses. Considering our sample size of 346, our sample exceeds the minimum requirement.

Preliminary Analysis

After transferring survey data into SPSS, we inspected our data for any unusual entries. All participants completed the survey. There were no missing data and no outliers. Then we reverse coded items as needed. We inspected test assumptions, such as normality, Mahalanobis distance, Cook's distance, linearity, and homoscedasticity to determine whether any data points influencing the results existed. The results showed that assumptions were met. The sample size was sufficient ($n = 346$). The relationship between dependent and independent variables was linear. Mahalanobis results and critical values were used, and no outliers were detected. There was no multicollinearity. Tolerance values less than .2 cause of concern (Menard, 1995). Tolerance values for SEOES-T and BRS-T were .959. Moreover, VIF value of greater than 10 indicates multicollinearity (Neter, Wasserman, & Kutner, 1989). VIF values for SEOES-T and BRS-T were 1.043. Skewness and kurtosis scores were -.421 and .937, respectively. We detected no unusual data points and proceeded with the primary analysis.

Primary Analysis

To conduct a confirmatory factor analysis, we used the SPSS Analysis of Moment Structures (AMOS) software. Additionally, we used SPSS to carry out a multiple regression analysis to discover the predictive roles of resilience and social self-efficacy on college adjustment. Finally, we ran two separate independent-samples t-test to compare groups based on their attendance in college student orientation and whether or not they were a member of a student organization.

Results

Study 1

In this study, we conducted a CFA for continuous data using a maximum likelihood (ML) estimation to investigate the psychometric properties of the Inventory of New College Student Adjustment (INCA; Watson & Lenz, 2018) among a first-year Turkish college student population from various universities. The ML was utilized due to the existence of evidence for multivariate normality as evidenced by Mahalanobis distance statistics. Widely accepted and researched CFA indices for assessing model fit were selected (Mvududu & Sink, 2013). We examined chi-square statistics as well as several goodness-of-fitness indexes, including comparative fit index (CFI), goodness of fit index (GIF), root-mean-square error of approximation (RMSEA), standardized root-mean square residuals (SRMR), Tucker-Lewis index (TLI), Akaike Information Criterion (AIC), and Expected Cross Validation Index (ECVI). The determine the adequacy of the values associated with each statistic, we used the proposed acceptable model fit values of above .90 for CFI, GFI, and TLI while an RMSEA value of below .08, and an SRMR value of below .06 (Dimitrov, 2012; Marsh et al., 2004; Mvududu & Sink, 2013). Though a rule of thumb is not proposed for AIC and ECVI, these values allow researchers to compare models and the lower these values are the better (Schermelleh-Engel & Moosbrugger, 2003; Schumacker & Lomax, 2010). The primary analysis of the model fit with no modifications on any of the items (n = 14) showed an unacceptable model fit, χ^2 (76) = 266.15, p < .05, RMSE = .09, SRMR = .08, CFI = .80, GFI = .90, TLI = .76, AIC= 324.15, and ECVI = .94 (CI90% .81-.1.10). In the final model, we eliminated four items from the original INCA instrument and paired error terms for items 2 and 3 as well as items 9 and 10. The items that were removed were not theoretically related to the two subscales we retrieved in this study, as they appeared to focus on challenging courses and the ability to be genuine with others. We re-ran the analysis with a total of 10 items. Overall, the 10-item model with two factors revealed good fit to the data and no more applicable modification recommendations existed, χ^2 (32) = 70.19, p < .05, RMSE = .06, SRMR = .05, CFI = .95, GFI = .96, TLI = .93, AIC = 116.19, and ECVI = .34 (CI90% .28-.42) (see Table 1). All indices in the final model demonstrated improvements over the first model. The CFA was carried out and a two-factor solution with 10-items was shown in Figure 1.

Table 1. Results of Confirmatory Factor Analysis for the INCA-T

Variable	χ^2	*df*	*GFI*	*CFI*	*RMSEA*	*AIC*	*ECVI*
INCA-T First Model	266.15	76	.90	.80	.09	324.15	.94
INCA-T Final Model	70.19	32	.96	.95	.06	116.19	.34

Note. CFI = Comparative Fit Index; GFI = The Goodness of Fit Index RMSEA = Root-Mean-Square Error of Approximation; AIC = Akaike Information Criterion; ECVI = Expected Cross Validation Index.

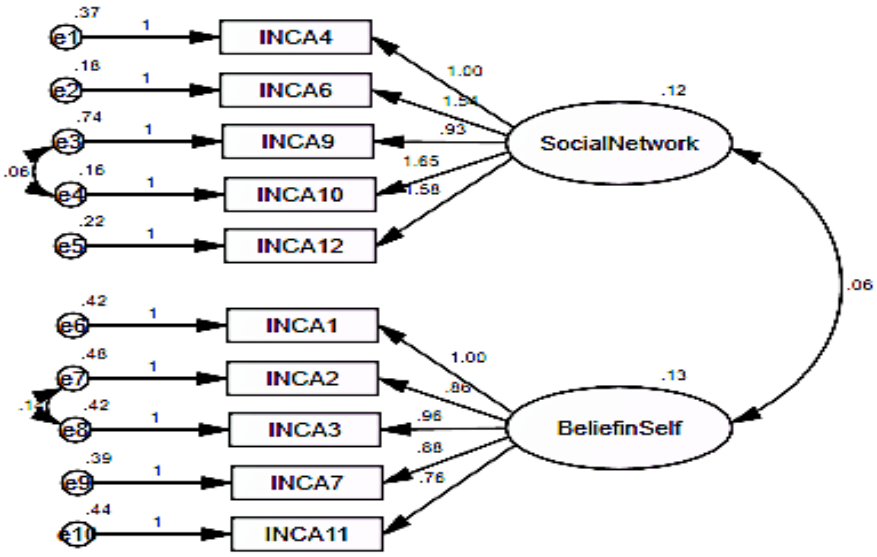

Figure 1: INCA-T Final Model in CFA

Study 2

In the second study, we tested the assumptions of multiple regression analysis (see the preliminary analysis section for details). The analysis results showed that all assumptions were met. After that, we ran a multiple regression analysis to understand the relationship among college adjustment, resilience, and social self-efficacy. We also carried out several group comparison tests to ascertain whether college adjustment differed across subgroups, such as attendance to college student orientation and involvement in student organizations.

Table 2. Summary of Multiple Regression Analysis

Variable	*B*	*SE B*	*β*	*t*	sr^2	*F*	R^2
						60.71	.26
Resilience	.31	.04	.35	7.39	.12		
Social Self-Efficacy	.12	.02	.31	6.50	.09		

A simultaneous multiple regression analysis investigating the predictive role of resilience and social self-efficacy in estimating college adjustment was conducted. Results suggested that both predictor variables (i.e., resilience and social self-efficacy) significantly predicted college adjustment among freshmen, $F(2, 343) = 60.71$, $p < .001$, $R^2 = .26$ (adjusted $R^2 = .26$). This effect size value (i.e., .26) indicates a large effect size (Field, 2013). When the predictor variables were examined individually, resilience scores uniquely explained 12% of the variation in college adjustment scores $B = .31$, $p < .001$, while social self-efficacy scores made a unique contribution of 9%, $B = .12$, $p < .001$ (see Table 2).

Additionally, we examined our data across two specific demographic variables that may be related to college adjustment. First, we ran an independent-samples t-test to compare the degree of college adjustment based on participation in a college orientation at the beginning of the year. During our analysis we discovered that freshmen students who attended to student orientation reported significantly greater adjustment to college, $t(344) = 2.11$, $p = .04$, Cohen's $d = .23$ (see Table 3), indicating a small effect size (Cohen, 1992). Second, we compared college adjustment based on membership to a student organization. Our data revealed that freshmen students who were a member of a student organization reported higher levels of adjustment to college, $t(344) = 3.58$, $p < .001$, Cohen's $d = .47$ (see Table 3), indicating an approximately medium effect size (Cohen, 1992).

Table 3. Summary of Independent-samples T-test Analysis

	Yes		No		*t*(344)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Attended Freshmen Orientation	29.32	3.79	28.40	4.18	2.11	.04	.23
Member of a Student Organization	30.16	3.58	28.37	4.08	3.58	.001	.47

Discussion

The present study had two purposes. The first one was to translate the INCA into Turkish language and evaluate the psychometric properties with Turkish first-year college student sample. The second purpose was to assess the relationship between college adjustment and related concepts such as resilience, social self-efficacy, participation in college orientation and involvement into a student organization. We believe that the findings of the present study fill a gap in the literature as well as provide implications for practitioners and future researchers.

Study 1

The original version of the INCA is a 14-item instrument and developed with first-year students in the USA to assess college adjustment struggles (Watson & Lenz, 2018). Then, Pester and colleagues (2018) used the INCA with Ghanaian college students, evaluated and reported the validity evidence for Ghanaian sample after

modifications and removing 1 item. In the current study, collecting data from the first-year college students in Turkey, our results also confirmed a two-factor scale after modifications and removing 4 items from the original instrument. It was important to note that 3 of the deleted items (5 [*Challenging courses make me a better student*], 8 [*I always see the good in situations*], and 13 [*I know what I will do after graduation*]) were belonged to belief in self subscale. Since individuals participating in the present study live in a collectivistic culture in Turkey, necessary item removal from the belief in self subscale can be interpreted in relation to the meaning 'belief in self' in this culture. Researchers stated that individuals from individualistic cultures tend to value self-esteem while individuals from collectivistic cultures tend to value self-criticism rather than self-esteem (Konrath, 2012). It can also be interpreted that participants might find supportive network items more relatable since previous research results indicated a positive relationship between social support and college adjustment among Turkish first-year students (Rahat & Ilhan, 2016; Sevinc & Cem, 2014). Additionally, after carrying out factor analyses, one item from each subscale yielded under the other subscale (4 [*My classmates value my opinion*] and 11 [*My family's support makes me feel stronger*]). This change might be related to differences in cognitive processes in different cultures (Lenz, Soler, Dell'Aquila, & Uribe, 2017). The final version of the INCA-T consists of a total of 10 items including 5-items per subscale. Thus, we conclude that the INCA-T is a brief, practical, and valid instrument with a capacity to contribute to evidence-supported practices in Turkey. It is important to note researchers tend to use following instruments to measure the concept of adjustment to college in Turkey; the Adjustment to University Scale (Akbalık, 1997), the University Life Scale (Aladağ et al., 2003) and the Adjustment to University Life Scale (Aslan, 2015). However, some of these instruments are impractical due to the number of items included. Additionally, some of these instruments consist of various subscales and were not necessarily developed based on a theory. However, the INCA (Watson & Lenz, 2018) was initially developed using Tinto's (1988) theory of student departure as a framework. Therefore, as a practical and brief instrument, the INCA-T can be an option for practitioners and researchers working on adjustment to college issues.

Study 2

In the present study, we found that resilience and social self-efficacy together predicted 26% variance in college adjustment scores of the first-year students. Individually, resilience predicted 12% and social self-efficacy predicted 9% variance in college adjustment. Our findings were consistent with the extant literature (e.g. Haktanir et al., 2018; Yalim, 2007) meaning that individuals with higher resilience reported higher college adjustment. Previous researchers examined the level of social self-efficacy among undergraduate students (e.g. Bakioglu, 2019; Zorlu Yam & Tüzel İşeri, 2019); however, the relation between college adjustment and social self-efficacy was unexamined. Therefore, we believe that we closed a gap in literature with our findings claiming that social self-efficacy is a significant predictor of college adjustment.

Researchers reported no correlation between orientation attendance and adjustment to college and retention among the USA freshmen students (Martin & Dixon, 1994; Perrine & Spain, 2008). However, the present study results showed that participants attending college orientation reported significantly greater adjustment to college. Our result also contradicted with another study which was conducted with Turkish samples, as their findings indicated no difference in college adjustment scores between individuals attending the orientation program and those who did not attend (Sevim & Yalcin, 2006). Since the previous research studies conducted almost two decades ago, the content of college student orientation programs might have changed, and this could be the reason for contradiction between previous and present findings.

Theory behind adjustment to college includes several aspects, however both Baker and Siryk (1986) and Tinto (1988) stated that social support is one of the most important aspects of adjustment to college. Moreover, previous studies reported that receiving social support predicted college adjustment with Turkish samples (Sevinc & Cem, 2014; Rahat & İlhan, 2016). The results of the present study showed that freshmen students engaging in student organizations reported higher college adjustment than their peers. Therefore, it is possible to infer that individuals participating in student organizations may receive social support. Additionally, freshmen students engaged in student organizations can develop new relationships on campus, and student organization membership may give students a sense of belonging to their institution. Both these interpretations can also positively contribute to college adjustment. In conclusion, our results asserted the importance of attending orientation and participating in student organizations during the first year of college for a smooth adjustment to a new academic and social environment.

Implications, Recommendations and Conclusion

Considering the existing literature and the current study results, individuals working with first-year students (e.g. faculty advisors, college counselors, and researchers) can utilize the present study results in various ways. For instance, faculty advisors continuously work with a large number of students on top of their coursework and research practices in Turkey. The INCA-T can be a practical tool to assess college adjustment scores of first-year students. Considering the results, advisors may arrange individual or group meetings with struggling students and subsequently utilize the INCA-T to monitor students' college adjustment status. As the present study results suggest, faculty advisors may encourage students to become involved with student organizations. We also suggest that each university should design an orientation program for first-year students to ease student adaptation. The orientation programs may provide information about student organizations and ways to support students to overcome adjustment to college issues. Additionally, faculty advisors can work with the office of student affairs to ensure that all first-year students participate in the orientation program.

As discussed earlier, most university counseling centers are understaffed in Turkey (Ulus et al., 2019), yet students still seek help for various issues including adjustment difficulties (Muezzin & Kaya, 2018). To use time and energy effectively, college counselors may utilize the INCA-T with the first-year students on campus in order to identify struggling students with adjustment to college. Then counselors may develop appropriate interventions for those in need. These strategies may include individual or group interventions focusing on fostering resilience, social self-efficacy and support, as we found these variables significantly contribute to college adjustment. College counselors may also design materials such as brochures and handouts for freshmen. These materials may provide information related to student orientation, available student organizations, and suggestions to enhance students' college network. Such materials and resources can be shared with students online. College counselors may also educate faculty members and advisors about the ways to support first-year students.

Our study findings suggested that resilience and social self-efficacy are significant predictors of college adjustment, yet continued research is needed with these variables to better understand individuals' personal experiences. Therefore, researchers may design qualitative studies to explain first-year students college adjustment experiences in relation to resilience, social self-efficacy, orientation and student organization involvement through interviews. Additionally, researchers conducting experimental or longitudinal studies can utilize the INCA-T to monitor college adjustment over time or across treatments.

Although the present study contributes to the literature and provides implications in many ways, it is not free of limitations. For instance, we recruited more participants than the minimum required numbers; however, there was still a risk of selection bias by selecting known people and friends due to snowball sampling procedure. Another limitation of the study could be social bias. The freshmen students might have discomfort if they were inexperienced in participating in a research study or they might be enthusiastic during the first semester of their college life. Therefore, participants' discomfort or comfort might affect the honesty of their responses.

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An Analysis of the Qualities of the Problems Posed by the Students in a Seventh Grade Mathematics Course Assisted by the Problem Posing Approach

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An Analysis of the Qualities of the Problems Posed by the Students in a Seventh Grade Mathematics Course Assisted by the Problem Posing Approach

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Abstract

In this study, it is primarily aimed to determine the qualities of the problems posed by the students in a mathematics class delivered through the problem-posing approach and to examine the mean scores of the students obtained from these qualifications. The linear equations topic at the seventh grade was taught using the problem-posing approach. The study was designed as a case study and involved twenty students as participants. The data were collected using thirteen problem-posing tasks. At the first step of the study, a problem-posing evaluation rubric was developed. The rubric involved the following criteria: clarity, mathematical accuracy, contextual originality, originality in terms of mathematical relations, complexity level and pertinence to situation qualifications. Then, this rubric was used to identify the qualities of these problems. It was also employed to determine whether or not the mean scores of the participants significantly differed based on the objectives stated. The findings of the study suggest that in parallel to the participants' improvement on the objectives, their mean scores on contextual originality, originality in terms of mathematical relations, and complexity also improved. It is concluded that the integrity of the problem-posing approach into the educational program will improve the qualities of the problems developed by the participants.

Key words: Problem posing, Linear equations, Problem posing evaluation rubric, Qualities of the problems

Introduction

Problem posing can be defined as introducing new problems or rearranging an existing problem and generating various mathematical problems from a given situation in the broadest terms (Leung, 1993; Silver, 1993). Problem posing is also expressed as interpreting concrete situations based on mathematical experience and formulating them as a meaningful mathematical problem and it is emphasized that this definition includes a meaning suitable for the addressing of problem-solving in the context of school mathematics in accordance with the aims of mathematics teaching (Stoyanova & Ellerton, 1996).

Problem posing is a skill the importance of which has been emphasized by scientists such as Einstein, Darwin and Werthemier in terms of mathematical and scientific inquiry (McDonald & Smith, 2020; Silver & Cai, 2005; Stoyanova, 2003). Einstein (Einstein & Infeld, 1938), expressed the importance of problem posing with the following phrase "To raise new questions, a new possibility, to regard old problems from a new angle, requires creative imagination and marks real advances in sciences" (as cited in McDonald & Smith, 2020, p.400). Research on problem posing has demonstrated that problem-posing is closely related to problem-solving and that problem-posing makes some contributions to the development of problem-solving skills (Silver & Cai, 1996). However, the positive effects of problem-posing are not limited to its contribution to problem-solving skills. Posed problems reflect the details of students' understanding of mathematics, their mathematical skills and beliefs so that teachers can also benefit from problem posing to learn about students' mathematical concepts and processes (Kwek, 2015; Klaassen & Doorman, 2015; Stoyanova, 2003; Toluk-Uçar, 2009). It is stated that problem-posing fosters flexible thinking, contributes to creativity and also provides opportunities for

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** This study is produced from the doctoral dissertation of the first author.

understanding and interpreting mathematical concepts (Bonotto & Santo, 2015; Canköy, 2014; Işık & Kar, 2012; Kwek, 2015).

Many studies on the algebra learning area have shown that students have difficulty in making sense of algebraic symbolism, coordinate system, linearity and linear equations and have some misconceptions about them. Some of the difficulties encountered in algebra are transforming verbal expressions into algebraic symbolism, providing transitions between different representations, and creating a graph of linear equations (Canadas, Molino & Rio, 2018; Çelik & Güneş, 2013; De Bock et al., 2002; Hattikudur et al., 2012; Nirhamati, Fatimah & Irma, 2020; Sezgin-Memnun, 2011). The necessity of studies to improve the teaching of algebra and geometry, including the topics of the coordinate system and linear relationship, transitions between different representations of a linear relationship and linear equations and to overcome difficulties encountered in the teaching of these subjects has also been emphasized in several previous studies (Birgin, Kutluca & Gürbüz, 2008; Erbas, Çetinkaya & Ersoy, 2009; Mielickey & Wiley, 2016; Sezgin-Memnun, 2011; Yenilmez & Yasa, 2008, Wilkie, 2016). In particular, the understanding of the subjects of the coordinate system and linear relationship forms the basis of the analytic geometry and the subject of function. Therefore, it is noted that lack of understanding in the subjects of the coordinate system and linear equations in middle school may cause misunderstandings about some subjects in the high school mathematics curriculum (e.g. functions, complex numbers, limits, derivatives, integrals) (Birgin & Kutluca, 2006; Turanlı, Keçeli & Türker, 2007). Therefore, it can be maintained that the topic of linear equations is a difficult subject, but it is very important for understanding many different mathematical topics.

In the current study, an instruction was designed with the support of the problem-posing approach considering its possible contributions to the understanding and interpretation of the subject of linear equations as it has been emphasized in many studies that it considerably contributes to the understanding and interpretation of mathematical concepts (Cai & Hwang, 2019; Ticha & Hospesova, 2013; Toluk-Uçar, 2009).

It has been seen in various studies that problem-posing tasks are used as an assessment tool to reveal students' verbal skills, representational skills, and knowledge and skills about the transition between them (Cai et al., 2013; Canadas et al, 2018). The problems posed by the students reflect their mathematical knowledge and skills. Therefore, in this study, it is aimed to examine the problems posed by the students who took linear equations courses supported by the problem-posing approach. For this aim, the qualification of the problems posed by students was explored.

Theoretical framework

Problem posing

The notion of problem-posing was described in various ways by different researchers. To illustrate, Duncaner (1945) expressed it as reformulating a given situation or creating a new problem (as cited in Stoyanova, 2003). Leung (1993) defined problem-posing as formulating a set of mathematical problems from a given situation. Likewise, Silver (1993) stated that problem-posing means both creating a new problem and reformulating the given problems. Accordingly, it can be derived from these definitions that problem-posing can occur before, during or after the solution of the problem.

Considering the opportunities it creates for mathematics education, it is important to include problem posing in teaching mathematics in schools (Singer, Ellerton & Cai, 2013). Being a major element of instruction, problem-posing has also been considered a component of measuring students' mathematical understanding (Cai et al., 2013; Cai & Hwang, 2019).

One of the commonly used classifications for problem-posing tasks belongs to Stoyanova and Ellerton (1996). Stoyanova and Ellerton categorized problem-posing activities as free problem posing, semi-structured problem posing and structured problem posing. According to this theoretical framework, students are asked to pose a problem for a general situation, such as a mathematical calculation problem, a problem they think is difficult in the content of the free problem-posing activity, in semi-structured problem-solving situations, students are given an incomplete problem situation. For example, a problem is created based on an equation or a shape. In structured activities, a well-structured problem and a problem solution are given to create a new problem for this situation (Stoyonova, 2003). It is seen that the structures of the tasks used in problem-posing studies are determined in line with the research purposes.

In some studies, it has been observed that the problems posed by students were evaluated in terms of achieving the related objectives or concepts and the difficulties encountered (Cai et al., 2013; Işık & Kar, 2012). In some other studies, it has emerged that the aim is to measure problem-posing skills and various tools that have been created for this purpose (Bonotto & Santo, 2015; Canköy, 2014; Kaba & Şengül, 2016; Kwek & Lye ,2008; Silver & Cai, 1996).

Different characteristics of the posed problems have been examined in the previous studies. For instance, Silver & Cai (1996) asked students to pose various arithmetic problems by giving them a problem situation. The problems posed by the students were first examined as to whether they were mathematical questions or not. If the posed problem was indeed a mathematical problem, in the next step, the problems were categorized into two groups as solvable and unsolvable questions. If there was not enough information to solve the posed problem, then these problems were included in the category of unsolvable questions. In the final stage, a semantic and linguistic analysis was conducted for the difficulty of the problems in the category of solvable questions. A semantic analysis was also conducted for the unsolvable questions (Silver & Cai, 1996). Several pieces of research were utilized in this analysis process (Bonotto & Santo, 2015; Crespo & Sinclair, 2008; Kwek & Lye, 2008).

In a different study, Crespo & Sinclair (2008) used the problem-posing tasks identified in the literature (Silver & Cai, 1996; Vacc, 1993) with pre-service teachers and analysed them according to the same analysis schemes and found similar results to those reported in the literature. Subsequently, they conducted group discussions with the pre-service teachers about the characteristics that a good problem should have, and they evaluated the problems posed by themselves. At the end of this study, they stated that broader categorizing schemes are needed to evaluate the problems and that aesthetic criteria (e.g. surprise, novelty, fruitfulness) of the problems can also be taken into consideration.

In another study, a detailed analysis of the complexity of the problem was addressed in three categories; namely, low complexity, moderate complexity and high complexity (Kwek & Kye, 2008; Kwek 2015). The problems with low complexity are directed to recognizing and recalling the previously learned information. Answers to problems with moderate complexity require more flexible thinking than problems with low complexity and generally involve more than one step. The problems with high complexity, on the other hand, require more abstract reasoning, creative thinking and association and analytical skills.

In their exploratory study, Bonotto and Santo (2015) also desired to determine the relationship between creativity and problem-posing activities based on real-life situations. Firstly, considering some analysis schemes in the literature (Silver & Cai, 1996; Yuan, 2008; cited in Bonotto & Santo, 2015), the problems were analyzed as to whether they were problems or not and if they included reasonable and adequate data. The problems including reasonable and adequate data were analysed concerning the sub-dimensions of creativity; flexibility, fluency and originality. In the problem-posing stage of this study carried out at three stages, the students were asked to pose various problems in a specified period on the basis of the mathematical situations in a brochure handed out to the students. Flexibility was determined by categorizing the posed problems according to different types of knowledge and problem types included in the reasonable problems; fluency was expressed with the means of the number of the problems posed by the students. Originality, on the other hand, was expressed as the answer to the posed problem being similar to fewer than 10% of the answers to all the problems.

More recently, Kaba & Sengül (2016) developed a rubric to evaluate the posed problems. It is observed that although there are items that show the difficulty level of the problem and the originality of the problem in the draft form of the rubric, these items are removed in the final form. The reason for the removing of the difficulty item is stated as the fact that all problems are problems posed in similar 2-3 steps and this item does not contain any distinguishing properties. The reason why the item of originality is not included in the final version of the rubric is that the students pose problems that are far from real life due to the concern of posing original problems and this item does not make a difference in terms of performance. The problem qualities in the last form of the rubric are the text of the problem (language and expression), the compatibility of the problem with the mathematical principles, the type/structure of the problem and the solvability of the problem.

Another study examining problem-posing skill according to the variables of attitude towards problem-solving, gender and success was carried out by Özgen, Aydın, Geçici, and Bayram (2017). In this research; seven criteria were determined as using mathematical language, grammar and expressiveness, suitability of the problem to the objectives, the amount and quality of the data in the problem, the solvability of the problem, the originality of the problem, and the level of the students are stated as the evaluation criteria for problem-posing skills. Each criterion was assessed on a four-point scale ranging from 1 to 4 levels (0 to 3 point). At the end of the study, it

was found that students had difficulty posing problems. It was observed that there was no difference in problem-posing skills according to the gender variable. However, a significant difference was found in relation to problem-posing skills according to general academic success and mathematics course success.

As it can be seen from the review of the studies thus far, various problem-posing qualities emerge according to the feature focused on in problem-posing studies. Since problem-posing tasks are open-ended, it is probable for students to create a wide variety of problems with these problem-posing tasks. Although this variety is the desired situation in terms of teaching, it presents several difficulties as to measurement (Silver & Cai, 2005). Here, the problem of which criteria a teacher will base his/her assessment on while using problem-posing in the classroom arises. In this regard, Kwek (2015) stressed that before making decisions, teachers should take into account their teaching objectives and the potential of problem-posing tasks to provide evidence of these objectives. The characteristics of the tasks complying with the teaching objectives provide the teacher with ideas to determine the criteria for assessing student's achievement. In other words, it is emphasized that the characteristics of a problem-posing task are important in determining criteria for the assessment of problem-posing tasks.

Problem posing in algebra

Students' ability to provide transitions between various representations is very important to perform meaningful learning in algebra and these transitions have received focal attention in some problem-posing studies. Various difficulties in transitions between various representations with problem-posing tasks involving algebra topics have been revealed through problems (Cai et al., 2013 & Canadas et al., 2018).

Canadas et al. (2018) used problem-posing to determine students' understanding of algebraic expressions and the difficulties experienced according to the characteristics of the given algebraic statements. In the study, pre-service teachers were given free and semi-structured problem-posing tasks containing symbolic statements. The problems were examined in terms of syntactic structure and semantic structure. Thus, the problems were converted into algebraic symbolism to analyze the syntactic structure, the compatibility with the symbolic statement has been examined. Semantic analysis was discussed within the additive and multiplicative structure. Additive problems were classified into comparison, part part whole and change categories. In addition, multiplicative problems were classified as comparison, cartesian and equal grouping. Meaningless problems, or problems that do not require algebraic symbolism to be solved, were not taken in evaluation. The results have demonstrated that in most cases, students posed problems in a syntactic structure different from the given symbolic expressions, so it was inferred that students have difficulty giving meaning to a given statement. It was observed that additive structures can pose problems more easily than multiplicative problems, and the rate of problems in comparison type is lower in both multiplicative and additive structural.

Cai et al. (2013) aimed to measure the effect of secondary school curriculum on high school learning by using problem posing as a tool. This study aimed to determine the effects, similarities and differences of a standard-based curriculum and a more traditional curriculum on students' learning algebra. The problem-posing task used in the research consists of two parts. In the first task, a system of equations task was given and the participants were asked to find the x and y values by solving them. After that, it was asked to the participants to pose a problem that could be solved by using the given system of equations. In the second task, a graph was provided and the students were asked to write an equation that would produce the given graph. Afterwards, the students were asked to write a real-life situation that could be represented by this graph. At the end of the research, it was found that 22% of the students were able to solve the equation system and only 19% of them could write the correct equation for the graph task. Only 6.2% of the students were able to pose a problem for the system of equations task, and 16.6% could pose a valid problem for the graph task. When the conditions of the posed problems to meet the conditions given in the problem are examined, it baceame obvious that only 14.3% for the system of equations task and 18.3% for the graph task match at least one condition. As a result, it was concluded that a small proportion of the students were able to pose valid problems for both tasks.

In the current study, problem-posing is integrated into the linear equations instruction, which is considered a challenging subject for most students. It is aimed to examine the problems related to linear equations posed by the students taking this course. The qualifications of the posed problems were determined for this aim. Linear equations topic includes 3 separate subtopics: coordinate system, linear correlation and linear equation graphs (Mone, 2013).

In problem-posing researches, the difficulties with various representations, and transitions with these representations were indicated. It has been observed that representational changes within the same subject have

a different level of difficulty (Cai et all, 2013). While different difficulties arise in different representations of the same concept, it was aimed to examine whether the qualification of the problems posed for the subtopics of a mathematics subject differ at a significant level.

From this point of view, this study aimed to determine whether the qualities of the problems in the mathematics teaching program ((MoNE, 2013), the sub-topics of the coordinate system, linear correlation and linear equation graphs, which are included in the 7th-grade linear equations topic, differ or not.

To this end, answers to the following research questions were sought throughout the extant study.

1. What are the qualities of the problems that the students posed in the linear equations courses supported by a problem-posing approach?
2. How do mean scores gotten from the problem qualities vary according to the objectives set in the curriculum?

Methodology

The current case study was conducted in the classes where the subject of linear equations was taught with the support of the problem-posing approach to 20 seventh grade students. The students were chosen by the typical sampling method to study the average ranking of successes. The mathematics teachers in a province in the Mediterranean region in Turkey were interviewed to determine the study sample. The students in the classroom of a teacher who volunteered to participate in the study were included in the study. To find answers to research problems, the problem-posing assessment rubric was developed by the researcher. Then, by using this rubric it was aimed to determine the qualities of the problems posed by the students and to investigate whether the means of the scores obtained from these qualities varied in terms of the objectives set in the math curriculum. The lesson contents prepared are related to the subject of linear equations taught in the seventh grade. The related objectives set in the Turkish 5^{th} – 8^{th} Math Curriculum are presented in Table 1 below (MoNE, 2013).

Table 1. Objectives set for the subject of linear equations

Objective No.	Short names to denote the objective	Objectives
1	Coordinate system	Knows the coordinate system with its features and shows ordered pair.
2	Linear correlation	Expresses how one of the two variables having a linear correlation between them changes depending on the other with tables, graphs and equations.
3	Linear equation graph	Draws the graph of linear equations

The problem-posing tasks were integrated into the course content. The course contents were prepared by the researchers with the support of an expert group constituted by math educators and the data collection process was conducted in continuous cooperation with the course teacher. In the 2015-2016 school year, a 12-hours pilot study was carried out to test the relevance of the course outlines and problem-posing tasks. Then required corrections for course contents and the problem-posing tasks were made for the final form of the course contents by the researchers. Incomprehensible points were determined in problem-posing tasks and some explanations were added and linguistic arrangements were made to clarify them. A 12 hour-class for the subject of the linear equation was conducted by the course teacher in their normal class hours in the fall term of the 2016-2017 school year. Before the linear equations lessons, 3 hours of problem-posing exercises were conducted with the students. It was ensured that the students were familiar with problem-posing. All three types of problem-posing tasks are integrated into linear equations lessons. The general purpose of the structured problem-posing activities is to reinforce newly learned knowledge and to understand in which contexts these mathematical concepts are needed. As noted by some scholars, such activities would be useful for students to start posing problems and to understand the structure of the problem (e.g. Stoyanova, 2003). The tasks used towards the end of the lessons are semi-structured and free problem-posing. By giving more general situations with semi-structured and free problem-posing tasks, students were guided to reveal their mathematical knowledge and skills in their new acquisition. A total of 13 problem-posing tasks integrated into the course were used as the data collection tool. These problem-posing tasks were designed in such a way to support mathematical

knowledge and skills related to the concept. As proportional to the weight of the objectives in the curriculum, there are two tasks (one semi-structured and one free) for the coordinate system; six tasks (five semi-structured and one free) for linear correlation and five tasks (four semi-structured and one free) for the linear equation graphs objectives (Karaaslan, 2018, pp.241-261). Students individually posed problems for the tasks integrated into the course flow. Sufficient time is allowed for all students to complete the problem.
A sample problem-posing task integrated into the teaching of the subject of the coordinate system is given in Figure 1 below. Before the problem-posing task, to draw the attention of students to coordinate system objective, Descartes' anecdote about how to locate the position of a fly walking on the ceiling was told. A discussion was conducted with the students on the basis of this anecdote and then definitions of ordered pair and the features of the areas were discussed through the problem tasks. Following the problem-solving activities, the students were facilitated to pose similar problems through the structured problem-posing tasks and then they were asked to pose their own problems to foster their mathematical comprehension and problem-posing skills

PROBLEM ACTIVITY 4 - PROBLEM POSING: of the A, B, C and D points, two are on the axes and the other two are in another region. By using the information given, place the points in the coordinate system and by using these points, pose a different solvable problem including a real-life situation and then solve the problem you have posed.

Figure 1. The task of posing a sample problem in the subject of the coordinate system

Mathematical situations allowing them to verbally explain the mathematical patterns and relationships given for the subject of linear correlation and to relate them to real-life situations were preferred. Problem situations that require mathematical relations to be expressed in tables, graphs and algebraic expressions and transitions to be made between these representations were used. For the subject of graphs of linear equations, problem situations that enabled the creation of graphs and to relate them to other representations were used.

Data Collection and Analysis Procedures

In order to find an answer to the first research question "What are the qualities of the problems that the students posed in the linear equations courses supported by a problem-posing approach?" a problem-posing assessment rubric was developed by the researchers. On the other hand, to find an answer to the second research question "How do the scores gotten from the problem qualities vary in relation to objectives?", one of the non-parametric tests; the Friedman test was used. For the problem qualities for which a significant difference was observed, the non-parametric Wilcoxon signed ranks test was used to find the difference between the objectives.

Different methods were employed to increase the validity and reliability of the study. Throughout all the processes followed in the current study such as data collection, data analysis and interpretation, great care was taken to be consistent. A long-term interaction was carried out with the data sources and while evaluating the problems posed by the students, first all the problems were carefully examined and then the problems with similar qualities were coded into the categories in the rubric. In the evaluation process of the problems, besides the researchers, another expert was involved in the process for the expert confirmation. The stages followed in the rubric development process are given below in detail.

Development of a Problem-Posing Evaluation Rubric

As the problem-posing tasks were open-ended, it was possible to create a great variety of problems from these tasks. Although this variety is a desired situation in terms of teaching, it presents several difficulties in terms of measurement (Silver & Cai, 2005). Here, the problem of which criteria a teacher will base his/her assessment on while using problem posing in the classroom arises. In this regard, Kwek (2015) stated that before making decisions, teachers should take into account their teaching objectives and the potential of problem-posing tasks to provide evidence of these objectives. The characteristics of the tasks complying with the teaching objectives provide the teacher with ideas to determine the criteria for assessing students. In other words, it is emphasized that the characteristics of a problem-posing task are important in determining criteria for the assessment of problem-posing tasks.

Silver and Cai (2005) talked about three main criteria that might be used for the assessment of problem posing. These are quantity, originality and complexity. Quantity refers to the number of problems correctly posed in

accordance with the problem-posing task. Here, the teacher can take into account the number of problems correctly posed by the student, as well as the number of correct answers that are different from each other. Constructing a large number of answers in a fluent manner has also been regarded as a measure of creativity (Guilford cited in Silver & Cai, 2005). When problem-posing tasks are used to measure creativity, the dimension of originality emerges as another evaluation criterion. Particularly in problem-posing tasks applied to a large number of people, the answer that is different from the typical answers given by the people is considered original (Silver & Cai, 2005). Another criterion of evaluation is complexity. Silver and Cai (2005) stated that complexity is a criterion that can be addressed in many respects. One way of evaluating complexity is to examine the scope of mathematical relationships within the problems posed by students. Kwek and Lye (2008), for example, discussed the complexity in terms of mathematical relationships involved in the problem. According to this approach, the problems of low complexity are considered to be problems for recalling and recognizing prior learning. Answers to problems with moderate complexity require more flexible thinking than the problems of low complexity, and these problems often involve more than one step. The problems with high complexity, on the other hand, require more abstract reasoning, creative thinking and association and analysis skills. Another way of evaluating complexity is to evaluate the difficulty level of problems (Silver & Cai, 2005). There is also linguistic complexity. The works of Silver and Cai (1996), Işık and Kar (2012) can be given as examples to the studies that accept linguistic complexity as a criterion.

In addition to the criteria of quantity, originality and complexity, there are also other evaluation criteria used. Vacc (1993), for example, evaluated the type of problem posed, and Canköy (2014) evaluated the solvability, logic, and structure of the problem. Kaba & Şengül (2016) looked at the language and expression of the problem, the compatibility of the problem with the mathematical principles, the type/structure of the problem and the solvability of the problem. The problem evaluation criteria discussed in the literature are summarised in Table 2.

Table 2. Major problem evaluation criteria

Researchers	Publication date	Problem evaluation criteria for characteristics
Kaba & Şengül	2016	The Text of the Problem (Language and Expression)
		The Compatibility of the Problem with the Mathematical Principles
		The Type/Structure of the Problem
		The Solvability of the Problem
Bonotto & Santo	2015	Flexibility
		Fluency
		Originality
Canköy	2014	Solvability
		Reasonability
		Mathematical Structure
Kwek & Lye	2008	Mathematical Complexity
Silver & Cai	2005	Quantity
		Originality
		Complexity
Silver & Cai	1996	Mathematical question/nonmathematical question/statement
		Solvability
		Mathematical Complexity
		Linguistic Complexity
Vacc	1993	Question Types

A closer inspection of the literature reveals that studies investigating problem-posing focused on different qualities depending on the research purpose. While developing the problem-posing assessment rubric in the current study, a detailed investigation of the problem qualities discussed in the literature was conducted (Bonotto & Santo, 2015; Canköy, 2014; Kaba & Şengül, 2016; Kwek & Lye, 2008; Silver & Cai, 1996; 2005; Vacc, 1993) and during this investigation, it was realized that a rubric to serve the purpose of the current study in particular needed. In line with the purpose of the study, the opinions of 8 math education experts were sought and thus the qualities to be taken into consideration in the current study were determined. The qualities taken into consideration in the current study are; clarity, mathematical accuracy, contextual originality, originality in terms of mathematical relations, complexity level and pertinence to the situation (Karaaslan, 2018, pp.265-280). While developing the rubric, rubric development stages proposed by Andrade (2000) were followed. Problem posing tasks left unanswered or incompletely answered were not taken into evaluation. Scores for the problems

were calculated by the researcher and another expert math educator and the reliability coefficient calculated according to Miles & Huberman (2015, s.64) formula "reliability = the number of agreements / (the number of agreements + the number of disagreements)" was found to be 0.92. The problems on which the experts could not agree were discussed again and thus an agreement was reached and the problem qualities scores were calculated according to this.

Findings

Findings on the First Research Question: "What are the Characteristics of the Problems That the Students Developed in the Linear Equations Courses Supported by a Problem-Posing Approach?"

The problems posed by the students were evaluated with the problem-posing assessment rubric and the findings obtained in relation to the qualities of the problem are presented in Table 3.

Table 3. Distribution of the scores across the problem qualities

Score	Clarity		Mathematical accuracy		Contextual originality		Originality in terms of mathematical relationship		Complexity level		Pertinence to situation qualifications	
	f	%	f	%	f	%	f	%	f	%	f	%
0	5	%2,3	56	%25,2	65	%29,3	31	%14	11	%5	24	%10,8
1	92	%41,4	31	%14	75	%33,8	165	%74,3	95	%42,8	60	%27
2	78	%35,1	49	%22,1	34	%15,3	22	%10	110	%49,5	42	%18,9
3	47	%21,1	86	%38,7	48	%21,6	4	%1,8	6	%2,7	96	%43,2

When the scores obtained by the students from the problem qualities were examined, it was found that only 5 problems (2.3%) were given 0 point for clarity. When there was unnecessary information in the problem statement, when the problem statement did not have unity; that is, when the problem was unclear, it was given 0 point. The fact that 41.4% of the students got 1 point shows that many problems could be understood when they were examined together with the information external to the problem, such as notes written on the problem task, notes on the graph and if there was, the solution to the problem. Seventy-eight (35.1%) of the problems were assigned 2 points, which shows that what was intended to be asked was understood in general but there is also some linguistic unclarity. The problems in this category include one or more difficulties, such as incorrect use of affixes, use of some words with wrong meanings or missing elements in the sentence (e.g., it was asked to write the equation. However, which linear relation should be written was not clearly explained). Only in 21.1% of the problems, the problem statement was clear and understandable which clearly shows that the students experienced difficulty in posing linguistically understandable problems.

When the mathematical accuracy of the problems was examined, it was found that 56 (25.2%) of the problems included understandings completely erroneous from a mathematical point of view. For example, cases such as thinking that the points in the coordination system can be summed up, not understanding that a point in the coordination system is an ordered pair or not understanding the relationship between two variables and the interdependent variation were assigned 0 point in terms of mathematical correctness. 31 problems (14%) were assigned 1 point. These problems included non-systematic mistakes. The problems in this category included one or more of the cases, such as improper use of definitions (improper use of mathematical definitions and expressions related to coordinate system, point, ordinate, axis etc.), mistakes resulting from calculation errors or inattention while posing the problem (e.g., although the linear correlation; that is, interdependent variation of two variables was conceptually understood, there were calculation errors), incorrect use of mathematical notations (showing ordered pairs without putting them into parentheses). A sample problem assigned 1 point in terms of mathematical correctness is illustrated in Figure 2.

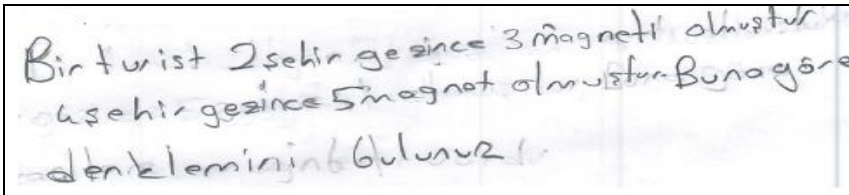


Figure 2. A sample problem assigned 1 point in terms of mathematical correctness

In this problem, it can be generally understood in respect of what is mathematically required. In the problem, it was intended to use the relationship between the number of cities visited and the number of magnets possessed. However, there is no expression showing that the relationship between the variables is linear. Moreover, it was not clearly explained between which variables the relationship that would constitute the equation was. Therefore, 1 point was assigned to it in terms of mathematical correctness. Forty-nine problems (22.1%) receiving 2 points for the mathematical accuracy included missing or unnecessary mathematical expressions. The problems in this category included one or more of the following cases: the values taken by the variables were exemplified with few numbers yet no expression indicating that the relationship persists as it is or that the relationship is linear was included in the problem; though it is understood that the graph related to the situation or the relationship between variables was asked to be drawn, it is not clear between which variables the relationship would be shown or which situation was asked to be shown on the coordinate system. Only 86 problems were assigned 3 points; that is, 38.7% of the problems included correct mathematical information, definitions, concepts and symbols.

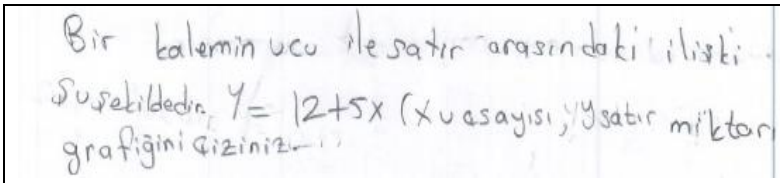
When the problems were examined in terms of contextual originality, it was found that 65 problems (29.3%) drew on usually used contexts that are not original, used in the courses or the textbooks. For example, when one of the following contexts was used, 0 point was assigned: the use of the desks in the classroom or the cinema context for the coordinate system, the use of distance-time relationship, consumed full-time relationship and the growth of a sapling-time relationship for a linear relationship. Problems receiving 1 point from the contextual originality are problems that can be encountered in textbooks, include frequently used contexts, and in which no contribution by the student to context is observed.

For example, when contexts such as determination of the position of the houses on streets or cars in a car park for the coordinate system; the number of pages read and the time passed, money put into a moneybox and the time passed for a linear relationship and equation graphs were used, then 1 point was assigned for the 75 problems (33.8%). Thirty-four problems (15.3%) problems receiving 2 points from the contextual originality included contexts that could be found in textbooks, yet in which some original contributions were made to the context by the student. On the other hand, 48 problems (21.6%) were evaluated to be contextually original problems. These problems included a thoroughly original context that had never been encountered in classes or textbooks.

For the originality in terms of mathematical relationships, 31 problems (14%) were assigned 0 point. These problems included the same mathematical topics and situations as the ones found in the problems frequently studied in classes and textbooks. For instance, they included relationships, such as asking the coordinates of new points on the coordinate system by shifting one point on the coordinate system, asking the distance of the points to each other, giving one of the variables making up the linear relationship and asking the other. A total of 165 problems (74.3%) were assigned 1 point. Problems receiving 1 point are not original in nature, and include mathematical subjects and situations in the problems of linear equations in books. For example, the problems including the following cases were assigned 1 point: creating a closed area with certain points on the coordinate systems and asking the circumference of the area, asking the formation of the graph, equation and table for a linear relationship. A total of 22 problems (10%) received 2 points. If the problem included a mathematical topic or situation similar to the problems presented in classes or textbooks but if various contributions were made to the situation, the problem was assigned 2 points in terms of originality in mathematical relationships. For example, the problems including cases such as the following: instead of asking the area of the closed shape constructed by combining certain points given in the coordinate system, giving three points and asking the addition of the fourth point so that the required shape could be formed (for example, to form a rectangle) and then asking for the calculation of the area of the rectangle to be formed in this way were assigned 2 points. If there was a problem requiring the use of a mathematical topic that had not been encountered in the problems of

linear equations in course or textbooks, then 3 points were assigned for this problem. Only four problems (1,8%) were in this category.

Eleven problems (5%) received 0 points from the complexity of the problem. Problems requiring the direct recall of the knowledge and not requiring any operations were assigned 0 points. Problems asking for showing an ordered pair on the coordinate system, giving a table or graphical representation of a linear relationship and asking the value of the other variable according to the value taken by one variable can be shown as examples of such problems. Ninety-five problems (42.8%) have a low level of complexity and they were assigned 1 point. Such problems required more than just recalling the prior knowledge. Nevertheless, they only required following the procedures and included one-step operations. For example, problems asking the distance between two points, requiring the formation of the next ordered pair in a problem in which table values of two variables are given, asking for the calculation of the value taken by the other variable in a relationship given with an algebraic expression in which the value of the one variable is known were included in this category. A total of 110 problems (49.5%) were found to have moderate complexity and they were assigned 2 points. The problems in this category require the problem solver to think more flexibly than the problems with low complexity, to decide what to do and to use information obtained from different representations. These are the problems generally solved in more than one step. Problems asking for the calculation of the area of the closed shape formed by combining many points given or of its circumference; asking for the verbal expression of a linear relationship and formation of the algebraic expression or graph suitable for this relationship; asking for the graph of a relationship on the coordinate system whose table values are given were included in this category. A sample problem receiving 2 points from the complexity is shown in Figure 3. The problem presented in Figure 3 requires a transition from an algebraic expression to a graphical representation.



The relationship between the tip of a pencil and the line is as follows: y = 12+5x (x = the number of tips, y= the number of lines). Draw the related graph.

Figure 3: A sample problem receiving 2 points from the complexity quality

Only 6 problems (2.7%) received 3 points from the complexity. Students' not being able to form complex problems is another remarkable finding. Complex problems require more reasoning and include multiple steps and decision-making points. For example, a problem in which three points are given in the coordinate system and asking for the formation of the fourth point under certain conditions and then asking for the calculation of the area of the closed shape to be constructed by combining these four points was assigned 3 points. Three points were also assigned to the problems requiring the formation of a table of a linear relationship and then asking for the formation of another relationship on the basis of these values in their complexity quality.

While posing a problem, students are first expected to attempt to meet the stated conditions. There are 24 problems (10.8%) receiving 0 points from compliance with the condition's quality. If a problem did not meet any of the conditions stated in the problem-posing task, it was assigned 0 points. The problem-posing tasks used in the current study were developed to address 3 different objectives. Each problem-posing task was designed to meet more than one condition. For example, there are cases in which points were asked to meet certain conditions in the subject of the coordinate system and a real-life situation was asked to be used in the problem. There are some cases in the subject of a linear relationship in which the type of representation to be used in the problem situation or solution is known and in addition to this, a different type of representation is asked to be used for the linear relationship. There are cases in the subject of linear equation in which the type of representation to be involved in the problem situation or solution is known and/or in which the use of a real-life situation is asked and/or in which special conditions are asked for the equation. Sixty problems (27%) only meeting one of these conditions were assigned 1 point. When many of the required conditions were satisfied, these problems were assigned 2 points and 42 problems (18.9%) were found to be in this category. Ninety-six problems (43.2%) were found to meet all the conditions required in the problem-posing task. Although the students were told to meet all the conditions involved in the problem-solving task throughout the lessons, more than half of them posed a problem not complying with the conditions. Instead of meeting all the conditions in the problem-posing task, the students may have focused on few conditions through which they thought they would pose suitable problems.

Findings on the Second Research Question: How do the Mean Scores Obtained from the Problem Qualities Vary According to the Objectives Set in the Curriculum?

In order to determine whether there are differences between the mean scores obtained by the students for each of the three objectives, one of the non-parametric tests; the Friedman test, which is used to compare more than two measurements belonging to one group, was employed in the current study. Results are presented in Table 4.

Table 4. Results of the Friedman test for the objectives

	Objectives	N	Mean Rank	df	χ^2	P
Clarity	Coordinate system	20	1.93	2	5.787	.055
	Linear correlation	20	1.68			
	Linear equation graph	20	2.40			
Mathematical accuracy	Coordinate system	20	1.98	2	4.880	.087
	Linear correlation	20	1.68			
	Linear equation graph	20	2.35			
Contextual originality	Coordinate system	20	1.43	2	24.080	.000
	Linear correlation	20	1.73			
	Linear equation graph	20	2.85			
Originality in terms of mathematical relationship	Coordinate system	20	1.43	2	10.364	.006
	Linear correlation	20	2.25			
	Linear equation graph	20	2.33			
Complexity level	Coordinate system	20	1.55	2	19.795	.000
	Linear correlation	20	1.65			
	Linear equation graph	20	2.80			
Pertinence to situation qualifications	Coordinate system	20	2.73	2	16.545	.000
	Linear correlation	20	1.70			
	Linear equation graph	20	1.58			

As can be seen in Table 4, there is no statistically significant difference between the mean scores obtained for the clarity of the problem in relation to the objectives ($\chi 2$ = 5.787, p (0.055) > 0.05). Similarly, no significant difference was found between the mean scores obtained for the mathematical accuracy of the problem in relation to the objectives ($\chi 2$ = 4.880, p (0.087) > 0.05). Given that the time of the course was not very long, that 3 class hours were allocated for the first objective, 5 class hours were allocated for the objective of a linear relationship and 4 class hours for the objective of equation graphs, it can be said that this period was not enough for the students to develop the clarity of the problem which is related to their communication skills. The determination of whether this quality can be developed by conducting longer courses can make some contributions to the field.

It was also found that there is no statistically significant difference between the mean scores obtained for the mathematical accuracy quality. It should be taken into consideration that different mathematical knowledge was required for each of the objectives concerning the mathematical correctness quality. For instance, while the correctness of the mathematical knowledge related to ordered pairs and represent ordered pair on the coordinate system was investigated for the subject of the coordinate system, the correctness of the mathematical knowledge in the subjects of expression of the linear relationship in a manner suitable for different representations and the formation of the graph for the drawing of the equation graph were investigated in relation to the objective of the linear relationship. However, working for a longer period on the same objective is considered to create a significant difference in the mean scores obtained from the mathematical accuracy quality.

As can be seen in Table 4, there is a significant difference between the mean scores of the contextual originality of the problem in relation to the objectives ($\chi 2$ = 24.080, p < 0.05). In order to determine the source of difference, Wilcoxon signed ranks test was used and the results are presented in Table 5.

Table 5. Wilcoxon signed ranks test results for contextual originality

Contextual originality		N	Mean rank	Sum of ranks	z	p
Linear correlation-Coordinate system	Negative sequence	5	10	50	$-.570^{b}$	.568
	Positive sequence	10	7	70		

	Equal	5				
Linear equation graph- Coordinate system	Negative sequence	1	1	1	-3.886^b	.000
	Positive sequence	19	11	209		
	Equal	-				
Linear equation graph– Linear correlation	Negative sequence	2	2	4	-3.771^b	.000
	Positive sequence	18	11.44	206		
	Equal					

b was arranged based on the negative sequence

In Table 5, the results show that there is no significant difference between the contextual originality mean scores in relation to the objectives of a linear relationship and coordinate system $(z = -0.570,\ p(0.568) > 0.05)$. On the other hand, a significant difference was found between the objectives of equation graphs and the coordinate system in favour of the objective of equation graphs $(z = -3.886,\ p < 0.05)$. When the difference between contextual originality mean scores for the subjects of equation graphs and the linear relationship was examined, a significant difference was found in favour of the subject of equation graphs $(z = -3.771, p < 0.05)$. As a result, it can be argued that the contextual originality means score obtained by the students from the problems they posed in the subject of equation graphs is higher than the contextual originality means scores obtained from the problems posed in the subjects of the linear relationship and coordinate system. That is, the students were able to pose more original problems for the objective largely addressed at the end of the study. Thus, it can be argued that the students' receiving an instruction supported with problem-posing throughout the lesson was influential in improving the contextual originality.

According to the results of the Friedman test, the originality in terms of mathematical relationships quality mean scores vary significantly by the objectives $(\chi^2 = 10.364,\ p < 0.05)$. In order to determine the source of this difference, Wilcoxon signed ranks test was run. The results of this test are shown in Table 6.

Table 6. The results for the originality in terms of mathematical relationship quality

Originality in terms of mathematical relationship		N	Mean Rank	Sum of ranks	z	p
Linear correlation- Coordinate system	Negative sequence	5	9.20	46	-2.207^b	.027
	Positive sequence	15	10.93	164		
	Equal	-				
Linear equation graph- Coordinate system	Negative sequence	3	10.67	32	-2.560^b	.010
	Positive sequence	16	9.88	158		
	Equal	1				
Linear equation graph– Linear correlation	Negative sequence	9	8.78	79	$-.284^b$	.776
	Positive sequence	9	10.22	92		
	Equal	2				

b was arranged based on the negative sequence

As can be seen in Table 6, there is a significant difference between the mean scores of the originality in mathematical relationships for the objectives of the linear relationship and coordinate system in favour of the objective of the linear relationship $(z = -2.207,\ p < 0.05)$. A significant difference was also found between the mean scores obtained from the originality in mathematical relationships for the objectives of equation graphs and the coordinate system in favour of the objective of equation graphs $(z = -2.560,\ p < 0.05)$. No significant difference emerged between the mean scores obtained from the originality in mathematical relationships for the objectives of the equation graphs and linear relationship $(z = -.284,\ p(0.776) > 0.05)$.

As a result, it seems that the problems posed for the objectives of the linear relationship and equation graphs are more original in terms of mathematical relationships than the problems posed for the coordinate system. There is no statistically significant difference between the mean scores obtained for the objectives of equation graphs and linear relationship. However, because mean scores for the objective of equation graphs are slightly higher than the mean scores for the objective of linear relationship, it can be argued that as the instruction process progressed, the students' scores acquired from the originality in mathematical relationships quality also

increased. Thus, it can be said that the problem posing-enhanced instruction had positive effects on the originality in mathematical relationships quality. When the process progressed and the students posed more problems, they attempted to integrate more different mathematical relationships into their problems.

According to the results of the Friedman test, the complexity level quality mean scores vary significantly by the objectives $(\chi^2 = 19.795,\ p < .05)$. In order to determine the source of this difference, Wilcoxon signed ranks test was run. The results of this test are shown in Table 7.

Table 7. Wilcoxon signed ranks test results for the complexity level

Complexity level		N	Mean Rank	Sum of Ranks	z	p
Linear correlation- Coordinate system	Negative sequence	8	9.38	75.00	$-.459^{b}$	.646
	Positive sequence	10	9.60	96.00		
	Equal	2				
Linear equation graph- Coordinate system	Negative sequence	2	10.25	20.50	-3.160^{b}	.002
	Positive sequence	18	10.53	189.50		
	Equal	-				
Linear equation graph– Linear correlation	Negative sequence	2	7.50	15.00	-3.363^{b}	.001
	Positive sequence	18	10.83	195.00		
	Equal	-				

b was arranged based on the negative sequence

Table 7 shows that there is no significant difference between the mean scores of the complexity level for the objectives of the linear relationship and coordinate system $(z = -0.459,\ p(0.646) > 0.05)$. However, between the mean scores for the objectives of equation graphs and coordinate system, there is a significant difference in favour of the objective of equation graphs $(z = -3.160,\ p < 0.05)$. The mean scores of the complexity level quality for the objectives of equation graphs and linear relationship, there is a significant difference in favour of the objective of equation graphs $(z = -3.363\ p < 0.05)$. As a result, it can be said that the problems posed in the subject of equation graphs are more complex than the problems posed in the subjects of the linear relationship and coordinate system. Although no significant difference was found between the mean scores obtained for the objectives of the linear relationship and coordinate system, the mean score obtained for the objective of linear relationship was found to be slightly higher than that of the objective of the coordinate system. In this regard, it can be concluded that the students were able to pose increasingly more complicated problems throughout the process. Thus, it can be argued that the problem-enhanced instruction had positive effects on the complexity level of the problem. According to the results of the Friedman test, the mean scores gotten from the pertinence to situation quality varied significantly depending on the objectives $(\chi^2 = 16.545,\ p < 0.05)$. In order to determine the source of this difference, the non-parametric Wilcoxon signed ranks test was administered. The results of this test are presented in Table 8.

Table 8. The results for the compliance with the quality of the conditions

Pertinence to situation qualifications		N	Mean Rank	Sum of Ranks	z	p
Linear correlation- Coordinate system	Negative sequence	15	10.67	160	-3.250^{b}	.001
	Positive sequence	3	3.67	11.00		
	Equal	2				
Linear equation graph- Coordinate system	Negative sequence	18	10.36	189.50	-3.685^{b}	.000
	Positive sequence	1	3.50	3.50		
	Equal	1				
Linear equation graph– Linear correlation	Negative sequence	10	10.65	106.50	$-.056^{b}$	.995
	Positive sequence	10	10.35	103.50		
	Equal	0				

b was arranged based on the negative sequence

According to the results in table 8, there is a significant difference between the mean scores acquired from the pertinence to situation qualifications for the objectives of the linear relationship and coordinate system $(z = -3.250,\ p < 0.05)$. Also, there is a significant difference between the mean scores for the objectives of equation graphs and coordinate system, in favour of the objective of the coordinate system $((z = -3.685,\ p < 0.05)$. And, there is no significant difference between the mean scores for the objectives of equation graphs and linear relationship $(z = -0.056\ p(0.995) > 0.05)$. Thus, it can be argued that the problems posed by the students within the objective of the coordinate system are in greater pertinence to situation qualifications. When the problem-posing tasks given in the subject of the coordination system were examined, it was seen that there were fewer conditions when compared to those found in the subjects of the linear relationship and equation graphs. In the subjects of the linear relationship and equation graphs, there were more semi-structured problem-posing tasks, showing that there were certain conditions required to be met in the problem-posing task. It is argued that the types of problem-posing tasks rather than the content of the objective affected the scores gotten from the pertinence to situation quality.

Results, Discussion and Suggestions

When the scores obtained from the problem qualities are examined, it is seen that the thoroughly clear problems constitute 21% of all the problems posed. The difficulty experienced by students in posing problems has also been reported in other studies (e.g. Cetinkaya, 2017; Kwek & Lye, 2008). As for the current study, it should be noted that the students encountered problem posing for the first time and that a total of 12 class periods were allocated to the teaching of the subject of the linear equation. No significant difference was observed between the scores acquired from the clarity of the problem for the objectives. However, it is contended that when students pose more problems in classes, they will be able to improve the clarity of the problem, one of the qualities the students were found to be bad at.

In the analysis schemes used in some of the problem-posing activities, it was observed that the problems including mathematically missing/incorrect data were not included in the evaluation (Bonotto & Santo, 2015; Silver & Cai, 1996; Silver & Cai, 2005; Kwek & Lye, 2008). In a study conducted by Kwek and Lye (2008) with 120 gifted middle school students, they first separated the problems that could not be solved by using the scheme developed by Silverand Cai (1996) and then performed various analyses related to the level of complexity of the solvable problems. However, in these studies, especially when the problems that require calculations with four operations are examined, it is seen that it is not possible to reach a solution when there is missing data. In the current study, on the other hand, when the student's drawings, graphs and solutions are examined holistically in some posed problems, it appears that a general idea about what was asked could be gained. For example, a student used the expression "the sum of the origin's points" in his/her problem. Here, it is understood that the student wanted to refer to the numerical values of the apsis and ordinate components of the origin. This problem was subjected to evaluation and its errors were evaluated within the mathematical correctness quality.

When the mathematical accuracy of the problems was examined, only 38.7% of the problems were evaluated as completely and mathematically correct and received 3 points. As a result, given that fewer than half of the problems posed by the students were completely correct in mathematical terms, it can be said that the math problems posed were inadequate in terms of mathematical accuracy quality. The mean scores of the students in the mathematical accuracy quality were found to be not varying significantly depending on the objectives. Here, it should be noted that different math knowledge was used for each objective about the mathematical correctness quality. However, the determination of whether different results can be obtained when the period of the study directed to the same subject or same objective is extended can make some contribution to the field.

For the mathematical accuracy quality, it may not always be possible to understand whether students have posed their problems with the awareness of mathematical requirements involved in their problems based on the written documents of the posed problems. It has been revealed in previous studies that some students have various misconceptions especially about the subject of linearity (De Bock et al., 2002; Hadjidemetriou & Williams, 2002; Leinhardt et al., 1990). In the current study, interviews were not conducted with the students about all the problems they posed. However, it is believed that for the problems posed in subjects, such as linearity in which students are expected to experience some difficulties, conducting interviews or asking students to explain their problems through the courses will allow for conducting a better evaluation of the issue under investigation.

Another remarkable finding is that the mean scores acquired by the students from the contextual originality and originality in mathematical relationships qualities are lower than the mean scores from the other qualities

addressed in the current study. It was found that 21.6% of the problems received 3 points for their originality; namely, they were evaluated as being original. Only 1.8% of the problems were found to be original in terms of mathematical relationships. Thus, it seems clear that the students were not successful in posing mathematically original problems. The high majority of the problems received 1 point for their mathematical originality; namely, it was seen that majority of the students posed problems including mathematical relationships that can be seen in textbooks. Similar results have been reported by the studies investigating problem-posing skills in terms of originality in the literature. To illustrate, Bonotto (2013) conducted a study on children aged 10-11 and found that the majority of the problems posed are similar to the problems found in textbooks. Korkmaz and Gür (2006) stated that while posing problems, the pre-service teachers adhered to textbooks. Cetinkaya (2017) also reported that while the 5^{th} graders were posing problems, they used the same contexts and posed problems similar to the problems they had seen in their academic life. Therefore, it can be inferred that students tend to pose problems in the ways they have encountered before and that they experience difficulty in posing problems that can be considered original. On the other hand, towards the end of the research process, the scores obtained from the contextual originality and originality in mathematical relationships qualities can be said to have increased. Thus, it is suggested that the problems posed by the students have made positive contributions to the development of these qualities.

When the problems were examined in relation to the complexity of the problem, 42.8% of the problems were found to be at the low complexity level while 49.5% of the problems were found to be at the moderate complexity level. Only 2.7% of the problems were found to be highly complex and to include more reasoning and decision-making steps. Similar results were also found in the study conducted with the gifted middle school students in that more than half of whose problems were found to have a low level of complexity (Kwek & Lye, 2008). Investigating the mathematical complexity of problems, Silver and Cai (1996) gave a problem-posing task and asked the students to pose problems. As a result, problems like the ones requiring the distance taken by two cars driven by two different people were posed and the complexity of these problems was evaluated on the basis of the relationships they included. Apparently, there is no single way of evaluating the complexity; there are severaş different ways of doing this on the basis of the responses given depending on the structure of the problem-posing tasks. In the current study, on the basis of the complexity level rubric used by Kwek and Lye (2008), the complexity of the problem was evaluated in a more general structure. The complexity level quality of the rubric developed in the current study is thought to be suitable for the problems posed in all subjects.

When the mean scores obtained from the complexity level quality were examined, no significant difference was found between the objectives of the linear relationship and coordinate system. Though there is no significant difference between the mean complexity scores, the mean complexity score obtained for the objective of the linear relationship is slightly higher than the coordinate system. On the other hand, a significant difference was found between the mean complexity score in the subject of equation graphs and the linear relationship and coordinate system subjects in favour of the subject of equation graphs. In the course of the research process, the students were found to be able to pose more complex problems.

In relation to the pertinence to situation quality, 43.2% of the problems were found to have completely satisfied the conditions while 10.8% of them were found to have satisfied none of them. When the mean scores obtained from the pertinence to the situation were evaluated in terms of the objectives, a significant difference was found in favour of the mean score in the subject of the coordinate system. When the problem-posing tasks were examined, it was seen that there were fewer conditions involved in the problem-posing tasks given within the subject of the coordinate system; thus, it is thought that students were able to pose problems more pertinence to the situation in the subject of coordinate system.

A quality related to the compliance of the problems with the objectives, which is similar to pertinence to situation quality of the current study was addressed in a study conducted by Özgen et al. (2017). However, the structure of the problem-posing activities was analysed in relation to gender, achievement etc. yet no analysis was conducted in relation to qualities. Cai et al. (2013) reported that a small percentage of the students were able to write problems complying with the required conditions and that the percentage of the problems satisfying at least one condition is 14.3% for the subject of equation systems and 18.3% for the task of graphs. Similarly, in the study of Canadas et al. (2018), students had some difficulties in posing a suitable problem to the given situation. It was stated that posed problems syntactic structures were different from the given symbolic expressions. They stated that students posed problems by changing the relationships between variables, adding new variables or adding new relationships (Canadas et al., 2018).

In the current study, problem-posing was integrated into classes and the qualities of the problems posed by the students throughout the process were identified. However, as stated by Cai et al. (2013), it is thought that a

measurement and evaluation approach to be applied after students have been engaged in problem posing for a longer period of time and gained more experience about it will yield more efficient outcomes. In the current study, the classes to which problem posing was integrated were limited to 12 class hours. Throughout the study, the scores obtained from the originality in mathematical relationships, contextual originality and complexity level qualities were observed to increase. As a result of the integration of problem-posing into classes for a longer period, it is believed that the subject will be understood better and more improvement will be observed in problem-posing skills.

When the literature was reviewed, it was seen that different rubrics were developed for different subjects. On the basis of the rubrics used in other studies for different subject areas, the qualities that could be found in the subject of linear relationships, which is the subject of the current study, and in other math subjects were detected (Clarity of the problem, mathematical accuracy, contextual originality, originality in terms of mathematical relations, complexity level, pertinence to situation qualifications). The rubric developed in the current study can also be used to evaluate the problems posed in different subjects and the results obtained in this way can be compared with the results reported in the literature.

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Are We Online or in Class? Students' Smartphone Usage Habits

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Abstract

Smartphones, which enable us to be online everywhere and every time, are also commonly used by students today. This study aims to reveal undergraduate students' habits of using smartphones. With this purpose, the phone usage track application was installed on students' smartphones, and their 7-day use was recorded with the application and was then analyzed. In addition to that, the students' views on using smartphones during classes were also investigated through open-ended questions. As a result, it was found that they used their smartphones for 4 hours and 50 minutes on average and that they used the same or different applications approximately 380 times a day. The most frequently used smartphone applications were found to be social media and messaging applications. The students were found to use their smartphones the most intensely between 21.00 and 24.00. The majority of the students used their smartphones during classes and their reasons for using the phones for non-educational purposes were more than the reasons for using them for educational purposes. The students stated that they used their smartphones for non-educational purposes such as check the time, make calls, and texting and for educational purposes such as research, take the photo of the blackboard or slides. While the great majority of the students had negative views about using smartphones during classes, some of them also had positive views.

Key words: smartphone, classroom settings, students' habits, usage habits, online in a classroom

Introduction

Smartphones, which is an indispensable part of our daily lives (Bagci, 2019), are not only used to make a phone call or to write text messages now (Ariel, Elishar-Malka, Ayidar, & Levy, 2017) but they also offer users with possibilities from entertainment, shopping, communication and banking transactions to preparing homework (Nayak, 2018; Yıldız, 2018). One of the locations where smartphones are now available in the classroom (Rozgonjuk, Kattago, & Täht, 2018). The statement "students have smartphones" no longer gives amazing or extraordinary information (Jesse, 2015). Students do not break their ties with the outside world even when they enter the classroom, and they keep using their phones both for in-class and out-of-the class activities (Synnott, 2015). However, the framework for the effects of students' use of smartphones in the classroom was not drawn clearly in the literature. According to some research, using smartphones in the classroom can cause students' distraction, discontinuation of learning processes (Pulliam, 2017; Uğur & Koç, 2015) and even lower academic scores (Synnott, 2018). Although there are many studies in the literature regarding the negative effects of problematic smartphone use outside the classroom on academic achievement (Kates, Wu, & Coryn, 2018; Rozgonjuk, Elhai, Ryan, & Scott, 2019; Rozgonjuk, Saal, & Täht, 2018; Samaha & Hawi, 2016), there are no definite results especially in the literature related to receiving lower academic scores; because there are studies in the literature claiming that using smartphones in-class have positive, negative or ineffective on students' academic achievement (Dempsey & Brennan, 2018; Lepp, Barkley, & Karpinski, 2015; Ng, Hassan, Nor, & Malek, 2017)).

Despite insufficient evidence for its contributions to students' learning (O'Bannon, Waters, Lubke, Cady, & Rearden, 2017), smartphones that individuals of any age and almost any economic status possess should be employed for learning purposes (Joyce-Gibbons et al., 2018). Although smartphones entered into our life so much, they have made course contents of educational institutions accessible from anywhere and they have made it possible to access to information in a short time; they are not still used in the classroom for learning at the

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desired level (Kim, Lee, & Rha, 2017). Identifying students' habits of using smartphones and their views on using smartphones in the classroom became important at a time when especially mobile learning is becoming so widespread, when several learning and teaching methods are being used in relation to the use of smartphones (Tossell, Kortum, Shepard, Rahmati, & Zhong, 2015) and when classrooms are so much invaded by smartphones.

Students' Smartphone Usage Habits

Smartphones can be defined as a combination of the internet and mobile phones. Especially young people use smartphones- which make it possible for people to have access to any content at any time and place- to watch videos, to communicate and to search on the internet (Cha & Seo, 2018). Various research on the purposes of using smartphones is available in the literature. Tammy Lin (2019), in a study investigating university students' use of smartphones in Taiwan, stated that students were permanently online and permanently connected- in other words, they were seriously addicted. Cha and Seo (2018) found that students mostly used smartphones for the purposes of the instant messenger. It was pointed out that those phones were also intensely used for searching the web and for listening to music. Jesse (2015) found that the applications that were the most useful to students were the calculator and translation applications and that such applications as social media and weather forecasts were also considered to be useful by students. It was stated by students that the most frequently used applications were social media, instant messenger, and mail applications and that the activities most frequently done were scanning on the web and playing games. The most frequently used social media applications were Facebook, Twitter, and Pinterest, respectively. Alfawareh and Jusoh (2014) investigated students' habits of using smartphones by means of surveys and they found that students used their phones generally for making phone calls, searching on the internet and taking photos. Students also said that they often used their phones to look at the clock and to download software. They also said that they used their phones to have access to social media. Robert and Rees (2014) pointed out that students used their smartphones to send text messages, to access social media (Facebook) and to check their e-mails. Another study investigated students' habits of using smartphones in general and in the classroom and their thoughts about the habits. Accordingly, students said that they used their smartphones when they felt bored or when they needed information. Besides, more than half of the students were found to check their smartphones and send text messages during classes (Emanuel, 2013).

Smartphone Usage in Class

It is apparent that the device apart from computers and tablet PCs students prefer most using in the classroom is their smartphone (Aggor, Tchao, Keelson, & Diawou, 2019). However, it is stated that using smartphones in the classroom and even in school is mostly forbidden (Lellis-Santos & Halpin, 2018). Moreover, some of the teachers were angry with the students for using smartphones in the classroom (Synnott, 2018). Because smartphones can distract students' attention (Anshari, Amunawar, Shahrill, Wicaksono, & Huda, 2017; Lellis-Santos & Halpin, 2018). Despite this, there are also attempts at integrating smartphones into the classroom made by teachers (Anshari et al., 2017). Considering these two contrasting situations, smartphones can be said to be the greatest challenge teachers can encounter in the 21st century (Kuznekoff, Munz, & Titsworth, 2015). On the other hand, Beland and Murphy (2016) found that forbidding smartphones in schools did not cause an increase in students' academic achievement significantly. They stated that schools should not ignore the fact that students have smartphones. In support of this view, a study investigated students' use of mobile devices (tablet PCs, Laptops and smartphones) and it found that students generally used smartphones in classes (Robert & Rees, 2014). Supporting educational innovations, technologies, developments and policies such as "Bring your Own Device" (BYOD) (Joyce-Gibbons et al., 2018; Koroleva, 2016) and on the other hand taking precautions against students' use of such devices can seem to be conflicting. This contradiction can also be seen in the literature. In some studies, it has been stated that smartphones have a great potential in terms of teaching-learning and by creating a learner-centered teaching process support students' learning and motivation when used appropriately in the classroom (Kartal, 2019; Roblyer, 2016). On the other hand, Shrivastaya and Shrivastaya, (2014) found that students had negative perceptions about using smartphones in the classroom. It is stated that students keep using their smartphones in the classroom despite this (Tammy Lin, 2019).

There are some researches to investigate the views of the teachers and students about using the smartphone in the classroom. Investigating teachers' and students' views on using smartphones in the classroom Aldrich (2017) found that both sides views are similar. Smartphones were a good educational instrument and that circumstances had changed and therefore teachers and students should adapt to the new circumstances. Uğur

and Koç (2015), consulting students' views, found that students considered smartphones as disturbing tools in the classroom. They also found that students used smartphones mostly for personal purposes and that very few students used their phones for educational purposes. It was stated that smartphones were used to reach various knowledge through the internet, to take the photo of the board and to make calculations for educational purposes. A similar finding that smartphones cause students' distraction is also obtained by Kim et al. (2019). For this reason, in addition to the fact that smartphones- which are said to be useful in many respects- will be harmful when used extremely should be taken into consideration. It was reported in another study that students said smartphones made their learning more effective although they distracted their attention. In addition to that, it should not be forgotten that students keep using their phones in classes in spite of teachers' warnings (Fernandez, 2018). Anshari et al. (2017) collected data from students through interviews and surveys and they concluded that smartphones helped students to learn, they were easy to carry, they contained visuals and they offered detailed learning experiences and therefore they facilitated students' access to knowledge. It was also stated that smartphones contributed to students' communication with their teachers outside the classroom and to their interaction with their teachers and classmates for their group projects. It is stated that it is difficult to integrate smartphones into the classroom despite all these. Interactive and interesting learning and teaching environments integrated with the subject should be created without distracting students' attention. On the other hand, distraction, low-quality face-to-face interaction and addiction are the other negative sides of phones. In addition, there should be rules for using smartphones in the classroom and that students should obey them to avoid all those negative effects (Anshari et al., 2017).

As seen in the literature, there are studies examining students' smartphone usage cases, but the use of smartphones in the classroom based on real data has not been found. In this respect, it is thought that our study will make an important contribution to the literature. In addition, our study is important in terms of revealing the students' use cases through real data by relating their views about their use in the classroom. In this context, the aim of this study to reveal students' habits of using smartphones and their views on using smartphones in classes. Therefore, the length of time they used their phones and the applications they used were recorded through phone usage track application (PUTA) which was installed on students' phones, and then the data were analysed. Additionally, students' views on using smartphones during classes were also analysed. Thus, answers were sought to the following research questions:

1) How are the smartphone usage habits of students?
    a) How long do students use their smartphones daily?
    b) How many times a day do students use the applications on their smartphones?
    c) How is the distribution of the applications students use the most frequently?
    d) How is the distribution of the periods of time students use their smartphones the most intensively?
2) What is the status of students' in-class smartphone use habits?
    a) What is the duration and rate of students using their smartphones during class hours on weekdays?
    b) For what purposes do students use their smartphones in the classroom?

Method

Research Design

Quantitative and qualitative methods were used together in this study. In order to determine the smartphone usage habits of the students in a more realistic way, daily data collection method via mobile application was used in quantitative part. In this method, users' general behaviours (answering the phone, hanging up the phone, emailing, text messaging, the internet, etc.) are recorded but no information is obtained about the screen and the keys pressed- that is to say, about the content of use. The case study design was chosen for qualitative part. Case studies are used to explain and describe a limited system or phenomenon under investigation by providing in-depth analysis within the framework of questions such as "How", "What" and "Why" (Merriam & Tisdell, 2015; Yin, 2018). The purpose of choosing the case study design was to investigate students' views and thoughts on using the smartphone during classes.

Participants

The participants were chosen on the basis of purposive and volunteer sampling methods. First of all, it has been determined that university students who have classes in a formal education institution on all weekdays should participate in the study. After that, only those who were volunteering were included in the research. 89 students

participated in the study at the beginning- whose demographic data are shown in Table 1. All participants are vocational high school students at a public university in Turkey.

Table 1. Participants

	f	%	Age (M)
Gender			
Female	45	50.6	20.85
Male	44	49.4	20.64
Department			
Public Finance	25	28.1	20.38
Civil Defence and Firefighting	22	24.7	20.09
Human Resource Administration	17	19.1	20.73
Computer Programming	15	16.9	22.23
Public Finance	10	11.2	21.22
Grade			
First	56	62.9	20.45
Second	33	37.1	21.27
Used Operating System			
Android	75	84.3	20.89
IOS	14	15.7	20
Total	89	100	20.75

Table 2. PUTA loaded participants

	f	%	Age (M)
Gender			
Female	19	70.37	20.94
Male	8	29.63	21.50
Department			
Public Finance	8	29.6	21.04
Civil Defence and Firefighting	7	15.9	20.29
Human Resource Administration	5	18.8	21
Computer Programming	4	14.8	23
Public Finance	3	11.1	20.67
Grade			
First	16	59.3	20.75
Second	11	40.7	21.78
Total	27	100	21.12

Table 2 shows the distribution of students whose phones PUTA was installed according to gender, department, grade, and mean age. Data were collected from 27 students shown in Table 2 to find answers to research question 1 and 2a in this study. Qualitative data were collected from 89 students shown in Table 1 to support the research question 2a and to answer research question 2b.

Data Collection Process

Firstly, the students declared in written that they voluntarily participated in in the study. The students who had taken part in the research at the beginning (89 students) were asked to express their views on using smartphones in classes. The views of the students were taken in written through a form consisting of open-ended questions. In the second stage, another written permission was received from students whose phones (Android) PUTA could be installed (75 students). At this stage, it was explained to the students that PUTA to be installed on their smart phones never records personal information, only information about usage behaviour. The application could not be installed on some students' (14 students) phones since it was not compatible with the operating system of the phones (IOS). PUTA- which recorded how much the students used their smartphones a day and what programmes they used daily- was installed on the smartphones of the researchers. The application does not obtain students' personal information, and neither does it send to others. It only records their habits of use. The pop-up notifications of the application were switched off and thus the students did not feel that the application was working. In this way, efforts were made to identify their real levels of use.

Following the installation, the students were asked to use their device normally for a week and then to contact the researchers to obtain the records on their phones and to remove the application from their phones. The data of 48 students could not be obtained due to deleting the application from their phones or the application not saving the data regularly. For this reason, only the data saved in 27 students' phones were collected. At the end of one week, the file saved in the phones by PUTA was taken by the researcher and thus the data collection process was completed. Data were collected in fall semester of academic year 2017-2018. The data collection process was completed in a month. The data collection process is shown in Figure 1.

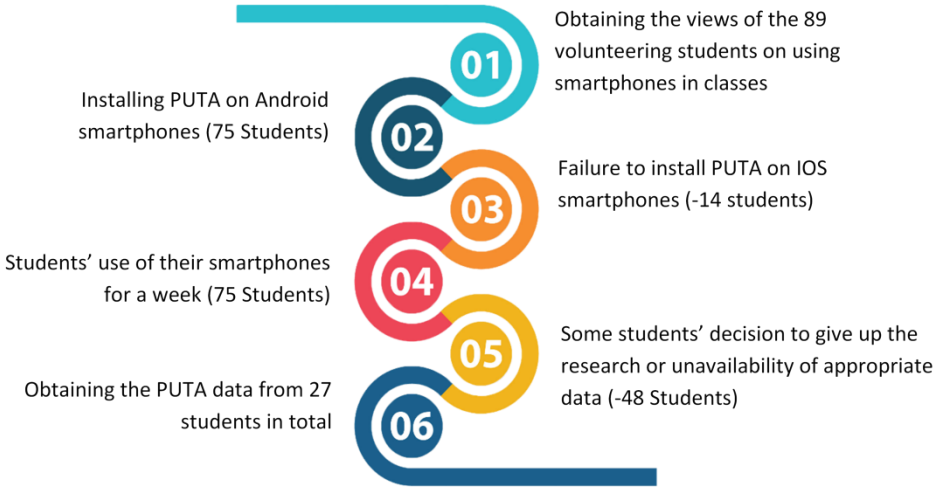

Figure 1. Data collection process

Data Collection Tools

PUTA

The data concerning how long students used their smartphones, which applications the used and how many times a day they used their phones were collected through an Android-based application, PUTA. Whether or not the application saved the records of using smartphones accurately was tested by installing the application on the researchers' smartphones. It was found that the application- which was found to save the records accurately in the researcher's phone- did not save the records regularly in some models of smartphones. Therefore, the records were taken only from those phones in which the application had regular records. The application does not absolutely save users' personal information or private content.

Open-ended Questions

The students' views about using smartphones in classes were obtained through open-ended questions. The open-ended questions were formed by the researchers in accordance with views of the experts in the field. The open-ended questions that the participants were asked to answer within the scope of this study were as in the following:

1) Do you use your smartphone during classes?
2) If so, for what purpose do you use it?
3) If you use it for education, explain how you use it.
4) What convenience does a smartphone offer you?
5) What other thoughts do you have on using smartphones in classes?

Data Analysis

The quantitative and qualitative data collected in the study were analysed independently. Behaviours of use saved by PUTA were analysed. The records taken from students' smartphones were transferred to the Microsoft Excel and the data were analysed by using descriptive statistics methods such as frequencies, percentages and mean. In addition to that, the qualitative data collected through open-ended questions were analysed by using thematic content analysis method. The thematic analysis provides higher level of interpretation of a

phenomenon (Vaismoradi & Snelgrove, 2019). In the first step of thematic analysis, the data are reviewed and recognized. In the second step, codes are created from the data. Themes are created by associating the similar codes, and the created themes are defined and named (Clarke & Braun, 2013; Miles & Huberman, 2013). In this study, the students' responses to the open-ended questions were reviewed and coded firstly and then classified and presented in accordance with the themes.

Results

Students Smartphone Usage Habits

Students Smartphone Daily Usage Time

On examining the means for students' use of smartphones for a week, it was found that they used their smartphones approximately 290.95 minutes a day- that is to say, 4 hours and 50 minutes a day. It was found that they used their smartphones the most on Mondays (5 hours and 49 minutes) and the least on Fridays (4 hours and 5 minutes). The means for the other days is shown in Table 3.

Table 3. Students smartphone daily usage time

Days	Mean (Minutes)	Mean (Hours)
Monday	349.22	5 hours 49 minutes
Tuesday	289.00	4 hours 49 minutes
Wednesday	313.26	5 hours 13 minutes
Thursday	266.22	4 hours 26 minutes
Friday	245.33	4 hours 5 minutes
Saturday	271.70	4 hours 31 minutes
Sunday	301.93	5 hours 2 minutes
Mean	**290.95**	**4 hours 50 minutes**

Students Smartphone Daily Usage Count

Table 4 shows the mean count of daily use of the smartphones by students. Daily usage count should be considered as the number of times students check or use the applications in their phones. The highest number of using the smartphones was on Tuesdays whereas the lowest number of using them was on Saturdays and Sundays. The students checked their smartphones 382 times a day on average. On looking at the averages for the number of times they checked their phones an hour, it was found that they used the smartphones in their phones at least 15 times an hour.

Table 4. Students smartphone applications usage count

Days	Count (day)	Count (per hour in a day)
Monday	374.33	15.60
Tuesday	401.44	16.73
Wednesday	397.15	16.55
Thursday	391.11	16.30
Friday	386.00	16.08
Saturday	358.67	14.94
Sunday	365.93	15.25
Mean	**382.09**	**15.92**

Most Commonly Used Applications by Students and Usage Time

The most frequently application the students had used for 7 days and the length of time they had used them were investigated. Figure 2 shows the distributions of the length of time of the most frequently used applications for a week (in minutes). The students were found to use 38 different applications. The application most frequently used by the students was Instagram. The students used Instagram for approximately 75 minutes a day. The second most frequently used application was WhatsApp while the third most frequently used application was YouTube.

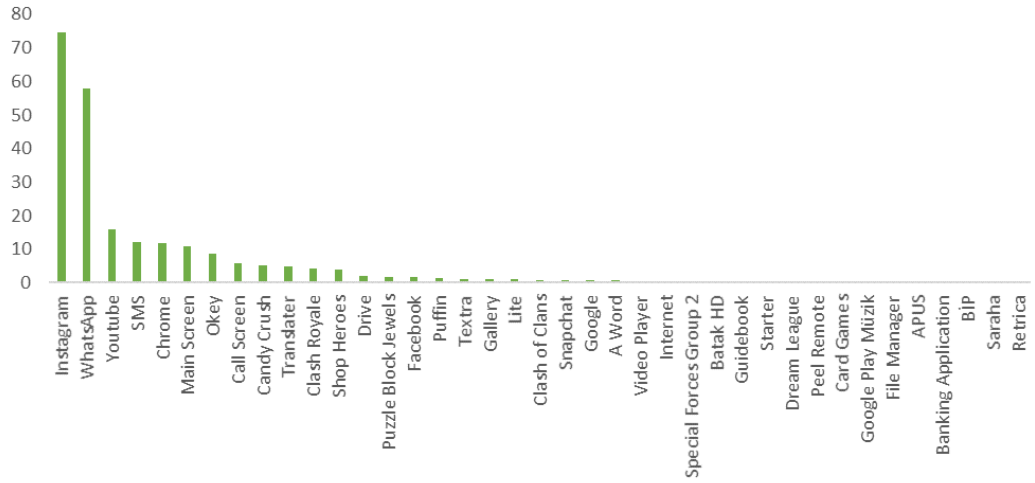

Figure 2. Applications used by the students (Daily mean minutes)

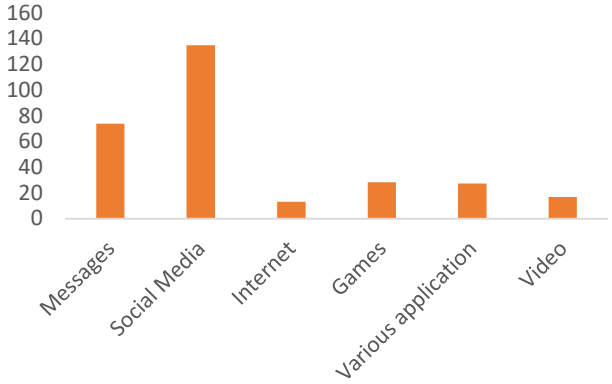

Figure 3. Categories of the applications used by the students (Daily mean minutes)

Figure 3 shows the distribution of the applications according to categories. The classification of the applications used by the students was based on the classification made by Lee, Ahn, Choi, & Choi (2014). An examination of Figure 3 shows that the category of applications the most frequently used by the students is the applications related to social media and that the students use them approximately 80 minutes a day. They were followed by the applications used for texting and video-related contents. Some applications (e.g. Instagram, YouTube, WhatsApp, Facebook) can take place in more than one category (e.g. social media, video, or messages). However, in this study, these types of applications have been classified in only one category according to their primary purpose.

Students' Daily Smartphone Usage

The distribution of periods of time students use their phones the most intensely during the day is shown in Figure 4. Accordingly, it was found that the students used their phones between 21:00 and 00:00 the most intensely. Students use their phones between 1:00 and 12:00- the first half of the day- less than the other half of the day.

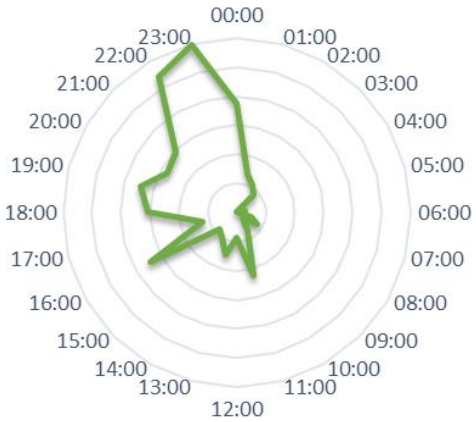

Figure 4. Students' daily smartphone usage

Students' Habits of Using Smartphones in Class

Students' Periods of Using Smartphones During Class Times

Students' length of time of using their smartphones during class hours on weekdays was investigated. Accordingly, how long students used their smartphones between 8:00 and 12:00 and between 13:00 and 17:00 on weekdays when they had classes was examined. Table 5 shows the distribution of lengths of time students used their smartphones on weekdays when they had classes. Accordingly, it was found that students used their smartphones more than an hour and 40 minutes in the period when they had 8-hour classes.

Table 5. Length of time students use their smartphones in class hours

Days	**Mean**
Monday	117.59
Tuesday	106.26
Wednesday	103.89
Thursday	83.26
Friday	91.19
Mean	**100.44**

Figure 5 shows the responses that 89 students had given to the question "Do you use your smartphone during classes?" in support of the data shown in Table 5. Hence, 64% of the students said that they used their smartphones in classes while 36% said that they did not use their smartphones in classes.

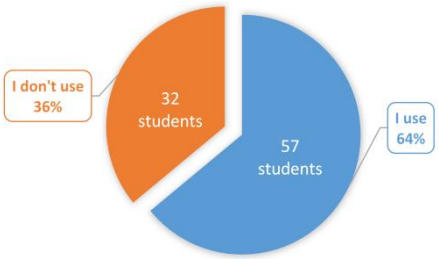

Figure 5. Students' Smartphone Usage in Class

Smartphone Usage Purposes in Class

When the reasons for the students' use of smartphones in classroom were examined, it was found that they used their phones for both educational and non-educational purposes. Students stated that they used the smartphones to check the time (29), calls, or messages (23) for non-educational purposes. Table 7 shows students' other non-educational purposes of using their smartphones in the classroom.

Table 7. Non-educational usage purposes of the students

	f
Check the time	**29**
Check the calls and messages	**23**
Check the social media (Instagram, Twitter & Facebook)	**12**
Spend time (because of getting bored with the lesson)	9
Surf on the Internet	6
Play a game	2
Check the applications	2
Total	**83**

Table 8 shows students' reasons for using their smartphones for educational purposes. It was found in this study that students used their phones specially to discourse-related research (38) or to take the photos of course-related content (15).

Table 8. Educational usage purposes of the students

	f
Do course-related research and get detailed information about a subject on the Internet	**38**
Take the photos of course-related slides or of what is written on the blackboard	**15**
Use as a calculator	**10**
Use it for educational purposes in general	6
Follow the course-related documents	4
Watch the videos of subjects which I do not understand in a course	3
Take notes	2
Swap lecture notes with my classmates	1
Use it as a dictionary	1
Total	**80**

On examining the students' views on the convenience that smartphones offer them during classes, it was found that a considerable number of students (23) indicated smartphones offered convenience in doing research about a subject. They stated that smartphones helped them to reach in a short time and easily the information requested by the teachers. Some of them (11) stated that they had used their phones to take notes or to take the photos of course content, and therefore it offered them great convenience. Students also indicated that they did not have enough time to take notes since their teachers quickly moved on to another subject. Table 9 shows in detail students' views on the convenience that smartphones offer them.

Table 9. Students' views about the advantages of using smartphones in class

	f
Research	
Make it possible to research about a subject during a class	**23**
Help to reach quickly the questions the lecturers ask	**12**
Help to reach more course-related information more easily and faster during a class	4
Make it easier to learn the unknown concepts	3
Make it possible to research about the content and to be comprehensively informed of it	3
Help to comprehend the subjects in a shorter time	1
Taking notes	
Help to take the photos of the blackboard or the presentation and to take notes more quickly	**11**
Make it easier to take notes quickly in general	4
Make it possible to follow a class through electronic content	3
Help to highlight the important points of a slide	1
Make it possible to record video or audio during classes	1
Other	
Offer convenience in distance education	2
Make it easier to check the time	2
Help to get rid of boredom when getting bored in class	1
Total	**69**

The students' views on using smartphones in classes were divided into three categories. The categories and detailed findings are shown in Table 10. The views of the students were classified into three categories; negative views on using smartphones in classes, views supportive of using them in classes, and other views. The students

who held negative views (25) expressed that smartphones hindered them from focusing on a lesson and that they distracted their attention. 19 students directly stated negative views on using smartphones in classes. It was found that the number of students who supported using smartphones was less than the number of students who did not support it. 16 students stated that it was beneficial to use smartphones in classes and that it made courses easier. Some of the students (10) indicated that smartphones could be used in relevant situations in the lessons, otherwise they should not be used. In the category of other views, 3 students stated that it was boring to listen to the lecturer during a class and therefore smartphones should be used.

Table 10. Students' views on smartphones usage in class

	f
Views That don't Support to Use in Class	
Distracts the attention	25
Students should not use smartphones	19
Cause students to neglect classes and to fall behind	3
Causes to distract others' attention	4
Disrupts the flow of a lesson	2
Distracts lecturers' attention	2
Causes waste of time	1
Gives harm to students	1
Views That Support to Use in Class	
Smartphones are beneficial and they make courses easier	16
Smartphones is useful if it is related to the course, otherwise they should not be used	10
Smartphones should be used as they helps with research	5
Smartphones should be used, but access to social media should be blocked	1
Smartphones should be used without disturbing anybody	1
Offer convenience when used beneficially	1
Should be used at the right time without distracting attention	1
Other Views	
Boring to constantly listen to the lecturer, so smartphones should be used	3
Smartphones should be with students so that they can reach their families	1
Lecturers should not take students' smartphones	1
Total	97

Discussion

This paper investigated students' habits of using smartphones in classes and their views on using them in classes. The data concerning their habits of using smartphones were collected through PUTA. Students status of using their smartphones and their views on the use of smartphones in classroom were identified by means of open-ended questions.

It was found that the students used their smartphones 290.95 minutes- 4 hours and 50 minutes- a day. They used their phones the most on Mondays but the least on Fridays. Students' length of time in using their phones was found to increase when compared with the findings obtained by Lin et al (2015) (4 hours and 20 minutes). The increase in the length of time in using smartphones might have stemmed from the fact that smartphones became more and more integrated into our life. A comparison with the findings obtained by Soegoto (2019) demonstrated that the length of time decreased (nearly 6 hours). The reason for the decrease might be that the study conducted by Soegoto (2019) was based on the data coming from a survey rather than the real data. There can be differences between the students' own statements and real data (Lee et al., 2017). It was found that the students used their smartphones 382 times a day on average- that is to say, they used the applications in their phones every four minutes. Lin et al. (2015) found that the number of daily use was 73.1 on average. A comparison of the finding of this study with the one obtained in Lin et al. demonstrated that students' use of their smartphones had increased more than 5 times approximately. The increase is natural due to the fact that smartphones have increasingly become a part of our life (Richardson, Hussain, & Griffiths, 2018) and that we use smartphones almost in everything in daily life (Nayak, 2018). Besides, it is a finding supportive of the results obtained in Office of Communication (OFCOM, 2018). OFCOM (2018) reported that individuals aged 15-24 use their phones more than 4 hours a day. The reason why students use their smartphones the most on Monday might be that it is the first workday of the week. Students might be using their phones more on the first weekday because they cannot adapt to classes and school life following the weekend break. It can be said that the length and number of their use of phones decrease as the weekdays pass by; because it was found that the

length of use and the number of times students used the applications decreased at the weekend when compared to the use on weekdays.

The distribution of the most frequently used application of the students was also found within the scope of this study. Instagram, WhatsApp, and YouTube were the most frequently used applications. When classified the applications into categories, it was found that the students used their smartphones mostly for social media, texting and video watching purposes. This finding confirms partially the findings obtained in Robert and Rees (2014), Cha and Seo (2018) and Tammy Lin (2019); because it should not be forgotten that the social media applications which students said were the most frequently used applications were mingled with instant messaging applications in this study and that they were used for both purposes. Thus, the finding that students use their smartphones most frequently for instant messaging and social media purposes obtained by Cha and Seo (2018), Robert and Rees (2014) and Emanuel (2013) are parallel to the one in this study in this respect. One of the most important reasons for students why they used social media the most frequently might be that they wanted to keep up to date (Vanozzi & Bridgetock, 2013). They thought that they would be informed of the latest status of their friends or of happenings in social media quickly in this way. Ariel et al. (2017) found that the second application used frequently in smartphones was Call Screen (Voice Call). The difference might have stemmed from the fact that the average age in this study (M=21.12) was different from the one in the study (M=25.45) conducted by Ariel et al. (2017) or from the fact that the participants in both studies owned different characteristics.

It was found that the students used their phones the most between 2:00 and 24:00. It was a finding supportive of the one that smartphones were using the most between 19:00 and 24:00 obtained by Localytics (2018). However, it was in contrast to the finding that students used their phones mostly in the afternoon obtained by Lee, Ahn, Nguven, Choi, and Kim (2017). On considering the time frame restrictions made by Lee et al. (2017) in relation to the use of phones, the time frames obtained in this study can be said to being the evening (18:00-22:00) in part and in at night (22:00-07:00) in part. The students might be using their phones more intensely in those periods of time because they are not busy or because they are less busy in those parts of the day. In other words, it can be said that students choose to use their smartphone for longer periods of time when they are not busy or when they get bored.

The students were found to use their smartphones for an hour and 40 minutes between 8:00 and 17:00 at class time. Considering the fact that breaks between classes are 10 minutes and that they communicate with their friends face to face rather than online in those periods, it is clear that the students use their phones for approximately 13 minutes in each class. Kim et al. (2019) also fund that students looked at their phones every 3 or 4 minutes and that it caused their attention to distract. In support of this finding, the majority of the students said that they used their smartphones during classes. 64% of the students said that they used their smartphones during classes. In a similar way, Emanuel (2013) found that more than half of the students used their smartphones in classes. It was a result supporting the result that students were connected to the internet and they used their smartphones during classes- which was obtained by Tammy Lin (2019) and by Aggor et al. (2019). All these indicate that we should face the existence of smartphones- which are said to have no significant effects on academic achievement (Beland & Murphy, 2016). Besides, the fact that students use their phones approximately 13 minutes in each class can also stem from teachers' integrating smartphones into their classes.

On examining the reasons for using smartphones in classes, it was found that non-educational purposes were more than educational purposes. The students were found to use their phones specially to check the time, search, text or to check the messages. Similarly, Uğur and Koç (2015) obtained that the majority of the students used their phones to check the time. On the other hand, it was also found that the students used their phones to take the photo of the blackboard or to make calculations. It was stated that smartphones were also used to make calculations and to research the unknown concepts. This finding supports Fernandez (2018), who found that students mostly used their smartphones to look up unknown words, to research and to take the photo of the blackboard in classes. It is also emphasised that smartphones offer such advantages as contributing to retention in learning since they appeal to more than one sensory organ, and as being easy to carry (Anshari et al., 2017). Uğur and Koç (2015) found that students mostly used their smartphones to text and that a small number of students used them to support their learning. On the other hand, this study found that a great number of students used their smartphones for different educational purposes. Therefore, the findings obtained in this study are conflicting with the result of Uğur and Koç (2015).

The great majority of the students consider smartphones as a factor that distracting their attention in classes. This finding supports the results of Hirsh-Yechezkel et al. (219), Pulliam (2017), and Uğur and Koç (2015); because students themselves also state that using smartphones distracts their attention. The finding that "they

cause our attention to distract"- the first negative thought found in this study- also supports this result. Similarly, Anshari et al. (2017) included distraction in attention and weakening in the quality of communication with students in the list of difficulties that teachers can encounter in integrating smartphones into classrooms. This indicates that the issue of attention is important when there is a desire to integrate smartphones into classrooms. It was found that the majority of students were of the opinion that smartphones should not be used in the classroom. While the majority of the students reported negative views about smartphones, a smaller number of them said that smartphones should be used in classes. This finding is in contrast to Fernandez's (2018) conclusion that most of the students believe that smartphone use makes learning more effective. Because it is seen that the positive opinions regarding the use of smartphones for educational purposes in class are less than the negative opinions. Aldrich (2017) concluded that both students and teachers supported using smartphones for educational purposes but they were against using phones for personal purposes. In this context, it can be said that what is important is the purpose of using smartphones. However, it should not be forgotten that there are certain disadvantages of using smartphones even if they are used for educational purposes. In addition to that, the fact that students used their smartphones every 4 minutes in class even though they said that they were distracted by phones and that they had negative views about using them in classes indicated that they were in a contradiction.

Conclusion

As a result, the views of the students and the findings obtained through PUTA were revealed that the students used their smartphones intensively both in-class and out-of-class. It was determined that the students used instant messaging and social media applications intensively on their smart phones. It was concluded that the students' use of smartphones in the class was mostly for non-educational purposes, but they used them for educational purposes, albeit limited. Although the majority of the students have negative opinions about the use of smartphones in the classroom, there are also students who stated that they can be used for educational purposes in the classroom. In line with these results, it can be said that students will continue to use smartphones in the class. Therefore, teaching environments should be designed considering the positive and negative effects of smart phones. It is thought that this study will provide significant contributions to the literature in terms of analyzing the students' in-class and out-of-class smartphone usage amounts, time intervals, purposes and reasons with a quantitative and qualitative approach with a holistic perspective.

Limitations and Recommendations

The findings obtained in this study are limited to PUTA installed on smartphones. Besides, the findings are limited to students studying at a public university and participating in the study. Another limitation is that some of the applications can be considered as applications of messaging, social media and the Internet. The basic properties of the applications were taken into consideration in classifying them. It was also assumed that the students' weekly course schedule was run normally.

The following recommendations can be made in the line of the findings obtained in this study:

1) The students were observed to use their smartphones intensely during the day. Therefore, precautions can be taken by teachers and administrators to integrate smartphones into classrooms.
2) It was found that students used their smartphones the most between 21:00 and 24:00. Activities that students can do through their smartphones in those periods of time can be planned.
3) Research can be done on how students can use their favorite applications for educational purposes.
4) Model researches for the integration of smartphones in the classroom can be conducted and possible challenges that teachers may encounter can be revealed.
5) The views collected in this study represent the voice of students. Investigating the opinions of the lecturers on this subject and reaching a common opinion can be achieved.
6) The students said that they used their smartphones for non-educational purposes to check the time. Students' checking the time can cause their attention to distract and it can result in their involvement in other applications in their phones. Therefore, if students have watches, their use of smartphones for non-educational purposes can be hindered.
7) It was found that Monday was the day the students used their smartphones the most; because students had problems in adapting to classes on weekdays. Therefore, students can be offered support in adaptation to classes on Mondays.
8) Social media was found to be the type of application the students used the most frequently. Accordingly, a practice can be made to use social media platforms for educational purposes.

9) It should be kept in mind that using smartphones in classes can distract students' attention. Thus, teachers or administrators should highlight the rules about using smartphones in the classroom.
10) The students were also found to use their smartphones in the classroom to check calls and messages. Students can be asked to block the incoming calls and messages during classes. In this way, using for non-educational purposes can be hindered even though they are not used for educational purposes.

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The Effect of Argumentation-Based Organic Chemistry Teaching on Students' Argument Construction Skills

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The Effect of Argumentation-Based Organic Chemistry Teaching on Students' Argument Construction Skills

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Abstract

Some students could not learn organic chemistry because of the difficulty of its submicroscopic nature. In this study, it was aimed to determine the effect of argumentation-based organic chemistry teaching on high school students' argument construction skills so on their meaningful concept learning. The study was conducted on 14 high school students at a vocational high school in Turkey on organic chemistry topics through 28 hours period based on the case study. The teaching guide's worksheets and students' observation notes were used as data collection tools. Through the application process, the students criticized each of the seven submicroscopic nature of organic chemistry concepts' paintings in big group discussions, then constructed their own arguments. Then the students evaluated the whole process. Content analysis was employed for the data analysis. Argumentation making students criticize the submicroscopic nature of organic chemistry resulted in a qualified student-constructed argument by making them understand the submicroscopic nature so become critical thinkers. Students' process evaluation also underlined that the process made students joyful, motivated, creative, criticizer, and meaningful learners with a differently constructed learning environment. For further studies, different argumentation-based organic chemistry teaching environments could be offered.

Key words: Organic chemistry teaching, Argumentation, Argument construction, Meaningful learning, Critical thinking

Introduction

Why do not some students learn chemistry? The students try hard, but the submicroscopic nature of chemistry makes it difficult (Nakhleh, 1992). We still do not have a change of seeing molecules, atomic or subatomic particles with any of the advanced instruments. We know these particles' existence by beams-particles interactions through the advanced analysis; thus, it is equally difficult for teachers to arrange teaching environments for making students understand the submicroscopic nature of chemistry that is still invisible.

Teaching students the submicroscopic nature of chemistry would be meaningful for students if only proper scientific images about the submicroscopic nature of chemistry concepts could be constructed in students' mental schemes. Conceptual image can be expressed as holding a conceptual representation of an image as a mental picture in one's mind (Mackenzie & White, 1981). For example, if one keeps an image of the crystal form of sodium chloride in one's mind, it means that one can envisage sodium chloride ions, their ionic sizes, and the ions' electrostatic interactions, as well as the sodium chloride's unit cell structure and the crystal form comprised of these unit cells (Eyceyurt-Türk & Tüzün, 2018). Then, it is essential to employ proper teaching methods for constructing teaching domains in chemistry to make students gain appropriate concept images while learning chemistry concept meaningfully. Argumentation, which is based on inquiring - criticizing concepts, is one of the current teaching methods for making students critical thinkers to construct scientifically correct concept images so learn meaningful. Argumentation is also conducted in effective speech communication to improve critical thinking and construct proper concept images (West, 1994). Argumentation was defined as "a social, intellectual, verbal activity serving to justify or refute an opinion, consisting of statements directed towards obtaining the approbation of an audience" (Van Eemeren, 1985, cf., Driver, Newton

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& Osborne, 2000, p. 292). Argumentation is also "the coordination of evidence and theory to support or refute an explanatory conclusion, model, or prediction" (Suppe, 1998, cf., Osborne, Erduran & Simon, 2004, p. 995).

Argumentation training in the learning environments has two main functions: one is an inquiry process that brings together learners in the coordination of conceptual and epistemic goals, and the other is to allow the trainers to evaluate the progress of the students' scientific thinking and reasoning throughout the training (Osborne, Erduran & Simon, 2004). Argumentation, which is a teaching method, provides some information about the distinction between argument and argumentation. Argument refers to "the substance of claims, data, warrants, and backings that contribute to the content of an argument, whereas argumentation relates to the process of assembling these components, in other words of arguing" (Simon, Erduran, & Osborne, 2006, p. 237).

Engaging students with argumentation processes require the use of argument patterns. The diversity of argument patterns from the literature are like Lawson (2003, p. 1390) argument pattern -hypothesis, planned test, prediction, observed result, conclusion - and Walton and Reed (2003, p. 201) argument pattern - premise, premise, premise, conclusion - whereas the most common is Toulmin (2003, pp. 90-96) argument pattern - claims, data, warrants, qualifiers, backings, rebuttals-. According to Toulmin argument pattern:

> Claims: Assertions about what exists or values that people hold.
> Data: Statements that are used as evidence to support the claim.
> Warrants: Statements that explain the relationship of the data to the claim.
> Qualifiers: Special conditions under which the claim holds true.
> Backings: Underlying assumptions that are often not made explicit.
> Rebuttals: Statements that contradict data, warrant, backing or qualifier of an argument (1958, cf., Simon, Erduran & Osborne, 2006, p. 240).

An example of an argument according to Toulmin argument pattern can be seen at Figure 1.

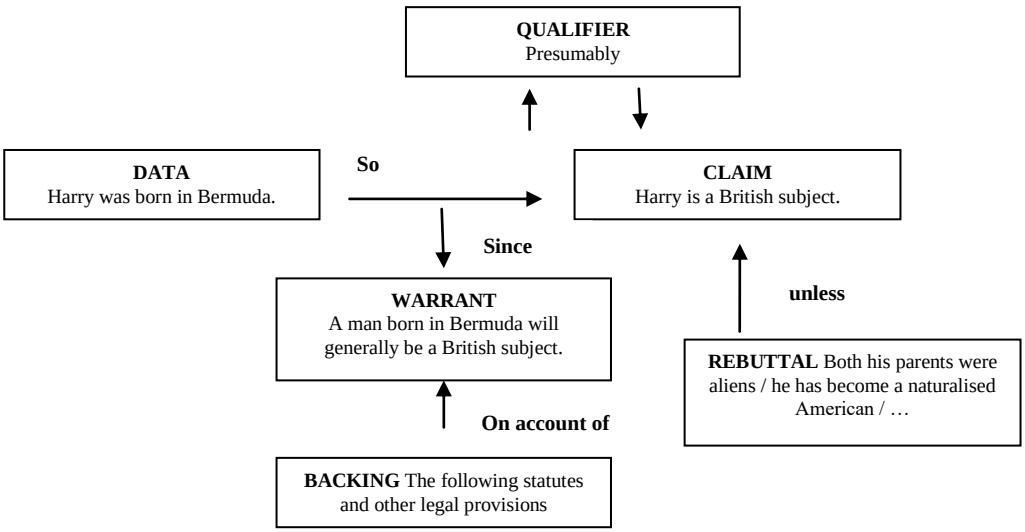


Figure 1. An example of an argument according to Toulmin argument pattern components (2003, p. 97)

Many strategies are being used in argumentation such as table of statements, concept maps, experiment reports, competing theories, and predict-observe-explain processes in literature (Erduran, 2007). Being different from the literature in the current study, drawings were offered as an argumentation strategy for making meaningful the submicroscopic nature of chemistry for students through images.

On the other hand, along with the changes and developments of the 21st century, countries are organizing science curricula to develop critical thinking of individuals to adapt to innovations. However, this situation cannot be appropriately integrated into the classes since teachers do not have enough knowledge about critical thinking or that the meaning attributed to critical thinking is not clear (Vieira, Tenreiro-Vieira & Martins, 2011). Thus, "What do we mean by the term 'critical thinking'?" Although there is no consensus on the definition of critical thinking for researchers, Norris and Ennis (1989, cf., West, 1994, p. 3) define critical thinking as

"reasonable and reflective thinking that is focused upon deciding what to believe or do". In other words, Scriven and Paul (2003) stated that "critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action" (cf., Cook, 2008, p. 13). Critical thinking can be stated in argumentation as the process of the argumentation, which would also give a chance to students to construct much more properly scientific images in their mental schemes as a product of criticizing their own and others' thinking strategies in depth.

There are studies on argumentation-based teaching environments, argument construction skills, meaningful learning, and critical thinking in literature. In a research, a general chemistry laboratory course was constructed on the basis of argument driven inquiry as an instructional model. Making students criticize their own and each other thinking strategies, making students construct arguments through inquiry would make students critical thinkers. This study modelled how to design an argument driven inquiry chemistry lab session for making student critical thinkers through arguing (Kadayifci & Yalcin-Celik, 2016). West (1994) conducted an argumentation education with 74 students by using an experimental design with pre and post-test control group for improving students' critical thinking. At the end of the study, it was found that the experimental group's students were successful than the control group' students based on 'data interpretation' and 'argument' subtests. In another study, argument structures and critical thinking questions were examined. There had been an application process for six months. Experimental design with pre and post-test control groups were employed in this study too. The study showed that experimental group's students could not only construct critical thinking questions successfully but also could construct arguments containing arguments and counter-arguments at the same (Nussbaum & Edwards, 2011). Kabataş-Memiş and Çakan-Akkaş (2020) investigated the effect of argumentation supported by inquiry on fifth-grade students' critical thinking skills. Experimental design was employed. The lessons in the experimental group were constructed on argumentation supported by inquiry. It was underlined that argumentation supported by inquiry made experimental group students' critical skills enhanced. In a different study, Think-Read-Group-Share-Reflect (TRGSR) argumentation strategy was utilized for improving high school students' critical thinking based on Toulmin argument pattern (TAP). Experimental design was used. 50 twelfth-grade students participated in the research. Experimental group lessons were with TRGSR based on TAP. Watson-Glaser critical thinking appraisal Form–S was employed for evaluating the critical thinking of both groups as pre and post-test. After a nine-week period, a significant difference among the groups were found in means of critical thinking (Giri & Paily, 2020).

For all these reasons, this study examines the effect of argumentation-based organic chemistry teaching on high school students' argument construction skills so on meaningful learning and critical thinking. Being aware of the missing studies in literature about argumentation-based organic chemistry teaching and the need of it, the current investigation would exemplify a detailed educational application process for further studies (Eyceyurt-Türk, Tüysüz & Tüzün, 2018). Hence the study's research question is: What is the contribution of argumentation-based organic chemistry teaching to students' submicroscopic nature of organic chemistry perceptions via their argument construction skills?

Method

Theoretical Framework: The Case Study

This study employed the case study as the theoretical framework. The cases of interest in education are people and programs. It is interested in them for both their uniqueness and commonality. It was sought to understand them in depth (Stake, 1995, p. 1). This framework is especially suited for this study since the case of interest is argumentation-based organic chemistry teaching as the program and its effect on students' argument construction skills so on their submicroscopic concept understanding and critical thinking as the people. Through the study, students' evaluation about the whole process was taken, but the study was not a phenomenological one since students' argument construction skills; thus, their concept understanding, and critical thinking were examined too.

Setting and Participants

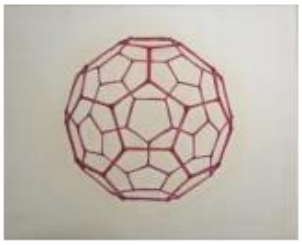
This study was conducted at a vocational high school in Turkey. The first semester of the organic chemistry course was the focus of the investigation. It was met a class of 14 students for four hours per week for seven weeks which was a total 28 hours period for this study. Reachable sampling was employed for this study since the participants were one of the researchers' backyard. All the participants were willing. The participants were

female because of the vocational high school's type. The participants were being educated on arts at this occupational high school.

Instruments

For enhancing high school students' critical thinking by making them argue the submicroscopic nature of organic chemistry concepts via argument construction, first, seven paintings were created by a professional artist parallel with Ministry of National Education's 12th-grade organic chemistry teaching targets. The paintings illustrated the submicroscopic nature of organic chemistry concepts successfully. Three different science educators checked the paintings' content validity. The science educators' suggestions were reflected in the teaching process, such as "Atoms do not have colors, using color in paintings is only for presentation to help to recognize the different atoms."

In the second step, an argumentation-based organic chemistry teaching guide for enhancing students' critical thinking skills by criticizing the submicroscopic nature of organic chemistry concepts and constructing their own arguments was constructed. The teaching guide consisted of seven activities, making students create their own arguments after analyzing, arguing and criticizing the submicroscopic nature of concepts in the paintings. The first painting was about an organic compound (methane), the second one was about carbon allotropes (fullerene), and the third was about Lewis's formulas about organic compounds (methane's Lewis's formula). The fourth was about hybrid orbitals of organic compounds (ethylene's hybrid orbitals), fifth about molecule geometries of organic compounds (tetrahedral geometry of methane), sixth about functional groups of organic compounds (ethyl alcohol and diethyl ether), and the last one about isomers in organic compounds (three isomers of pentane). Hence, the first instrument was determined as the teaching guide. Three different science educators checked the teaching guide's content validity. In Figure 2, examples from the teaching guide were given.



Painted by Başak, 2016

After analyzing, arguing and critizing the painting in a big group discussion, construct your claim about the painting (allotropy concept).

.....

Find statements (data), that could be used as evidence to support your claim.

.....

Construct warrants to explain the relationship of your data with your claim.

.....

Guarantee your warrants with backings to underline your assumptions that are not explicit.

.....

Describe the rebuttals, statements that contradict either your data, warrant or backing of your argument.

.....

Painted by Başak, 2016

After analyzing, arguing and critizing the painting in a big group discussion, construct your claim about the painting (isomery concept).

.....

Find statements (data), that could be used as evidence to support your claim.

.....

Construct warrants to explain the relationship of your data with your claim.

.....

Guarantee your warrants with backings to underline your assumptions that are not explicit.

.....

Describe the rebuttals, statements that contradict either your data, warrant or backing of your argument.

.....

Figure 2. Examples from the teaching guide's worksheets

Students' observation notes were used for evaluating the whole process. Thus, the second instrument was determined as observation notes. The observation notes' content validity was also checked by three different science educators. Three independent science educators checked the instruments' reliability, 95 percentages were calculated as the researchers' coding and categorizing consistency. For coding, categorizing, and cross-content analysis Erickson's (2004) research was used.

Data Collection and Analysis

Before the application session, argumentation strategy and critical thinking's meaning were introduced to the students. During the application session, the students analyzed, argued, and criticized each of the seven paintings in big group discussions, criticized their own and others' thinking strategies, and then constructed their own arguments individually based on Toulmin (2003, pp. 90-96) argument pattern components (claims, data, warrants, backings, and rebuttals) throughout four hours per each of the paintings. In a traditional learning session, the students only listen to the teacher; however, a constructivist social context was constructed for students - they were able to access interactive board, organic chemistry presentations, organic chemistry simulations, questions about organic chemistry, Ministry of National Education's 12th grade online chemistry book, and each other and teacher so to criticize the submicroscopic nature of chemistry in this study. At the end of the application session, students evaluated the whole process. The content analysis was employed. First codes were constructed, then the codes categorized on the philosophical logic of which argument contained what codes as a whole category, and then frequencies-percentages calculations were made. Cross-content analysis (Erickson, 2004) – making sure that each of the codes is under a category - was made for data reliability. For the content analysis process, it would be beneficial to underline how argumentation, making students criticize the submicroscopic nature of chemistry, and argument construction would enhance students' critical thinking. Based on Cambridge International Thinking Skills Syllabus (2020-2022), being able to construct scientifically true arguments would mean the students gained critical thinking skills.

Results and Discussion

After analyzing the data, the results were given in two subtitles: students' argument construction skills and students' process evaluation.

Students' Argument Construction Skills

Toulmin's argument pattern components (claims, data, warrants, backings, rebuttals) were used as codes, the student constructed arguments were analyzed according to these codes, then these codes' combinations made the categories. For each of the categories, frequencies and percentages were calculated. The analysis could be seen in Table 1.

Table 1. Student constructed arguments' analysis for each of the seven paintings*

	f - %										
Painting about	**CD**	**CDW**	**CDB**	**CDR**	**CDWR**	**CDBR**	**DWBR**	**CWBR**	**CDWBR**	**CDD WBR**	**total**
1.Identifying organic compounds				1 7% S3	2 14% S8, 11				11 79% S1, 2, 4, 5, 6, 7, 9, 10, 12, 13, 14		14 100%
2.Carbon allotropes	1 7% S13	2 14% S8, 10	2 14% S4, 5	1 7% S9					8 57% S1, 2, 3, 6, 7, 11, 12, 14		14 100%
3.Lewis formulas of organic compounds						1 7% S3			13 93% S1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14		14 100%
4.The hybrid orbitals of organic compounds					1 7% S5	1 7% S13			11 79% S1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12	1 7% S14	14 100%

5.The molecule geometries of organic compounds		1 7% S5	1 7% S14	1 7% S8		1 7% S10	10 71% S1, 2, 3, 4, 6, 7, 9, 11, 12, 13	14 100%
6.The functional groups of organic compounds							14 100% all	14 100%
7.Isomery in organic compounds	1 7% S5				1 7% S14		12 86% S1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13	14 100%

*It would be beneficial to underline that only the third painting is about the symbolic nature of chemistry. Except that all other paintings are about the submicroscopic nature of chemistry. In Table 1, claim was shown by C, data by D, warrant by W, backing by B, rebuttal by R, frequency by f, percentage by %, and student by S.

As can be seen in Table 1, student-constructed scientifically correct arguments based on all Toulmin's argument pattern components were 79, 57, 93, 86, 71, 100, and 86 percentages through the paintings. The students' conceptual understanding in other words submicroscopic thinking skills via constructing arguments would be adopted adequate by the three science educators if only scientifically correct arguments based on all Toulmin argument pattern components would be 33% for each of the paintings. It can be seen in Table 1, all the percentages are over 33%; thus, it can be said that students' concept understanding, in other words submicroscopic thinking skills via constructing arguments are adequate so their critical thinking skills' improvement is too since scientifically proper argument construction means the improvement of critical thinking too according to Cambridge International Thinking Skills Syllabus (2020-2022).

Student constructed arguments from worksheets were given below for strengthening the findings.

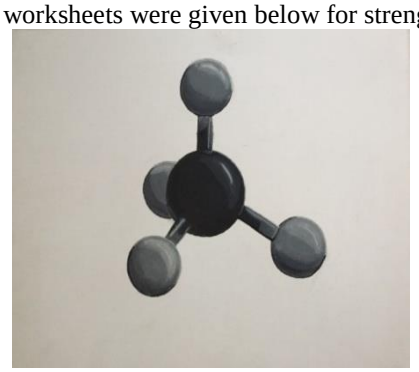


Figure 3. Painting about identifying organic compounds *(Painted by Başak, 2016.)*

The argument of student 2 (S2): CH_4 is an organic compound (claim). It consists of C and H (data). If a compound consists of C, H, O, N and S atoms, then it is an organic compound (warrant). For forming this organic compound, C makes four bonds with H (backing). A compound could have C atoms that does not mean it has to be an organic compound always (rebuttal).

The argument of S5: CH_4 is an organic compound (claim). It is combustible (data). Organic compounds are combustible (warrant). C_2H_6 is an organic compound, and it is combustible too (backing). If a compound is combustible that does not mean it has to be an organic compound (rebuttal).

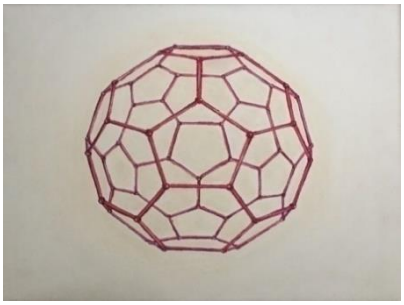


Figure 4. Painting about carbon allotropes *(Painted by Başak, 2016.)*

The argument of S1: Fullerene is an allotrope of carbon (claim) because of its' shape in space (data). The other carbon allotropes differ from fullerene because of their shapes in space (warrant). For example, graphite's layer formation differs from other carbon allotropes (backing). If we could find a chemical in space like fullerene formation, then the warrant would be invalid (rebuttal).

The argument of S4: Fullerene can be used in nanotechnology (claim). When K is vaccinated to fullerene, its' conductivity increases (data). Nanotube can be used in nanotechnology like fullerene (backing).

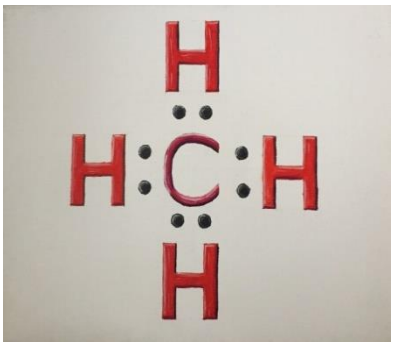


Figure 5. Painting about Lewis formulas of organic compounds *(Painted by Başak, 2016.)*

The argument of S12: Lewis' formula of methane is  (claim). Electron dot structure is the basis for this (data). Dots showed the electrons of C and H's orbitals with the highest energy in Lewis' formula (warrant). Lewis' formula of methanol is  (backing). If the concept of Lewis' formula loses its' scientific value, then the warrant would be invalid (rebuttal).

The argument of S13: Lewis' formula of methane is  (claim). C and H use two electrons per bond (data). C makes four bonds with H atoms (warrant). The structural formula of methane is  (backing). If Lewis' formula loses its scientific value, then the claim would be invalid (rebuttal).

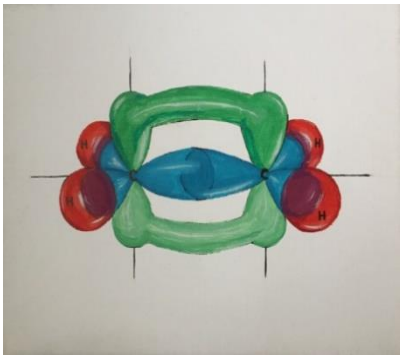


Figure 6. Painting about the hybrid orbitals of organic compounds *(Painted by Başak, 2016.)*

The argument of S6: C makes the hybrid of sp^2 (claim).  (data).  (warrant). The molecule geometry is triangular (backing). If the concept of hybridization loses its' scientific value, then the claim would be invalid (rebuttal).

The argument of S8: C makes the hybrid of sp^2 (claim).  (data). The sp^2 hybrid orbitals' energies are equal (warrant). The molecule geometry is triangular (backing). If the concept of hybridization loses its' scientific value, then the claim would be invalid (rebuttal).

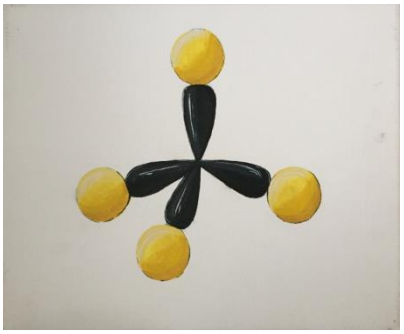


Figure 7. Painting about the molecule geometries of organic compounds *(Painted by Başak, 2016.)*

The argument of S5: The molecule geometry of CH_4 is tetrahedral (claim).  (data).  (backing).

The argument of S11: The molecule geometry is tetrahedral (claim). The hybridization of the central atom is sp^3 (data). The molecule geometry is tetrahedral because of the hybridization of the central atom (warrant). Just like C_2H_6 molecule's central atom (backing). If the concept of hybridization loses its scientific value, so does the concept of molecule geometry its scientific value (rebuttal).

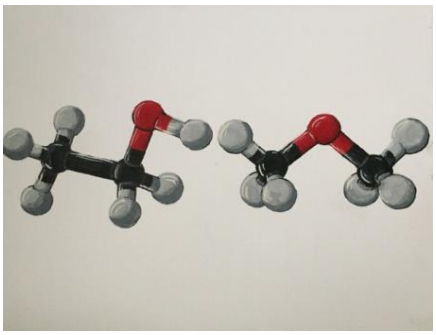
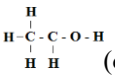
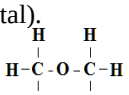


Figure 8. Painting about the functional groups of organic compounds *(Painted by Başak, 2016.)*

The argument of S7: The functional group of ethanol is -OH (claim).  (data). Because its' structural formula involves –OH, I classified this compound as alcohol (warrant). C_2H_5 - OH (backing). If the concept of functional group loses its' scientific value, then the claim would be invalid (rebuttal).

The argument of S11: The functional group of dimethyl ether is -O- (claim).  (data). Because its' structural formula involves -O-, I classify this compound as ether (warrant). CH_3 - O - CH_3 (backing). If the concept of functional group loses its' scientific value, then the claim would be invalid (rebuttal).

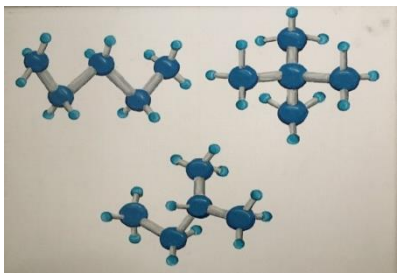


Figure 9. Painting about isomers in organic compounds *(Painted by Başak, 2016.)*

The argument of S3: n-pentane and isopentane are chain isomers (claim).  and  (data). The molecular formulas are the same, but structural formulas are different (warrant). CH_3-CH_2-CH_2-CH_2-CH_3 and CH_3-$CH(CH_3)$-CH_2-CH_3 (backing). If we did not argue, the arguments and counter arguments would not be formed (rebuttal).

The argument of S4: isopentane and neopentane are chain isomers (claim).  and  (data). The molecular formulas are same but structural formulas are different (warrant). CH_3-$CH(CH_3)$-CH_2-$CH_3$and (CH_3)-$C(CH_3)_2$-CH_3(backing). If we did not argue, the arguments and counter arguments would not be formed (rebuttal).

Students' Process Evaluation

Observation notes were coded, then categories were constructed, and then frequencies-percentages were calculated for codes. The results could be seen in Table 2.

Table 2. Students' process evaluation

Categories	Codes	f - %
Learning outputs	Meaningful learning	12 - 86% S1,2,3,4,5,6,8,9,10,12,13,14
	Different learning environments	6 - 43% S1,2,3,5,6,13
Behavioral outputs	Enjoyable learning	7 - 58% S1,2,3,4,6,11,13
	Being motivated	5 - 36% S1,3,7,11,14
Critical thinking outputs	Criticizing own and others' thinking strategies	6 - 43% S1,4,9,10,11,12
	Being creative	5 - 36% S1,3,7,11,14
		total 14 - 100%

The codes would be considered by the three science educators if only the percentages of the codes would be over 34%. It can be seen in Table 2 that students' evaluation was about meaningful learning (86%), different learning environments (43%), enjoyable learning (58%), being motivated (36%), criticizing own and others' thinking strategies (43%) and being creative (36%).

Examples from the students' observation notes were given below for strengthening the findings.
S11: ……. Throughout the argumentation process, criticizing others' thinking strategies made the lesson meaningful (criticizing own and others' thinking strategies code).
S14: ……. Student constructed arguments stated our creativity (being creative code).

Conclusion

This study examined the effect of argumentation-based organic chemistry teaching on high school students' argument construction skills so on their meaningful learning and critical thinking skills. It was found that argumentation making students criticize their own and others thinking strategies resulted in scientifically correct and qualified arguments, which showed they understood the submicroscopic nature of organic chemistry. According to Cambridge International Thinking Skills Syllabus' (2020-2022) targets, constructing a scientifically valid argument showed that students' critical thinking skills were also improved.

On the other hand, group discussions may have caused students to think much more deeply about the submicroscopic nature of concepts they faced and look at them with a more critical eye (Çelik & Kılıç, 2014; Çelik & Kılıç, 2017). Moreover, besides learning content, it is necessary to educate the students regarding how we know (Driver, Leach, Millar & Scott, 1996; Millar & Osborne, 1998, cf. Osborne, Erduran & Simon, 2004). More specifically, the construction of an argument, and its critical evaluation is a core discursive science activity especially making students enhance their mental images about concepts (Osborne, Erduran & Simon, 2004, p. 995).

It is necessary to create social context to support dialogic discourse (Osborne, Erduran & Simon, 2004). In this study, a constructivist social context was constructed for students - they were able to access interactive board, organic chemistry presentations, organic chemistry simulations, questions about organic chemistry, Ministry of National Education's 12^{th} grade online chemistry book, and also each other and teacher because only in constructivist classrooms, students can be viewed as thinkers with emerging theories about the world (Grennon-Brooks & Brooks, 1999, p. 17). After arguing in a dialogic discourse, the students constructed their own arguments individually based on Toulmin's argument pattern components which gave them a chance to judge a

claim based on data, warrant, backing, and rebuttals to make them understand the submicroscopic concepts much more appropriately by criticizing and critical thinking.

Students' process evaluation uncovered that argumentation made students criticize their own and others thinking strategies and learn meaningfully. Tümay and Köseoğlu (2011, pp. 105-106) explained the same case in their research as "Once the students are educated in argumentation-based classes, they are able to construct the chemical concepts properly in their minds, to think about daily life problems by inquiring alternative explanations, and to make plausible decisions by criticizing claims and warrants that came through an argumentation process".

Students' process evaluation also underlined that argumentation-based organic chemistry education made students joyful, motivated, creative, criticizer, and meaningful learners with the help of a differently constructed learning environment.

Recommendations

There was a gap in the literature about argumentation-based organic chemistry teaching to high school students for meaningful learning and for making them become critical thinkers via enhancing their argument construction skills (Eyceyurt-Türk, Tüysüz & Tüzün, 2018). For this reason, in this study it was investigated the impact of argumentation-based organic chemistry teaching on high school students' argument construction skills which meant by properly constructed arguments meaningful learning and criticizing could be done too, so this study exemplified a detailed educational application process not only about argumentation for making high school students criticize the submicroscopic nature of chemistry in organic chemistry education but also argumentation, argument construction, and critical thinking for further studies. Deliberative discussions are typically only included in 2% of all high school science classes (Lemke, 1990; Wells, 1990; cf., Osborne, Erduran & Simon, 2004). The way to increase this rate is to convince teachers that argumentation is an important component in science teaching (Osborne, Erduran & Simon, 2004). This study's detailed description may help this purpose too.

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The Mediating Role of Task Value in Relationship between Self-Efficacy and Approach Goals Orientations in Science

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Abstract

The current study aims to investigate whether there is a meaningful effect of self-efficacy and task value on the achievement approach goals in learning science. In line with this purpose, a correlational method was used in the current study. The participants of this study were 310 middle school students from six public schools (close to each other in terms of socio-economic level and opportunities) in different districts of Erzurum in Turkey. Data were collected through two previously validated instruments: The Achievement Goal Questionnaire and The Motivated Strategies for Learning Questionnaire (self-efficacy and task value subscales). The Achievement Goal Questionnaire was used to determine the students' approach goal orientations (mastery-approach and performance-approach) and The Motivated Strategies for Learning Questionnaire scale was used to assess the students' task value and self-efficacy perceptions. The data obtained were analyzed in two parts. In the first part, SPSS is used for descriptive statistics about variables. The structural Equation Model was used to test the proposed model in the second part. The results of the study have shown that self-efficacy and task value influence the level of students' mastery and performance approach goals. Besides, task value has a partial mediating effect on the relationship between self-efficacy and achievement approach goals. The results of the study were discussed according to the relevant literature.

Keywords: Task Value, Approach Goal Orientations, Self-Efficacy, Mediating Role, Science

Introduction

The issue of motivation, which is one of the factors affecting success in education, has an important place in educational research of recent years (Badiee et al., 2014). The expectation of success and task value, which are among the motivational beliefs, have a significant role in the choice of people's behaviors. While the expectation of success is the students' thoughts about the results of the task before they start it, the reason for doing such a task is defined as the task value (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000). The persistence and effort of the person for any given task depends on his/her self-efficacy and questioning his/her own self and talents. Self-efficacy is an individual's belief in the ability to initiate and execute tasks that will have positive results (Bandura, 1977). Self-efficacy affects individuals' lives in all aspects, including decision-making, persistence on difficult situations, thoughts, behaviors, and emotions (Caraway et al., 2003; Pintrich & Schunk, 2002). Many researchers state that the motivation of the student depends on his / her persistence in performing a task, the energy he/she spends for that task, and his/her desire in the subject matter (Eccles & Wigfield, 2002). In addition, the self-efficacy of students is important in determining the type of goal orientation they have for learning (Liem et al., 2008; You, 2018).

The achievement goal orientations that help determine why people want to achieve something, how they approach achievement and their experiences are divided into two. Researchers first explained goal orientation in two ways: performance goals and mastery goals (Elliot & McGregor, 2001). While the student's focus on understanding, learning, and personal development is their mastery goal orientation, the priority of comparison and performance is the performance goal orientation (Ames, 1992). Students who adopted performance goal orientation avoid difficult tasks, and are vulnerable when unsuccessful. Students who adopted the mastery-approach goal orientation, on the other hand, are willing and persistent in difficult tasks and accept failure not as a personal shortcoming but as an indicator of the need to find new ways to work around such failures. In later

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studies, performance-oriented goals were divided into performance approach, and avoidance goals (performance-approach and performance-avoidance), and mastery goals were divided into approach and avoidance (mastery-approach and mastery-avoidance) (Elliot & Thrash, 2001). On the one hand, if individuals use avoidance goals, they aim to avoid negative situations such as failing and making mistakes. The motive for approach examines the working situation for this purpose, considering the positive results. A good example is striving for any success. Avoidance is a motivation to prevent negative consequences that may occur. An example of this is avoiding failure. While mastery-approach in goal orientation focuses on developing skills and knowledge, the performance-based approach is an effort to manifest him/herself, to emphasize abilities, and to appear intelligent (Ames, 1992; Ames & Archer, 1988). In the current study, path analysis was carried out approach goal orientations, which is to improve students' knowledge and skills in a science lesson and to show themselves as competent and hard-working.

The subsequent sections provide an examination of the literature concerning the purpose of task value perception in self-efficacy and achievement approach goals. Research on the relationship among self-efficacy, task value, and achievement approach goals is presented in the coming sections. Based on the conclusions, hypotheses related to these relations were proposed, especially within the area of science.

The Relationship Between Task Value and Self-Efficacy

According to socio-cognitive theory, the perception of self-efficacy affects individuals' lives in many ways, such as their goals, decisions, resolve in the face of difficulties, and the type of tasks they undertake (Bandura, 1993). In summary, self-efficacy explains how individuals behave, think and feel (Caraway et al., 2003). The perception of self-efficacy affects the task value development process of individuals (Wigfield & Eccles, 1992). There is a positive correlation between two motivational beliefs (Eccles & Wigfield, 1995; Meece et al., 1990; Pajares & Miller, 1994). If students have positive beliefs about completing a task, the value for this particular task is high. Higher self-efficacy means higher task value (Cole & Denzine, 2004; Jacobs et al., 2002; Senler & Sungur, 2009). If individuals feel self-sufficient in a given task and believe that they will succeed, they tend to insist on doing the job and work harder (Eccles & Wigfield, 2002; Linnenbrink & Pintrich, 2003; Pajares, 2002) however, if they feel inadequate, they become reluctant and try to avoid the task (Lee, 2009). Based on the literature, self-efficacy and task value have an important and positive relationship, it was hypothesized in this study.

Structural relationship between Achievement Goals and Task Value, Self Efficacy

Task value has a direct correlation with goal orientations. There is a positive relationship between mastery and performance approach goal orientations and task value (Liem et al., 2008; Wolters et al., 1996). If students perceive the assignment as beneficial, interesting and important, they tend to use mastery-approach goal orientations. They develop knowledge and skills by focusing on learning and understanding (Bong, 2004; Hulleman et al., 2008; Xiang et al., 2004) and also try to show their skills to others (Liem et al., 2008).

According to socio-cognitive theory, goal orientations and self-efficacy work in harmony. If the goals are achieved, self-efficacy increases (Caraway et al., 2003). Self-efficacy is the direct cause of goal orientations. Self-efficacy is positively related to performance and mastery-approach goal orientations (Elliot & Church, 1997; Bong, 2001; Liem et al., 2008; Shim & Ryan, 2005). Conversely, some studies in the literature claim a favorable correspondence with self-efficacy and mastery-approach goal orientations (Hsieh et al., 2007; Shim & Ryan, 2005), and no correlation with the performance goal orientations (Philips & Gully, 1997), or a negative correlation between the two (Pajares et al., 2000).

Context of the study

Motivation affects students' learning and performance. At the same time, motivation is affected by the environment and living conditions in which individuals live. The socio-economic level of individuals and their perspective on education are other factors that affect motivation (Sungur & Şenler, 2008). Increasing students' motivation for success is important in achieving the targeted educational goals. Investigating the relationship between self-efficacy, approach goal orientation, and task value help understand students' motivation for success. When the related literature is taken into account, the students' goal orientations and motivational beliefs (task value-self-efficacy) are correlated. In this study, the effects of students' self-efficacy on the approach goal orientation through the mediated impact of the task value were investigated in the science course (Figure 1). Thus, it is aimed to understand the motivation for success of seventh and eighth-grade students in science class. Besides, the relationships between these variables depend on why students perceive a course as significant or want to succeed (Miller & Brickman, 2004). Therefore, it is important to examine these motivational variables in science class. In a limited number of studies, the relationship between self-efficacy, goal orientation, and task

value of Turkish students was examined (Aydın & Yerdelen, 2015; Feyzioğlu, 2019; Kahraman & Sungur, 2013; Pamuk & Elmas, 2015).

The object of the current study is to evaluate the relationships with the structural equation model and to examine the mediating role of task value. The conceptual model created by taking into account the literature was tested using path analysis. The path analysis allows the relationship between variables to be examined at the same time. The model results were compared with the literature and tried to be explained according to the Turkish culture and Turkish education system.

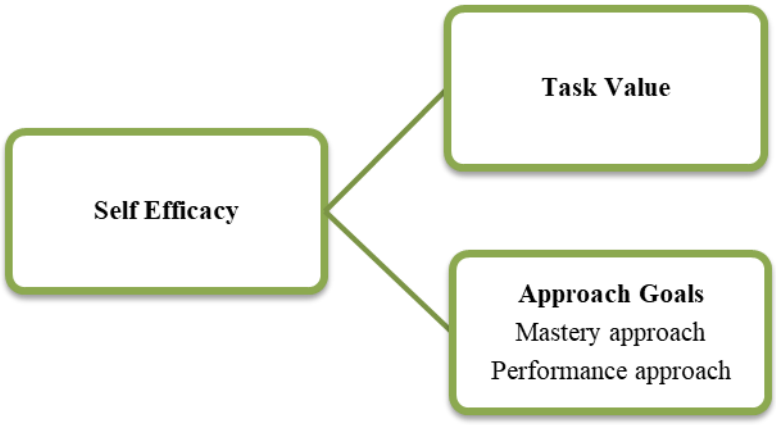

Figure 1. Proposed Model

The proposed model was created as a result of the related literature. Hypotheses created in accordance with the purpose of the research are shown below.
H 1: There is a meaningful and favorable relationship between self-efficacy and mastery approach goals.
H 2: There is a meaningful and favorable relationship between self-efficacy and performance-approach goals.
H 3: There is a meaningful and favorable relationship between self-efficacy and task value.
H 4: The task value has a mediating role in the relationship between self-efficacy and approach goals.

Method

Research Design

The study is a correlational study which examined the relationship between more than two variables without any interference in the environment (Fraenkel & Wallen, 2006). In this study, the relationship between variables (self-efficacy, task value, approach goal orientations) was examined without any interference in the environment.

Sample

The sample in this study included 310 (143 girls, 167 boys) students from six different public schools located in Erzurum. The schools selected for the study are close to each other in terms of socio-economic levels and opportunities they have. In addition, schools are easily accessible for the researcher. The distribution of participants by class level: 149 (48 %) seventh and 161 (52 %) eighth grade student.

Instruments

The Motivated Strategies for Learning Questionnaire (MSLQ)

It was improved by Pintrinch et al., (1991), translated and adapted into Turkish by Sungur (2004). A 7-point Likert scale from (1) not at all true of me to (7) very true of me. The self-efficacy subscale consists of 7 items, and the task value subscale consists of 6 items. The task value is defined as the main reason for students to start a task (a sample item: I think I will be able to use what I learn in this course in other courses), while self-efficacy is the student's belief in their own abilities to accomplish a task or learn a subject (a sample item: I'm certain I can master the skills being taught in this class). In the present study, Cronbach alpha coefficients of self-efficacy and task value subscales were 0.86 and 0.75, respectively.

The Achievement Goal Questionnaire

It was developed by Elliot and Church (2001). It consists of 15 items responded on a 5 point Likert scale. The scale including 4 subscales was translated and adapted into Turkish by Senler & Sungur (2007). The four subscales are: mastery-approach (3 items, a sample item:I desire to completely master the material that presented in this class) and performance-approach (3 items, a sample item: It is important to me to do better than other students). While mastery-approach goals focus on self-improvement and willingness to learn new things, performance-approach goals emphasize demonstrating their skills and achievements to others. In the present study, Cronbach alpha coefficients of mastery and performance-approach goals subscales were 0.76.

Prodecure

The study was conducted during regular class hours. Information about the study and how to fill in the questionnaires was provided to students. Students are informed that their answers will remain confidential and will not affect their grades in any way.

Data Analysis

Descriptive statistics (mean, standard deviation, Cronbach alpha coefficients,) related to the variables discussed in the study are carried out through the SPSS 20. The structural equation modelling was performed using AMOS to test the proposed model. The research method proposed by Baron and Kenny (1986) was used to test whether the role of the task value was formed in the structural equation modelling created. This research model consists of three stages:

1. The independent variable affects the dependent variable,
2. The independent variable affects the mediator variable.
3. When the mediator variable is included in the model with the independent variable, the effect of the mediating variable on the dependent variable should be significant, while the effect of the independent variable on the dependent variable is reduced.

Results and Discussion

As a result of the analysis, descriptive statistics (the mean, standard deviation) and bivariate correlation values of the variables were presented in Table 1.

Table 1. Descriptive statistics and bivariate correlation values of the variables

Variables	**M**	**Min-Max**	**SD**	**1**	**2**	**3**	**4**
1.Self-efficacy	5.34	1-7	1.43	1	0.468**	0.400**	0.285**
2.Task value	5.72	1-7	1.16		1	0.165*	0.442**
3.Mastery approach	4.04	1-5	0.84			1	0.431**
4.Performance approach	4.19	1-5	0.97				1

** Correlation is significant at level 0.01 level (2-tailed),
* Correlation is significant at level 0.05 level (2-tailed)

When the results are examined, it is seen that the arithmetic means of self-efficacy (M = 5.34; SD = 1.43) and task value (M = 5.72; SD = 1.16) are above the mean values of the scales. Moreover, mean values for mastery and performance approach were above the mid-point of the five-point scale. Students tended to have mastery and performance approach at moderate to high levels. It was seen that the highest correlation was between self-efficacy and task value (r = .468), the lowest correlation was between task value and mastery approach (r = .165).

In order to check the proposed relationships among task value, self-efficacy and approach goals (see Figure 1), structural equation modelling was conducted by using AMOS programme. In the model tested with the help of mediation, it was first tested whether the independent variable (self-efficacy) affects the dependent variable

(mastery and performance-approach goals) (1 and 2 hypotheses). When the model was evaluated , the results indicated evidence to support an adequate model-to-data fit (See Table 2).

Table 2. Structural equation model fit ındexs

	X^2	df	X^2/df	SRMR	GFI	CFI	RMSEA
Fit Index	122.625	63	1.946	0.061	0.927	0.948	0.063
Good fit indexes			≤3	0≤SRMR≤0.05	≥0.90	≥0.90	≤0.05
Acceptable fit indexes			≤5	0.05≤SRMR≤0.01	≥0.85		≤0.08

p>.05 (Şimşek, 2007).

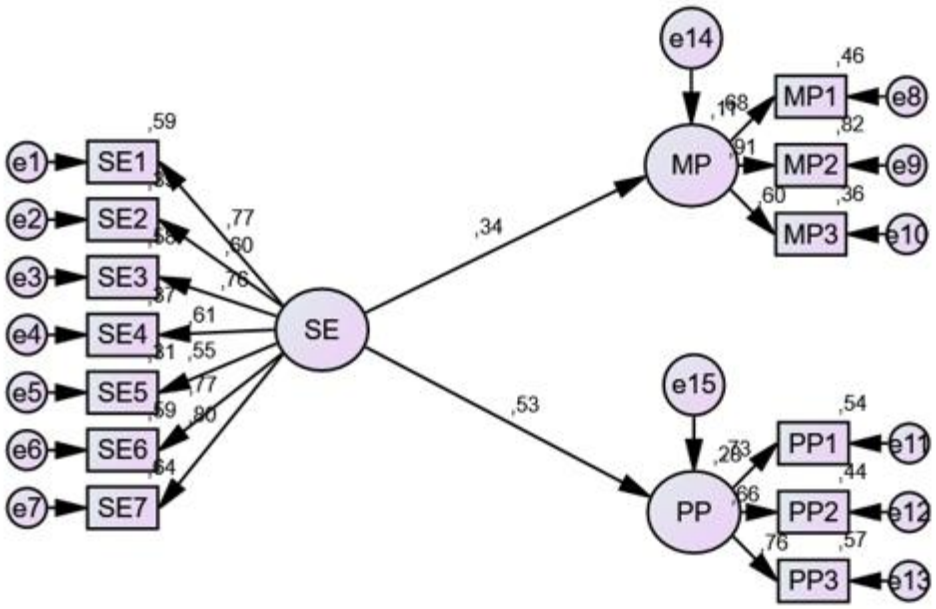

Figure 2. Structural equation model to test predictive effect of self-efficacy on approach goals self-efficacy (se), mastery-approach goals (mp) and performance-approach goals (pp)

Standardized β coefficients, standard error, critical ratio, p and R^2values among variables according to the generated model are shown in Table 3.

Table 3. Structural equation model coefficients

Variables		Standardize β	Standard Error	Critical Ratio	p	R^2
Self efficacy	Mastery approach	0.34	0.41	4.18	***	0.39
	Performance approach	0.53	0.40	6.26	***	

Results of the analysis showed that self-efficacy predicts mastery approach goal orientations (β=0.34; p<0.05) and performance-approach goal orientations (β=0.53; p<0.05), that is, self-efficacy significantly and positively predicted approach goals. Based on these findings, hypothesis number 1 and 2 of the study is supported. When the squared multiple correlations (R^2) value obtained from the model is investigated, it is determined that self-efficacy explains 39% of the approach goal variance.

The Testing of the Mediating Effect with Structural Equation Model

The mediating role of task value in the relationship between self-efficacy and approach goal orientations was tested through the three-step method proposed by Baron and Kenny (1986). The effects of the independent variable, which is the first stage of the mediation effect, on the dependent variable are revealed (Figure 2). The structural equation modelling for the second and third stages is given in Figure 3.

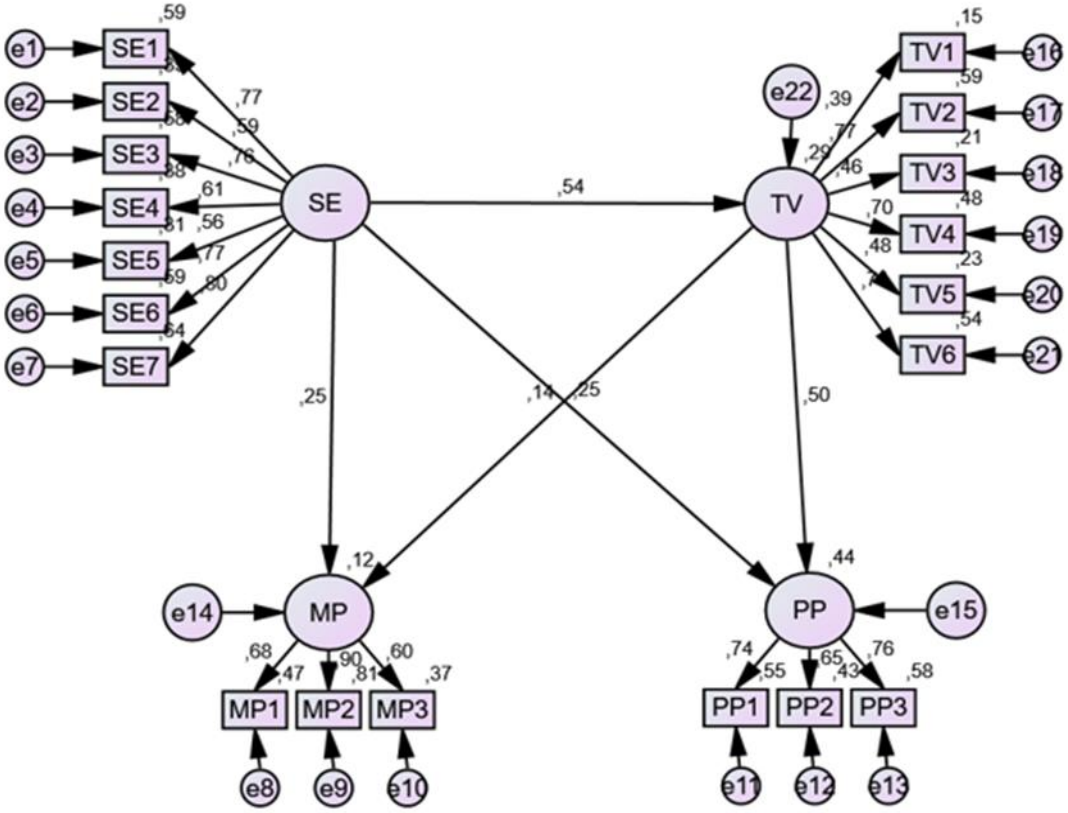

Figure 3. Structural Equation Model to Test Mediating Effect
self-efficacy(SE), mastery-approach goals(MP), performance-approach goals(PP) and task value (TV)

Adaptive values of the model seen in Figure 3 are within acceptable limits, and the model fit values for which the model is structurally appropriate are given in Table 4.

Table 4. Structural equation modeling fit indexs created to measure the mediating effect

	X^2	df	X^2/df	SRMR	GFI	CFI	RMSEA
Fit Indexs	254.153	147	1.729	.050	0.901	0.933	0.05
Good Fit Indexs			≤3	0≤SRMR≤0.05	≥0.90	≥0.90	≤0.05
Acceptable Fit Indexs			≤5	0.05≤SRMR≤0.01	≥0.85		≤0.08

p>.05 (Şimşek, 2007)

Standardized β coefficients, standard error, critical ratio, p and R^2 values among variables according to the generated model are shown in Table 5.

Table 5. Structural equation modeling coefficients created to measure the mediating effect

Variables		**Standardize β**	**Standard Error**	**Critical Ratio**	**p**	R^2
Task value	Self-efficacy	0.54	0.059	4.627	***	0.29
Performance approach	Self-efficacy	0.25	0.042	2.915	0.004	0.56
	Task value	0.50	0.12	4.001	***	
Mastery approach	Self-efficacy	0.25	0.048	2.659	0.008	
	Task value	0.14	0.098	1.444	0.149	

Note: * $p< .05$

If we look at the values in the table 5, it can be seen that there is a statistically significant correlation between self-efficacy and task value (β=0.54; p<0.05). Based on this finding, hypothesis 3 of the study was also supported. When the mediation was included in the model, it was observed that the task value influenced the performance-approach goal orientation (β=0.50; p <0.05) but did not affect the mastery-approach goal orientation (β=0.14; p> 0.05). However, it was found that the effect of self-efficacy on both mastery-approach and performance-approach goal orientations decreased. Therefore, it can be stated that task value has a mediating role in the relationship between self-efficacy and approach goal orientations. It was observed that the third phase of Baron and Kenny (1986) was partially provided. In light of these findings, the 4th hypothesis of the study is partially supported. If we look at the Squared Multiple Correlations (R^2) value of the model, it can be seen that it explains 56% of approach goal orientations and 29% of the task value.

Conclusion

In the current study, the effects of the self-efficacy of the students in the science course on approach goal orientation were investigated through task value. For this purpose, four different hypotheses were developed and tested. A positive and statistically significant correlation was found between the perception of self-efficacy and mastery and performance-approach goal orientations (Hypothesis 1 and 2). The findings are consistent with the related literature. Elliot and Church (1997) state that students with higher self-efficacy tend to use approach goal orientations. Also, in many studies, a positive correlation was found between self-efficacy and mastery-approach and performance-approach orientations (Bong, 2001; Liem et al., 2008; Shim & Ryan, 2005). This can be explained by the fact that self-efficacy (Bandura, 1993), which is one of the internal factors that need to be activated in order for the individuals to take action, helps individuals to set goals for specific areas, and to seek different solutions to solve the problems they face (Henson, 2001; Pajares, 2002).

The third hypothesis of the study, which is the claim that "There is a statistically significant and positive correlation between self-efficacy and task value", was confirmed. The relevant literature also confirms a positive and statistically significant correlation between the two variables (Eccles & Wigfield, 1995; Feyzioğlu, 2019; Meece et al., 1990; Pajares & Miller, 1994; Kahraman &Sungur, 2013; You, 2018). Individuals with high self-efficacy are individuals with high task focus. High task focus enables accurate interpretation of given information and the feedback; the exact opposite occurs in low self-efficacy. In other words, the higher the positive beliefs in completing and accomplishing a task, the more the value given to the task increases (Cole & Denzine, 2004; Eccles & Wigfield, 2002; Jacobs et al., 2002; Senler & Sungur, 2009).

Another finding of the study is related to the last hypothesis formed related to the research (Task value has a mediating role in the relationship between self-efficacy and approach goal orientations). It was found that there was some mediating effect of task value between self-efficacy and approach goal orientations. The partial mediation effect results from the fact that the task value has a statistically significant correlation with the performance approach goal orientation; it has a non-significant correlation with mastery-approach goal orientation. The first part of the fourth hypothesis is that the correlation between task value and performance-approach goals orientations is consistent with the literature. If students find a task interesting and valuable, they tend to show their skills to others while performing this task (Liem et al., 2008; Wolters et al.,1996). The correlation between the task value and mastery-approach goal orientations, which is the second part of the hypothesis, is not supported by the literature. While the relevant literature statistically supports the correlation between the two variables (Bong, 2004; Hulleman et al., 2008; Xiang et al.,2004) the correlation between the

two variables was found to be non-significant in the study. It has also been reported with different results in the literature. For example, in the model development study by Liem et al. (2008), the path between the task value and the goals of approaching performance was removed because there was no relationship. Instead of this path, the path from the task value to mastery goals was added, and a positive relationship was found. The absence of a significant path between task value and mastery approach goals in the present study may be due to the effect of self-efficacy on the performance approach goal. Relationships may be affected by the variance shared with other variables included in the analysis. According to Miller and Brickman (2004), a course becomes important for the realization of goals when students are perceived as beneficial for future goals. Perception of a course from this point of view can result in the development and illustration of ability in the subject, or the consideration of both. In the present study, the positive results of the task value in a science lesson with the performance approach goals may be related to the students showing themselves more capable than their peers. This result can also be explained by the general structure and culture of the Turkish education system. Culture is an important factor in the cognitive, emotional, and motivational development of individuals (Markuset al. 1996 in cited Elliot et al., 2001). Turkey is a country with a traditional and collectivist culture (Caffaro, Ferraris & Schmidt, 2014). In collectivist societies, individuals form themselves based on societal norms (Chiou, 2001; Triandis, 2001). In such societies, individuals tend to behave for the acceptance and appreciation by a community or group rather than emphasizing their individual differences and development. In addition, high levels of fear of failure and social anxiety can be seen in people living in such societies (Eaton & Dembo, 1997). The results obtained can also be explained with the current education system of Turkey. Seventh and eighth graders school students are in a competitive and test-oriented environment. To enroll in a good high school, they need to get a good score at the end of the secondary school test. In such a competitive environment, the student has to prove to his/her surroundings that he/she is smart and that he/she has talents by enrolling in a good high school and getting good grades.

Recommendations

According to these findings, students' opinions about achievement, learning, and considering science lessons important affect each other and differ significantly according to the situations they consider important. For example, is it important to be more successful in science lessons than their peers (performance-approach) or to understand the lesson as well as possible (mastery-approach)? Being highly motivated in a science subject can increase the desire to learn. In the learning environment, task value is an important variable that can affect self-efficacy and approach goal orientations. The study findings show that self-efficacy, task value, and performance approach goal orientations have a remarkable role in the learning and motivation of 7th and 8th-grade Turkish students. Therefore, educators, teachers, and researchers should be aware of the importance of self-efficacy and task value, and goal orientation. In the science education environment, the aim should be to increase students' positive judgments about their science learning capacities. For this reason, teachers may be advised to give students different types of tasks and corrective notifications in science lessons. Students can be allowed to focus on tasks that they do correctly, rather than tasks that they can not do (Pintrich & Schunk, 2002; Linnerbrink & Pintrich, 2003)..

Limitations

There are a few limitations in the study. First, the data of the study were collected through scales. It was assumed that the students answered the questionnaires sincerely. Secondly, this study examined the suggested relationships for science class. Whether the relationships are the same for other areas is not answered in this study. Thirdly, since 7th and 8th-grade Turkish students participated in the study, the results cannot be generalized to all Turkish primary school students. In addition, the data obtained for future studies can be supported by long-term observations and interviews.

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Writing Synthesis Texts: Effect of Synthesis Text Writing Training and Students' Views*

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Abstract

This study aims to investigate the effect of the synthesis text writing training on the success of 7th grade students to create synthesis text and to evaluate the effectiveness of the training given through student opinions on the training process. The research was conducted with 51 students studying in the 7th grade of a public school in Turkey. The research was modeled according to the embedded design. As for the quantitative dimension of the research, there was a training application based on a quasi-experimental design with pretest-posttest control group. In the qualitative dimension of the study, semi-structured interviews were used. According to the results, it can be said that the training organized to improve the synthesis text writing skill has a positive effect on the success of synthesis text writing. It was also concluded that the qualitative data collected through the interviews also supported the quantitative results and some changes and developments in the students were reflected in the interviews.

Key words: Discourse synthesis, Synthesis text writing, Writing from sources, Writing training, Text synthesis

Introduction

High-level literacy skills require access to reliable sources, reading, analyzing and evaluating them. For this, skills of critical thinking and using the acquired knowledge are needed. Regarding this situation, Goldman (2004, p. 318) states that fully and productively participating in the information society depends on reading, understanding, organizing and integrating multiple sources and various types of information. In this context, it can be thought that writing a synthesis text will help individuals gain these skills.

Synthesis text creating is based on Spivey's (1983, 1990, 1997) concept of "discourse synthesis". Spivey (Spivey, 1984, as cited in Spivey, 1997) states that discourse synthesis is a concept related to the process that authors use when reading multiple texts and creating their own texts related to this. More specifically, discourse synthesis can be defined as the writers' integrating material from multiple textual sources while creating their new texts (Nelson, 2009, p. 545).

According to Spivey (1997, p. 146), who restricts discourse synthesis to literacy actions, "no piece of writing is discrete, unconnected from other texts, because writers draw from their own experiences with other writers' texts when they write their own, using knowledge they have built of discourse conventions and options, of topic and domain, contrasting views, and so on." The author considers discourse synthesis as the process of comprehending and composing in which the writer uses cues from multiple texts to create meaning for the text written (Spivey, 1997, p. 146). In this process of comprehending and composing, the reader uses his previously acquired knowledge to work with textual cues, organizes his mental representations with the material they select from the text and connect them with the material he produces (Spivey, 1990). Similarly, according to Boscolo, Arfé, and Quarisa (2007, p. 422), writers should elaborate different sources of information in the process of creating a synthesis text and compare, transform, and integrate them in a more inclusive text (intertext).

* This study was produced from the first author's doctoral dissertation entitled "The Effect of Synthesis Text Writing Education on Synthesis Writing Skills of 7th Grade Students".

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Discourse synthesis has three main concepts (Spivey, 1990): organizing, selecting, and connecting. With these operations, the reader organizes the textual meaning, selects the content in the text to present, and connects the content presented in the text with the content produced from previously acquired information (Spivey, 1990, p. 257). These three concepts can be defined as follows from the information provided by various sources (Martínez, Mateos, Martín, & Rijlaarsdam, 2015; Mateos & Solé, 2009; Spivey, 1990, 1997; Zhang, 2012; Zhao & Hirvela, 2015): *Selecting* is the selection of information that the reader perceives as important and which is shown important by the cues in the text. *Organizing* is the transformation of the reader/writer to create mental presentations about the content to organize the text and to create meaning in its own text. *Connecting* is conveying the information which the writer reads from multiple texts by transforming and combining them with what she learns from the new texts and her prior knowledge.

When the literature is examined, it is seen that discourse synthesis can be expressed with concepts such as "writing from sources (Kirkpatrick & Klein, 2009; Nash, Schumacher, & Carlson, 1993; Reynolds, 2006; Segev-Miller, 2004; Spivey, 1990), synthesis text (Martínez et al., 2015), synthesis writing (van Ockenburg, van Weijen, & Rijlaarsdam, 2019), although less used – report writing (Reynolds, 2006; Spivey, 1990)" in the literature. The concept of discourse synthesis expressed so far has been handled as "synthesis text writing" in the study. Synthesis text writing refers to the processes of creating a unique text by synthesizing the information that students obtain from the 'informative' type of texts written on the same subject.

"The ability to synthesize effectively from sources has long been recognized as crucial to academic success" (Machili, Papadopoulou, & Kantaridou, 2020, p. 1). For this reason, it is important to develop this skill at an early age with a training appropriate to the students' level. However, when the relevant literature is examined, it can be said that this process is a challenging work that requires knowledge and success in many sub-skills. Some researchers (Fisher & Frey, 2014; Mateos, Martín, Villalón, & Luna, 2008; Mateos & Solé, 2009) emphasize that this skill is a challenging one. Although writing a synthesis text is a difficult skill, various studies have revealed that this skill is a skill that can be developed both at secondary school level (De La Paz & Felton, 2010; González-Lamas, Cuevas, & Mateos, 2016; Hammann & Stevens, 2003; Kirkpatrick & Klein, 2009; Martínez, Martín, & Mateos, 2011; Martínez et al., 2015; Reynolds, 2006) and at higher education levels (Boscolo et al., 2007; Emehatsion, 1998; Luo, 2018; Mateos et al., 2018; Mateos et al., 2020; Risemberg, 1993; Segev-Miller, 2004; Zhang, 2012). Additionally, in the literature, it is seen that there are correlational researches (Monopoli, 2002; Zhu, Li, Cheong, Yu, & Liao, 2021) or case studies (Mateos et al., 2008; Mateos & Solé, 2009; Read, 2000; Solé, Miras, Castells, Espino, & Minguela, 2013; Zhao, 2015; Zhao & Hirvela, 2015;) to examine the synthesis text writing skill at various educational levels.

When the studies aimed at improving the synthesis text writing success of secondary school students are examined, it is seen that studies are carried out on various strategies, text structures, and learning processes. For example, in the research conducted by Reynolds (2006), there are two experimental groups that are given text structure and self-regulation training. Both of the experimental groups, involved instruction in writing from sources. In the study conducted by Kirkpatrick and Klein (2009) regarding text structure teaching, comparison-contrast text structure teaching was carried out in instruction of writing from the sources. In the study conducted by Hammann and Stevens (2003), a group was trained on summarization, a group on text structure, and a group on both summarization and text structure. Students were expected to read two descriptive texts and to write text in a comparison-contrast text structure. In the study conducted by Martínez et al. (2015), along with the synthesis writing education, content learning, and literacy activities in the synthesis text writing process were examined. De La Paz and Felton (2010) examined the impact of historical reasoning strategy instruction in their study. Besides, in the research, they have made reading and writing from multiple sources practices. Martínez et al. (2011), on the other hand, organized an education program to teach students how to write synthesis texts based on some texts on environmental knowledge. In the research conducted by González-Lamas et al. (2016), the effectiveness of educational programs designed to improve students' argumentative synthesis text writing skills based on the texts read was investigated. One of the programs is Explicit, Practice, Feedback (EPF), the other is Explicit, Practice, Feedback, Modeling, and Guide (EPFMG) Program. In the EPFMG Program, a teaching based on self-regulation strategies has been made.

As can be seen from the examples above, research has been conducted in various contexts to increase the success of synthesis text writing of students at the secondary school level. These studies focused on the results of the experimental process and the achievements. However, in addition to quantitative results, student views about the educational process were not included in the studies. However, the opinions of the students about the practices will add depth to the research and help to make better sense of the results related to success or failure.

In line with the information provided, in this research, it was aimed to investigate the effect of training which was organized to improve the synthesis text writing skill on the success of the 7th grade students to create synthesis text and to evaluate the effect of training through student opinions on the training process. For the purpose of the study, the following research questions were determined:

1) Is there a significant difference between the pre and posttests of the experimental group in terms of the success for writing a synthesis text after the intervention training? If any, how do student opinions explain this difference?

2) Is there a significant difference between the pre and posttests of the control group in terms of the success for writing a synthesis text?

3) Is there a significant difference between the posttests of the experimental and control groups in terms of the success for writing a synthesis text?

Method

Research Design

The research is designed according to the mixed method based on the evaluation of quantitative and qualitative data together. The study was designed according to the embedded model. In the embedded model, the researcher can add a qualitative phase within a quantitative phase, such as an experimental study, or a quantitative phase within a qualitative phase, such as a case study (Creswell & Plano Clark, 2014, p. 80). In the quantitative dimension of the research, a quasi-experimental study with pretest-posttest control group was conducted. In the qualitative dimension of the research, interview method was used.

Participants

The study group of the research consists of 51 students studying in the 7th grade of a public school in the city center of Hatay in the 2017-2018 academic year. There were 26 students in the experimental group and 25 students in the control group. Qualitative data were collected through interviews with 12 students in the experimental group. Before starting the research at the school, necessary written permissions were obtained from the Hatay Governorship, Hatay Provincial Directorate of National Education, the school directorate, and the parents of the students.

Data Collection Instruments

In this section, information is provided about the teaching materials and measurement tools used in the research.

Teaching Materials

The teaching materials used in the research consisted of texts and training booklets. Information about these materials is given below.

Choosing the text: Quantitative and qualitative features taken into account during the selection of the texts were determined by taking into consideration the literature and the current study's aims and features. Accordingly, while selecting the texts, the fact that each pair of texts was written on the same subject, their suitability to the student level, the number of words and their content were taken into consideration.

Training booklets: In the training process, the booklets prepared for the use of researchers and students were two types: 1) Preparation booklets and 2) Booklets prepared for synthesis text creation practices. The aim of the preparatory booklets was to provide students with some basic information about reading and writing and to prepare students for the synthesis process. For this purpose, booklets were arranged separately for reading and writing skills. Following the 2-week application of the preparatory booklets, teaching was carried out with the booklets prepared for synthesis text creation. These booklets were prepared separately in each text group. These booklets contained content on reading and synthesis text writing processes.

Synthesis Text Writing Analytical Evaluation Rubric

Synthesis text writing analytical evaluation rubric was developed by the researcher. The rubric was organized in an analytical structure and consisted of five sub-dimensions: General Organization of Text, Creating Text Structure, Organization of Content and Expression, Using Source Texts and Language Use. Four levels between 0-3 points were created for the items of each dimension and the description corresponding to the scoring was defined. There were 26 items in rubric. The interrater reliability coefficient of the rubric was .93.

Information Units List

The source texts and student texts were analyzed in terms of information units with the aim of evaluating students' texts according to the Synthesis Text Writing Analytical Evaluation Rubric's "Use of Source Texts" dimension. For this purpose, a list of information units has been created.

In order to analyze the source texts in terms of information units, primarily, basic information that can be used in the text writing process was determined. While determining this information, first, the main ideas of the paragraphs of the texts were inferred. Then the basic thoughts, if any, were divided into units of information. Then, supportive sentences/information about main idea were determined in the paragraphs and these were separated and listed in the information units. In this way, all sentences in the text were divided into information units.

The information units in the synthesis texts created by the students were analyzed based on the list of information units prepared for the source texts. How and to what extent the texts covered the basic and supportive thoughts in the source texts, whether the information was handled correctly and accurately, and whether the information was repeated in the text were examined.

Written Expression Assessment Rubric

Written expression assessment rubric developed by the researcher for the 7th grade students was used to assess the students' general writing skills. The rubric was organized in an analytical structure and consisted of four sub-dimensions: Content, Organization of Text, Language and Expression and Spelling and Punctuation. Three levels between 0-2 points were created for the items of each dimension. There were 23 items in rubric. The interrater reliability coefficient of the rubric was .85.

Reading Comprehension Test

In the current study, the reading comprehension test developed by Ateş (2008) for the 7th grade level was used to measure the reading comprehension skills of the students. This test have included a 30-question test for text based on event, a 30-question test for text based on thought, a 15-question test for poetry, and a 15-question test for a scientific text. A reading comprehension test with 90 questions in total was applied to the students.

Semi-Structured Interview Form

While preparing the questions in the interview form, considering the characteristics of the individuals interviewed, eight basic questions were prepared in order to determine the practices of the students in the writing process and to reveal the developments they saw in themselves after the training. Probes were used when required.

Data Collection and Analysis

For the purpose of the research, quantitative and qualitative data were collected at different stages of the study. Quantitative data were obtained via identifying the experimental and control groups by equalising the groups in terms of various variables and via pretest and posttest in the experimental practices process. Interview was used

to collect qualitative data. The interview data were collected from the experimental group students after the experimental application. The data collection process was conducted in accordance with ethical rules.

Quantitative Data Collection and Analysis

Quantitative data during the process of group equalization was obtained from 183 students from 7th grade studying at a school in the city center of Hatay. Students studied at six different classrooms. While the groups were being equalized, firstly, the scores which were obtained from the variables of reading comprehension success score, general writing success score, and prior knowledge success score which were thought to affect students' synthesis writing skills were converted to a standard score by factor analysis. This score was evaluated as reduction score. In the process of obtaining this standard score, reading comprehension test was used for reading comprehension success and the Written Expression Evaluation Rubric was used for general writing success. In order to obtain the prior knowledge achievement score, the students were given 15-20 minutes and asked to write what they knew about dinosaurs. In the analysis of prior knowledge data, scoring methods were used through classification and ranking. After obtaining the reduction score, the groups that did not have a significant difference in terms of this score were determined.

Secondly, apart from the reduction score, another variable that was taken into consideration during the equalization of the groups was the synthesis writing success scores. To collect this data, two informative texts were presented to the students about the characteristics of dinosaurs. The students were asked to create their own original texts on the same subject using the information in these two texts. This application was carried out in two lesson hours. Written texts were scored with the Synthesis Text Writing Analytical Evaluation Rubric developed by the researcher. After scoring, necessary analyzes were made and the groups that did not have a significant difference in terms of synthesis writing success were determined.

Finally, the groups with no significant difference detected between their successes in writing synthesis were matched two by two in terms of their Turkish academic achievement scores. As a result of the analyses, groups with no significant differences were identified as well. Two of the groups with no significant difference in terms of all three variables were assigned as experimental and control groups by random method. The pretest and posttest data of the study were obtained from the synthesis text writing success scores of the experimental and control groups.

Pilot study: After determining the experimental and control groups, one of the booklets to be used in the process of creating a synthesis text was used with a 7th grade group outside the study group for two weeks. As a result of this pilot scheme, necessary changes were made in the initial format of the materials due to reasons such as saving time in order to gain the target skill, marking some practices planned to be acquired as unnecessary in order to make students achieve the actual outcome.

Experimental process: In the current study, the researcher was also the teacher. Since the subject studied is a new subject in the field, it is necessary to perform the experiment by informing the teacher about the subject. However, the training was provided by the researcher since there were no teachers to voluntarily participate in the research. During the experiment, all the predetermined stages were actually followed, and there were no practices or changes that were not included in the plan.

Before the experimental process, a pilot study was carried out with a group other than the study group for two weeks. For three weeks, a training including basic information about reading comprehension and planned writing process was given to experimental and control group students. This training was given to students so that they could gain basic skills such as synthesis writing training which required some high level skills (analysis, evaluation, synthesis, information organization and so on). The purpose of giving this training to both groups was that there would not be any difference between the two groups.

A 14-week experimental training was organized to improve the synthesis text creation skill. Students were taught three lessons per week. This training, in its most basic form, included practices such as reading the source texts (with the techniques of taking notes, underlining, making markings and so on), selecting the information needed, taking notes on the templates, associating / connecting the relevant information and organizing them by considering the coherence of the text.

Additionally, the training content given to the experimental group was presented to the control group by the researcher, but no training was given on the reading processes and the synthesis text writing process. In the

control group, the texts and the writing process were arranged in line with the curriculum similar to the reading and writing activities in other lessons.

Qualitative Data Collection and Analysis

Interview was used for the qualitative data collection dimension of this research. For the interviews, the students in the experimental group were classified as low, middle, and high by Turkish lesson academic grade averages and teacher opinions with maximum variation sampling model. Four students were selected for each level on a voluntary basis, and a total of 12 students were interviewed after the training. The interviews were organized by the researcher by transcribing them in Microsoft Word program. Then, it was analyzed with the content analysis method using the MAXQDA Qualitative Data Analysis Program. Qualitative data were used in the study to contribute to the clarity of the quantitative findings.

Results

Findings of First Sub-Problem

In the first sub-problem of the study, it was investigated whether there was a significant difference between the pretest and posttest scores of the experimental group students and how student opinions explained this difference status. Findings obtained in this direction are presented below:

Table 1. Paired samples t-test results of the experimental group students' scores from pretest and posttest

Measurement	N	$\bar{X}$	SD	df	t	p	Cohen's d
Pretest	26	31.6154	6.54875	25	-6.601	.000	-1.294
Posttest	26	44.2308	13.15844				

When Table 1 is examined, there is a statistically significant difference ($t_{(25)}$=6.601, p<.05) between the pretest mean score ($\bar{X}$=31.6154) and the posttest mean score ($\bar{X}$=44.2308) of the experimental group. The effect size calculated as a result of the test is found as d=-1.294. In the interpretation of the level of effect size, a rating of .2 (low), .5 (medium), and .8 (high) can be made (Green & Salkind, 2014, p. 153). In this case, the calculated effect size shows that the difference is high. As a result, it is seen that the training organized to improve the synthesis text writing skill in this group has a significant effect on the students' synthesis text writing success.

In addition to the quantitative findings, the students' thoughts on the practices during the writing process and thoughts on training process are presented below. In the presentation of the opinions, since the findings obtained from the thoughts of the students about the practices before, during, and after the writing and the developments they saw in themselves were related to the Synthesis Text Writing Analytical Evaluation Rubric's dimensions of general organization of the text, organization of content and expression, language use, and the use of source texts, the findings were arranged according to these dimensions.

Opinions on Pre-Writing Practices

In the interviews, regarding pre-writing practices, the codes related to the text organization were determined during the planning phase which were planning the title (f=1) and planning the introduction, body, and conclusion parts (f=5). The opinions of a student (S4) from high academic achievement group regarding the planning of the introduction, body and conclusion parts of the text are presented as an example:

S4: *"When I read, I marked it at the introduction. I already summarized all of them in conclusion. As we said, in body part I wrote its features."*
Researcher: *"So, for example, did you use the notes you took for the introduction? Can you explain a little more what you did?"*
S4: *"So I used the notes I took for introduction, I wrote the details of the subject in the body, and I summarized the whole subject in the conclusion."* It is understood from these statements of the student that he learned the body and result correctly.

In the interviews, the students had difficulties in writing introduction (f=2) and writing body part (f=1) in terms of the organization of the text during the preparation phase. The following is an example of a student (S9) from

the low academic achievement group reporting his problem with the body part: *"I had difficult times in finding what to write in the body paragraph."*

During the planning phase, the students had difficulties in the introduction part (f=1), body part (f=1), and the conclusion part (f=2). Regarding the difficulty in writing an introduction, S10 from the low academic achievement group expressed his thoughts as follows: *"I had difficult times in finding how to get started. That is to say, if I look at the texts, I said it would be like copying and pasting the same. I had some difficulty there."*

When the students' opinions about *organization of content and expression* at the stage of preparation for writing were examined, the following codes were determined: Organizing the underlined sentences (f=2), adding new information to the received notes (f=1), thinking about the prior knowledge about the subject (f=2) , separating necessary and unnecessary information from each other (f=2), connecting relevant information (f=2), creating categories for the text to be written (f=2), and organizing categories / information meaningfully (f=2). About organizing the underlined sentences, S11 from the low academic achievement group expressed what s/he did as follow: *"I tried to transfer the underlined sentences properly. As a sentence and coherent with each other."*

S7 from the middle academic achievement group expressed his opinions regarding adding new information to the already taken notes: *"I develop the small paragraphs I write by adding tiny information."* It is understood from this statement that the student made a preparation for detailing.

S1 and S3 from the high academic achievement group stated that they created categories by classifying the information, and wrote them by dividing into paragraphs. Regarding the theme of organizing the categories / information in a meaningful way, a student (S6) in the middle academic achievement group commented: *"I am preparing my paper. I put the paper that I wrote down some notes with me. I read my notes first. I make them a neat paragraph in my mind and write them down."*

The students made some practices in the planning phase. The codes determined about this were the classification of information (f=2), detailing the content (f=2) and the ordering of the subject categories (f=7).S3 from the high academic achievement group on classifying the information said: *"I received the information while I was reading the first text. I have reclassified them. Then, I indicated where and in which order to use my categorization.* Regarding the ordering of the subject categories, the opinions of the students in the high (S4) and middle (S6) academic achievement groups are presented below:

S4: *"I took the notes, and ordered them, I mean the subjects and the items on the subjects."*
Researcher: *"What did you consider when ordering?"*
S4: *"I started with the discovery of dinosaurs. Finally, I told them about their extinction and I gave the other information in between introduction and conclusion."*

The student stated that he was trying to follow a logical and chronological order as taught in the lessons. S6 from the middle academic achievement group stated how he organized the body part according to the subject categories as follows: *"For example, there is an order for the body paragraph. Which subject will come first, and which subject will come later. I am planning this."*

The students expressed that they had difficulty in the organization of content and expression dimension related to the following aspects: paraphrasing (f=1), putting the information in order (f=1), linking information (f=1), writing according to the basic idea (f=1), linking between paragraphs (f=1), and connecting taken notes (f=2). The paraphrasing problem of a student with low academic achievement group (S11) is given as an example: *"I had difficulties in expressing the information in the two texts with my own sentences."*

Additionally, it was determined that two students (S10 and S12) from the low academic achievement group started writing directly without any preparation. These students stated during the interview process that they had difficulty in writing an introduction and were afraid. This is related to the students not having a good preparation and planning process.

The students also had some difficulties with creating coherent content in the planning phase. These were linking paragraphs (f=1) and ordering subjects logically (f=2). Below is an opinion of a student from high academic achievement group regarding the difficulty s/he faced while ordering the subjects in a logical way:

S1: *"I sometimes have difficulty in identifying related issues. Apart from this, if I am ordering wrong, the logic flow may be disrupted. Sometimes I have trouble with that. I think on it a lot."*

Opinions on during Writing Practices

After the training, the findings regarding the general organization of the text in the opinions of the students during writing were as follows: thinking of the title of the text (f=1), writing the conclusion part (f=2), writing the body part (f=1), and writing the introduction paragraph (f=3). Some student opinions are presented below as an example:

Regarding thinking of the title of the text, S5 from the middle academic achievement group expressed his/her opinion as follows: *"I thought to put the title later while writing."* The students who gave an opinion about writing an introduction part were S1 from the high academic achievement group and S8 from the middle academic achievement group. While S8 stated that s/he used the texts while writing an introduction, S1 expressed his thoughts as follows:

"After I start writing the text, as the last sentence of the introduction must be linked to the following paragraph, I write the last sentence of the introduction by linking it to the first sentence of the following paragraph. Using linking words, if I think of different information about them, I try to connect them."

The codes determined regarding the difficulties in the organization of the text during writing were: writing introduction (f=1), writing body (f=1), and writing conclusion (f=3). For example, S2 from the high academic achievement group expressed his/her problem regarding the writing of conclusion as follows*: "I had great difficulty in composing the conclusion."*

The findings determined about *organization of content and expression* during the writing process of the students were as follows: connecting the individual expressions with the source text (f=1), writing connected sentences (f=1), utilizing ways to improve thought (f=1), using prior knowledge (f=2), using signal words (f=1), and creating related paragraphs (f=2). Some examples of the findings are presented below:

S5 from the middle academic achievement group expressed his/her opinions on the connection of individual expressions with the source text: *"I check if my own sentences connected with the text or not."* Regarding writing connected sentences, S4 from the high academic achievement group stated that s/he writes by considering the sentences should be related to each other. One of the critical skills in organization of content and expression is the use of signal words. In this regard, S1 from the high academic achievement group stated that he made connections between the paragraphs using the signal words.

During the writing, the students stated that they had difficulty in organization of content and expression in the following issues: planning the content (f=1) and linking the sentences (f=2). As for the content planning, S10 from the low academic achievement group expressed his difficulty as follows: *"For example, I wrote an important thing in the text while writing. Then when I started the second text, the same information appeared. I tried to fix it somehow."* This difficulty experienced by the student may be due to the lack of good preparation and planning.

The findings about the *use of language* during the writing process were as follows: paying attention to spelling-punctuation (f=2) and writing qualified sentences (f=4). Two students who stated that they paid attention to the rules of writing and punctuation during the writing process were S10 and S9 from the low academic achievement group. Below are the expressions of S10 as an example:

S10: *"I paid attention to the punctuation at first, but when I started writing fast, I might have missed the punctuation marks. I made sure to write in capital letters. Sometimes I can be confused about it at the beginning."*

The opinions of S6 from the middle academic achievement group in terms of writing qualified sentences are as follows: *"... I look for if the sentence structure is correct, and if I have used 'and' too much."*

After the training, the only student who stated that s/he had difficulty in using language during writing was S7 from the middle academic achievement group. S7 expressed his difficulty in spelling and punctuation as follows: *"The writing rules force me a lot during writing and punctuation marks."*

Opinions on after Writing Practices

After the training, when the students' opinions about their post-writing practices were examined, the findings obtained regarding the organization of the text were as follows: checking the conclusion (f=1) and finding a title in the text (f=7).

S3 from the high academic achievement group stated how s/he checked the conclusion section as follows: *"... I checked whether the conclusion paragraph really summarized all the body paragraphs*." Regarding finding a title to the text, S10 from the low academic achievement group stated that s/he found a title suitable for the content of the text. The opinion of S3 from the high academic achievement group is as follows: *"…Then my other purpose was to find the title. I found it. I checked whether the title was suitable for the text."*

The findings regarding the opinions of the students about *organization of content and expression* in their post-writing practices were as follows: re-reading the text written (f=11), checking the coherence of the text (f=7) and checking the information (f=3).

All students except the S1 from the high academic achievement group stated that they re-read the text they wrote for control. Regarding checking the coherence of the text, S11 from the low academic achievement group stated that s/he was looking at the harmony of the sentences. S3 from the high academic achievement group stated his/her opinion as follows: *"... I checked the passing between sentences and whether the sentences were written according to the sequence of occurrence."* S6 from the middle academic achievement group stated what s/he did to check the informations: *"... I am taking note paper again. I check the information and look for whether I misspell a piece of information."*

Regarding the *use of language*, the opinions of the students were as follows: controlling the use of vocabulary (f=2), grammar control (f=3), and spelling-punctuation control (f=6).

The two students who control the words in the text they wrote were S6 from the middle academic achievement group and S12 from the low academic achievement group. S6 stated that s/he checked for repetitive words; S12, on the other hand, stated that s/he corrected the words that distorted the meaning of the sentences.

Regarding the spelling-punctuation control, the opinions of one student from the middle (S6) and one student from low (S11) academic achievement group are given as examples:

S6: *"… I am looking at punctuation and spelling."*
S11: *"I pay attention to semicolons. I care for whether I should use uppercase or lowercase."*

Opinions regarding the Developments that the Students see in themselves

After the training, the following findings were obtained in relation to the text organization dimension in the opinions received about what kind of improvements they saw in the writing process: writing the introduction, body and the conclusion better (f=4), detailing the body part (f=2), and putting a title in the text (f=4).

The opinion of S11 from the low academic achievement group about writing an introduction, body, and conclusion section is as follows: *"... Actually, I started to write the introduction, body, and conclusion better, but I am still confused about body and conclusion a bit." S2*, a member of the high academic achievement group, expressed his/her opinion on writing an introduction as follows: *"I was very stuck when starting the introduction, but now I start a little easier."*

As for making the body section more detailed, opinion of S3 from high academic achievement group is as follows: *"In the past, for me, a text was three paragraphs, but you also taught how detailed the body part can be."* The opinion of S10, one of the students who saw improvement in writing the title of the text, is as follows: *"Iiii… So I used to have difficulty in writing the title. I have also learned to write the title after I finish the writing. I would write the title immediately at the beginning."*

Findings about the development of the organization of content and expression dimension of the students in themselves were as follows: starting paragraph (f=1), writing remarkable text (f=1), linking between paragraphs (f=3), writing related expressions (f=2), including important dimensions of the subject (f=1), presenting information in logical order (f=2), determining categories (f=5), and using connective sentences (f=1).

As for starting a paragraph, S10 from the low academic achievement group stated that it used to be very difficult for him/her to start a paragraph but now s/he can start more easily. Regarding the linking up between paragraphs, opinions of S3 from the high academic achievement group are as follows: *"When I wrote a text, I did not link up the paragraphs. But now I am linking up them. I have improved linking up the paragraphs a lot."* S5 from the middle academic achievement group expressed his/her opinion on writing related statements as follows: *"I can make sentences more connected."* S1, one from the high academic achievement group, stated how s/he has improved his/her skill in terms of covering the important aspects of the subject:

"I have also learned that I need to focus more on key points. It is necessary to explain more when trying to give the main purpose of the text. For example, if the subject is the dinosaurs' feeding styles, I mostly give information about it. According to the subject, the content should be richer."

Another skill for text coherence is to use connective sentences within the text. The only student who gave an opinion about this was S1 from the high academic achievement group: *"Now, I also point out whether the information can be proved and it shows the certainty with connecting sentences. So that, the reader will not be misled".*

Students express the improvements for using source text from their own perspectives as follows: not copying (f=1), benefitting from the source texts (f=2), and distinguishing necessary and unnecessary information (f=2). The opinions of S3 from the high academic achievement group and K6 from the middle academic achievement group which provide opinions on the use of source texts are given below as examples:

S3: *"You have taught me to use another text instead of writing directly, to sort the sentences properly and their order of occurring, and to classify the details and important information."*
S6: *"… For example, I did not use to write a text by reading it first. Now I am taking notes and writing a text."*
As for distinguishing necessary and unnecessary information, S1 from the high academic achievement group stated that: *"I could not distinguish important and unimportant information. I have started to realize whether these support information. I have learned not to use unnecessary information."*

Findings of the Second Sub-Problem

In the second sub-problem of the study, it was investigated whether there was a significant difference between the pre-test and posttest scores of the control group students. Findings obtained in this direction are presented below respectively.

Table 2. Paired samples t-test results of control group students' scores from pretest and posttest

Measurement	N	$\bar{X}$	SD	df	t	p
Pretest	25	31.5600	4.27278	24	-.505	.618
Psttest	25	31.7600	4.36157			

When Table 2 is examined, there is no significant difference between the pretest mean scores ($\bar{X}$=31.5600) and posttest mean scores ($\bar{X}$=31.7600) ($t_{(24)}$=-. 505, p>.05). As a result, writing training given within the framework of Turkish Lesson Teaching Curriculum does not affect the success of synthesis text writing.

Findings of the Third Sub-Problem

In the third sub-problem of the study, it was investigated whether there was a significant difference between the posttest scores of the experimental and control group students. Findings obtained in this direction are presented below respectively.

Table 3. Mann Whitney U test results of experimental and control groups' posttest scores

Group	N	Mean Rank	Sum of Ranks	U	p
Experimental Group	26	33.38	868.00	133.000	.000
Control Group	25	18.32	458.00		

Table 3 shows that, the results of this test are statistically significant in favor of the experimental group (U=133.000, p<.05). Pallant (2007, p. 223) gives the effect size calculation for Mann Whitney U test with the following formula: r = z/√N, (N=number of experimental group+number of control group). Based on this

formula, the effect size of the difference was calculated as: r=.51. According to the information provided by Pallant (2007, p. 223), this value shows that the difference is high.

Conclusion and Discussion

In this section, the impact of training organized to improve the synthesis text writing skills of the 7th grade students and conclusions of the qualitative data have been mentioned and these results have been compared with those of other studies in the literature. Additionally, suggestions have been made based on the results obtained.

As a result of the research, it has been determined that there was a significant difference between the pre-test and posttest scores of the students in the experimental group in favor of posttest. The difference was high according to the effect size calculation for the level of the difference. According to these results, it is seen that the training organized has a significant effect on the students' success in synthesis text writing. This result is related to the research results on the subject in the literature (Boscolo et al., 2007; De La Paz & Felton, 2010; González-Lamas et al., 2016; Hammann & Stevens, 2003; Kirkpatrick & Klein, 2009; Luo, 2018; Martínez et al., 2011; Martínez et al., 2015; Mateos et al., 2018; Reynolds, 2006; Segev-Miller, 2004; Zhang, 2012). When the results of the current research and studies in the literature are evaluated together, it is concluded that the synthesis text writing training, which is specially prepared according to the students' levels and needs, increases the success of synthesis text writing.

In addition to the quantitative results, the results of the interviews regarding the practices of the students in the writing process and the developments they saw in themselves during the training process are presented below.

When the students' opinions about pre-writing practices were analyzed, it was seen that, regarding the organization of the text it is noteworthy that the students went through a conscious planning process for creating synthesis text. Additionally, students had difficulty in a few issues. This is a result that supports the positive effect of the training provided.

After the training, it was seen that in the preparation phase, the views about organization of content and expression dimension could be gathered under the titles of organizing the notes, selecting the information, connecting the information, and making preparations for the text plan. In the planning process, it was seen that the students focused on planning and detailing the content. Similarly, in the research conducted by Read (2000), it was determined that students focus on determining what to write and what not to write and to generate ideas while writing a text. In current research, it is noteworthy that the preparation process associated with organization of content and expression included methods focused on synthesis text writing. The challenging topics about the content and expression were about coherence (link between paragraphs and logical ordering of topics), expression and content creation.

When the opinions reported in the interviews regarding the preparation process are evaluated in general, it is possible to say that the students had a specific and controlled preparation process for writing a synthesis text after the training. This is a result that supports the positive effect of the training provided.

When the students' opinions about applications *during the writing process* are analyzed, it is seen that in the general organization of the text dimension, it is noteworthy that the students sharing opinions attach importance to the issues such as text coherence and writing introduction, body, and conclusion parts. Additionally, some students have a few difficulties about writing introduction, body and conclusion parts. These are related to the training students received. Additionally, this result overlaps with similar study results in the literature. For example, in the case study conducted by Read (2000) with 24 first and second grade students, it was determined that the students pay attention to the text organization during the writing process.

In terms of organization of content and expression, the opinions expressed in the interviews can be summarized with the titles of using source text, using prior knowledge, benefitting from the ways of developing thought, and the coherence between sentences and paragraphs. The opinions expressed by the students are important in the way that they relate to the information provided during the training process. Additionally, some students have a few difficulties about planning content and linking sentences. This result regarding student views shows that students make conscious practices about organizing content and expression.

Regarding the use of language during writing, students stated that they paid attention to spelling-punctuation and writing qualified sentences. There was a student who stated that s/he had difficulty in spelling and

punctuation rules. Similarly, in the research conducted by Read (2000), it was determined that students pay attention to the syntax, spelling, handwriting so on.

When the opinions of the students regarding the practices during writing are evaluated in general, the reflections of the training given in terms of various dimensions can be seen in the expressions. This is a result that supports the fact that the training process provides positive changes in the students.

When the opinions of students regarding post-writing practices were examined, it was seen that the students did not make important practices about the general organization of the text. They just checked the conclusion and found a title for the text. This situation may be related to the fact that students concentrate more on the process of creating a text in the posttest, and have less time to review and revise it due the lack of time.

In terms of organization of content and expression, opinions on reading the text written, coherence and information control were reported. In the interviews, including opinions on the use of resources in writing synthesis has showed the effect of training. Additionally, students' checks on language use included the word control, grammar control and spelling-punctuation control after writing.

When the post-writing practices are generally evaluated, though there are opinions related to the training given, it is seen that the students are not very effective in this process. During the training, the revising and correcting phase has not been elaborated due to reasons such as time limitation, grammar, spelling and punctuation titles that are not elaborated as they were no the main focus of the training. The points that students will pay attention to are explained with a few examples. It is thought that this situation may be reflected in the interviews.

After the training, when the students were asked to evaluate what kinds of improvements they have seen in themselves, they stated about the organization of the text that they write parts of the text easier and more qualified, and they elaborated better and found the title more carefully after writing the text. These issues are important in increasing the quality of the text and are a result to support the positive effect of training. Similarly, some studies (Boscolo et al., 2007; Luo, 2018) have shown that students' success in text organization has increased as a result of synthesis text writing training.

From the perspective of students, they considered the developments in terms of organizing content, coherence, presentation of information and creating more selective content in the dimension of organization of content and expression. This self-assessment shows that students pay attention to the important points about creating content in synthesis writing. Similarly, in various studies (Boscolo et al., 2007; Zhang, 2012), it has been observed that issues related to content and expression can be improved with education.

Regarding the dimension of using the source texts, the students stated that they made progress in benefitting from the source texts correctly and selecting important / necessary information. This is important in a way that it reflects the positive impact of the training provided. Similarly, in the research conducted by Zhang (2012), it was found that in the posttest, students expressed their opinions about practices such as selecting basic ideas and selecting important ideas from the source text.

After the training, it was concluded that the students saw improvements in themselves in the issues related to the general organization of the text, organization of content and expression, and the use of the source texts. When all the results related to student opinions are evaluated together, it is seen that qualitative results support the change in favor of posttest in student success.

There was no statistically significant difference between the pre-test and posttest mean scores of the control group students who did not receive the training to improve the synthesis text writing success. This result obtained in the study is in line with the similar study results in the literature (Luo, 2018; Martínez et al., 2015). In conclusion, this result from the current research, shows that writing training given within the framework of Turkish Lesson Teaching Curriculum does not affect the success of synthesis text writing.

As a result of the analysis conducted to determine whether there was a significant difference between the posttest scores of the experimental and control group students, it was concluded that there was a significant difference between the experimental group students and the control group students' success in writing synthesis text in favor of the experimental group. In the effect size calculation for the level of the difference, it was determined that the difference was high. This result shows that a planned synthesis text writing training can increase students' synthesis text success. The results obtained are parallel with those in the literature (De La Paz & Felton, 2010; Emehatsion, 1998; Kirkpatrick & Klein, 2009; Luo, 2018; Martínez et al., 2011; Martínez et al.,

2015; Reynolds, 2006; Risemberg, 1993; Zhang, 2012). Based on the result of the current study, at the same time, it is concluded that the training given within the Turkish lessons in the current education curriculum does not allow students to improve their synthesis text writing skills.

Based on the findings and the conclusions obtained after the research, some suggestions for the researchers and training activities are given below:

Further Suggestions for Researchers

1. Researchers can carry out their studies on this subject in qualitative methods. In this way, more in-depth knowledge about the subject can be obtained.

2. It is possible to investigate the relationship between the synthesis text writing success and variables such as the success of reading comprehension, writing success, and prior knowledge of the subject that may affect the synthesis text writing success.

3. It is possible to investigate the relationship between affective factors for reading and / or writing, such as interest, attitude, anxiety, and synthesis text writing success.

Further Suggestions for Training Activities

1. Synthesis text writing process requires an effective reading and writing process. Necessary studies should be carried out to gain skills related to these processes.

2. Teachers should raise awareness among students that reading and writing skills are related skills, and that information obtained from reading can be a source for various types of written texts. Thus, students can be more careful in the reading process.

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Mediating Role of Self-Esteem in the Association between Loneliness and Psychological and Subjective Well-Being in University Students

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Abstract

The aim of this study is to examine the mediating role of self-esteem in university students in association with loneliness and psychological and subjective well-being. The study consisted of 340 university students, including 118 males and 222 females. The age range of participants is between 18 and 27. Rosenberg Self-Esteem Scale, Flourishing Scale, Satisfaction with Life Scale and UCLA Loneliness Scale were used in the study. Results of the study showed that loneliness was significantly and negatively associated with self-esteem, psychological well-being, and subjective well-being. Self-esteem was significantly and positively related to psychological well-being and subjective well-being. In this study, compared to male students, female students tended to report greater self-esteem, psychological and subjective well-being while they reported lower loneliness. Mediation analysis revealed that loneliness was a significant and negative predictor of self-esteem, psychological and subjective well-being. Self–esteem partially mediated the association between loneliness and well-being outcomes; and it significantly and positively predicted psychological wellbeing and subjective well-being. In university students, loneliness, and self–esteem, together, accounted for 38% of the variance in psychological well-being, while subjective well-being was 25%. Researchers can conduct new research to investigate the positive aspects of university students, and psychological counsellors working in schools can work towards strengthening the positive aspects of students.

Key words: Loneliness, self-esteem, psychological well-being, subjective well-being, positive psychology

Introduction

There is a growing interest in positive psychology, which highlights the individual's strengths, and promotes healthy development (Arslan & Coşkun, 2020; Masoom Ali et al., 2020). Within this context, the aim of positive psychology focuses on improving the living quality of an individual instead of rectifying the negative aspects in his/her life (Seligman, 2002; Seligman, Steen, Park, & Peterson, 2005). Positive psychology is a discipline that studies conditions and experiences related to human development. Positive psychology involves not only dealing with the challenges of life, but also creating positive qualities and changes in the person. Instead of focusing on the individual's shortcomings, positive psychology focuses more on strengthening and capacity building of the individual (Seligman & Csikszentmihalyi, 2000). The focus of positive psychology is to create resources to help individuals develop and become happier by promoting their positive emotions (Snyder & Lopez, 2004). It also focuses more on the positive characteristics, strengths, and virtues of individuals than on the negative, incomplete, and problematic aspects (Barton & Miller, 2015). In recent years, studies on positive psychology have gained remarkable momentum (Tanhan, 2020; Lucas, Diener, & Suh, 1996; Ryan & Deci, 2001). In this context, the course of studies focuses more on areas such as happiness (Deci & Ryan, 2001) self-esteem and optimism (Genç & Arslan, 2021; Lucas et al., 1996), well-being (Arslan, 2018; Meléndez, Satorres, Cujiño, & Reyes, 2019; Tanhan, 2019; Yıldırım & Belen, 2018). Studies on being particularly good appear to be increasing steadily (Meléndez et al., 2019; Tanhan et al., 2020). The concept of well-being refers to high-level psychological function and experience. Well-being has a wide range of content, such as creativity, strong work motivation, strong social bonds, physical health, and life expectancy (Diener, Pressman, Hunter, & Delgadillo-Chase, 2017; Kansky & Diener, 2017), and effective coping strategies and performance (Ryan & Deci, 2001). Investigating the effect of positive psychology on university students creating a significant part of the

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community is thought to be an important field of problem. Based on this idea, this study design has been formed.

Here, two approaches to well-being are prominent: psychological and subjective well-being. Psychological well-being mostly focuses on the happiness; and is defined as avoiding pain and achieving well-being, while more focused subjective well-being meaning, if it is to perform self-well-being, is associated with functions brought instead of the size of one's own (Diener, 1984; Ryan & Deci, 2001). Psychological well-being is that the individual shows his individual equipment against the conditions that she/he meets (Diener, 1984). The heart of psychological well-being has relation with an individual's using his power at the top (Ryff, 1989). Subjective well-being is self-evaluation of a person. This type of evaluation shows itself as both emotional and cognitive judgement (Moore & Diener, 2019). While positive and negative emotions take place in emotional dimension, life satisfaction takes place in cognitive dimension (Diener, 1984; Diener & Diener, 1996). In another word, subjective well-being is the self-evaluation of an individual in terms of work life and physical life (Diener & Lucas, 1999). Loneliness is at the beginning of the situations that weaken the positive aspect of the individual and his/her well-being and cause him/her to be more vulnerable to the negative. Loneliness is the cognitive awareness of sadness, emotional deficiency, and inadequacy (Asher & Paquette, 2003; Metalsky, Joiner, Hardin, & Abramson, 1993). Loneliness is a threat to one's mental and physical health (Du, Li, Chi, Zhao, & Zhao, 2019; Kong & You, 2013). A high level of loneliness causes an individual to have a low well-being (Bhagchandani, 2017; Ye & Lin, 2015) and low social acceptance (Vanhalst at al., 2013). Self-esteem plays an important role among the cases that can help the individual maintain psychological health under forced conditions (Baumeister, Campbell, Krueger, & Vohs, 2003). It is also an important psychological resource (Mruk, 2013). According to Rosenberg (1965), self-esteem is influenced by many factors at some places where one considers himself/herself as a whole. The assessment between individuals ' ideal self-perception and the self-perception they attribute to themselves shows self-esteem (Baumeister et al., 2003). The formation of self-esteem occurs through the experiences of the individual in their lives. From the first years of life, it is an individual's total personal values that she/he develops with family, peer group, and other people (Beumeiter et al., 2003; Ross, 2014). People with high self-esteem are resistant to depression and anxiety and have more positive values (Lyubomirsky, Tkach, & Dimatteo, 2006). A strong self-esteem has a preventative function against depression (Lee, Dickson, Conley, & Holmbeck, 2014), social exclusion, and similar negative psychological outcomes (Arslan, 2019). It has a strong influence on psychological adjustment individually (Smokowski, Guo, Rose, Evans, Cotter, & Bacallao, 2014). It also positively influences the person's ability to evaluate and achieve what they want according to their capacity (Mirjalili, Farahani, & Akbari, 2011). On the other hand, those with low self-esteem are negatively affected by loneliness, depression and anxiety, and exhibit more anti-social behaviours (Leary, 2005; Mackie & Smith, 2002; Luo et al., 2020). Moreover, low self-esteem causes one to have more problems with psychological adjustment (Leary, 2005; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). In one aspect, a high level of self-esteem serves as a protective shield against many negative situations. That is, loneliness has a devastating effect on one's life, and its negative effect on one's psychological well-being is evident. From this perspective, this study aims to examine the instrumental role of self-esteem in relation with psychological and subjective well-being and loneliness. In earlier studies, there have been no studies of the role of self-esteem as an intermediary between loneliness and psychological and subjective well-being. The study of the role of self-esteem as a mediator between loneliness and psychological and subjective well-being will contribute to the literature. Another goal of this study is to find out what is the negative influence of loneliness levels on university students studying in a rural location.

Loneliness, Psychological, and Subjective Well-Being

Loneliness is still an increasingly chronic problem (Viktor & Yang, 2012). Loneliness is a negative experience that occurs in the context of social relations, when there are some significant deficiencies, quantitative or qualitative, and is unpleasant case (Arslan, 2020; Perlman & Peplau, 1981). In other words, loneliness is a state of subjective contradiction between one's reality and the desired level of social relationship (Peplau & Perlman, 1982). Leaving home and acting independently during the University period brings loneliness with them (Ponzetti, 1990). Loneliness has a negative effect on social adaptation to a new environment (Wohn & LaRose, 2014). In this context, loneliness stands out as an important risk factor for university students. Having a high level of loneliness affects both physical and mental health problems (Kong & You, 2013). These problems are self-harm (Rönkä, at al., 2013), depression (Teo, Choi, & Valenstein, 2013), low self-esteem (Civitci & Civitci, 2009), low psychological and subjective well-being (Bhagchandani, 2017), low social acceptance and negative peer relations (Vanhalst et al., 2013), and weak social relations (Segrin, 2019). Having a high level of loneliness also causes one to isolate him/herself from society and experience academic failures (Benner, 2011). Ang, Chan, & Lee (2018) found a positive and significant relationship between high levels of internet addiction and loneliness in their research. All these data show that loneliness has a positive (internet addiction) or negative

(social adaption to a new environment, physical and mental health problems, depression) effect on many situations, depending on the level of loneliness. For example, Luo, Liu, & Zhang (2020) in their study found a positive and significant relationship between high-level loneliness and psychological maltreatment. In summary, all these results can be interpreted as a high level of loneliness plays a trigger role in the emergence of many psychological disorders in an individual. It can also complicate the individual's life and cause him / her to get into an unsightly predicament (Hyland et. al. 2019; Stoliker & Lafreniere, 2015).

The concept of psychological well-being relies on the holistic understanding that studies the features of individuals maintaining their lives functionally and that takes humanistic approaches as base (Diener et al., 2010). Psychological well-being involves self-actualization when faced with difficulties and mobilizing one's potentials for a meaningful life (Ryff & Singer, 2008). In other words, it is the individual's positive perception of himself and realistically recognizing himself and being aware of his strengths and limitations, as well as being satisfied with himself, being able to act autonomously and independently, and finding the life meaningful (Ryff & Keyes, 1995). Psychological well-being is related to emotional, physical, cognitive, spiritual, personal, and social processes (Roothman, Kirsten, & Wissing, 2003). Psychological well-being in general is based on six dimensions. These include positive relationships with others, purpose and personal growth in life, self-acceptance, autonomy, and environmental mastery (Ryff, 1989). Individuals with a high level of psychological well-being have productive, strong psychological resistance, healthy and positive interpersonal relationships (Ryff, 2014). A strong psychological well-being strengthens many positive sources in a person. The high-level psychological well-being has a positive effect on optimism (Ferguson & Goodwin, 2010), self-esteem (Jiang, 2020; Urzua et al., 2018; Xiang, Tan, Kang, Zhang, & Zhu, 2019). Johansson (2019), for twenty years, carried out a longitudinal study on psychological well-being and subjective well-being, and found out that the relationship between psychological well-being and subjective well-being is strong; and there appeared to be a significant relationship between them. Social anxiety with psychological well-being (Kermen, İlçin-Tosun, & Doğan, 2016), loneliness (Arslan, Yıldırım, & Aytaç, 2020; Meral & Bahar, 2016), depression and stress (Çeri and Çiçek, 2021), perceived discrimination (Urzua et al., 2018), separation-individuation (Çiçek, 2021), a negative and significant relationship was also found between them. Xiang et al. (2019), in their research, found that psychological well-being has an important function in reducing stress. On one side, psychological well-being creates a strong set against problems that reduce one's energy and weaken one's psychological endurance.

Subjective well-being is a cognitive and contagious multidimensional construct and is also used with happiness. It refers to individuals' subjective assessment of the quality of their lives and their life satisfaction (Diener, 1994; Yıldırım & Alanazi, 2018; Yıldırım & Çelik-Tanrıverdi, 2020). In other words, it is about how the individual evaluates and experiences his or her life cognitively and emotionally. Here, subjective well-being is a matter of self-evaluation of both emotional and cognitive aspects. It is often based on happiness and positive emotions (Myers & Diener, 1995). It covers strong interpersonal relationships, self-improving cognitive structures, mental health, and social and psychological outcomes (Lyubomirsky, King, & Diener, 2005a). Having a high level of subjective well-being allows one to experience less psychological and social problems such as loneliness, depression, and incompatible behaviours (Bhagchandani, 2017; Park, 2004; Ye & Lin, 2015). Additionally, subjective well-being has a positive effect in increasing self-esteem (Asli Azad, Shariat, Farhadi, & Shahidi, 2018), hope (Aziz & Hassan, 2019), social support (Çiçek, 2021; Alshehri, Yildirim & Vostanis, 2020), meaning in life (Yıldırım & Arslan, 2021), professional engagement (Dilekçi & Limon, 2020), psychological well-being (Joshanloo, 2019; Demir et al. 2021). In their study, Jalali & Heidari (2016) revealed that there is a meaningful and positive relationship between subjective well-being and happiness, creativity, and professional performance. Myers & Diener (1995) found that people with a high level of subjective well-being generally evaluate the events and phenomena around them positively and experience positive emotions. Similarly, Arslan (2018) found that subjective well-being has a role in enhancing social acceptance and social commitment. All these results show that along with subjective well-being, it makes significant contributions to the psychological empowerment of the person and provides more self-confidence.

Self-esteem as a mediator

Self-esteem plays a major role in the positive progress of individuals (Metalsky et al., 1993). This is an indication that self-esteem plays an important role in a person's psychological endurance. Considering the literature, it is seen that self-esteem has a mediating role among many variables. Self-esteem, life satisfaction, social exclusion (Arslan, 2019), life satisfaction and depression (Civitci, 2010), positive childhood and resilience (Aziz & Yıldırım, 2020; Kocatürk & Çiçek, 2021), social support and subjective well-being (Savi Çakar & Tagay, 2017; Yildirim, Alshehri & Aziz, 2019), procrastination with well-being (Duru & Balkis, 2017), emotional intelligence and life satisfaction (Zarei, Akbarzadeh, & Khosravi, 2019), stress and psychological well-being (Xiang et al., 2019), psychological bullying and loneliness (Luo et al., 2020) have

turned out to be an important intermediary variable among such variables. On the other hand, self-disrespect predicts many variables in both positive and negative way. It has been determined that individual's having high level of self-esteem, life satisfaction (Arslan, 2019; Çivitçi & Çivitçi, 2009; Kwan, Bond, & Singelis, 1997), psychological health (Sedikides et al., 2004) are positively correlated. All these studies show that self-esteem has an intermediary role among many variables. In the literature, there are few studies about the mediating role of loneliness between self-esteem and other variables. Setting out from this perspective, it is thought that investigating the intermediary role of loneliness between positive psychology of self-esteem, a powerful and positive source, and other variables will contribute to the literature. This study aims to examine the mediating role of self-esteem between loneliness and psychological and subjective well-being.

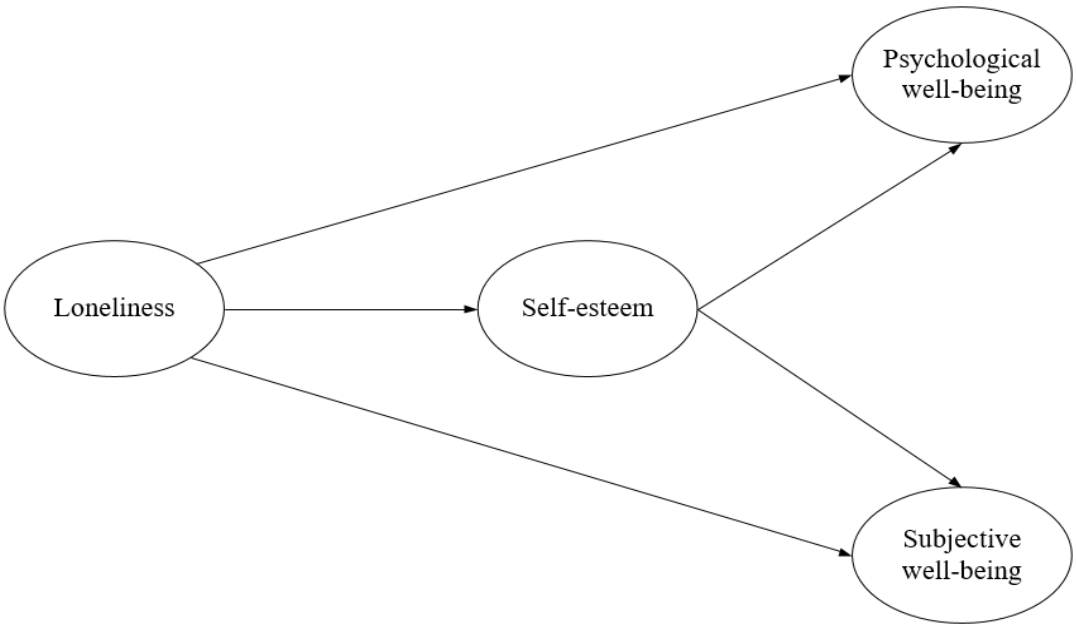

Figure 1. The proposed model of relationships between variables

Method

Participants

Participants of the study consisted of 340 university students. In the study, 222 of the participants were females and 118 were males (N=340). The age range of participants ranged from 18 to 27 (*M*=20.74, *SD*=1.70). The data was collected on a voluntary basis. All participants were assured that their responses would be confidential, anonymous, and used purely for research purposes and were not paid for their involvement in the study. Before starting the study, necessary permissions were obtained from the Batman University Ethics Committee (06/05/2020).

Measures

Rosenberg Self-Esteem Scale (RSES):

The Turkish adaptation of the Rosenberg self-esteem scale developed by Rosenberg (1965) to Turkish language was conducted by Çuhadaroğlu (1986). The Rosenberg self-esteem scale's self-esteem six scale has 10 items and was prepared in a quadruple Likert type (1=strongly disagree, 4 = strongly agree). The height of the scores taken from the scale means that individual's self-esteem is high. The Cronbach Alpha internal consistency coefficient

scale was found as α=.75. The Cronbach alpha internal consistency coefficient scale was calculated as **α=**.80 in the analyses made under this study. This result shows that the scale has a high reliability.

UCLA Loneliness Scale:

The UCLA Loneliness Scale is developed by Russell, Peplau, and Cutrona (1978) that aims to measure individuals' perceptions of their levels of loneliness. The work of adapting the scale to Turkish was done by Demir (1989). The scale consists of 20 items, 10 of which are positive and 10 of which are negative. Elevated scores from the scale indicate that individuals' levels of loneliness are also rising. In the analysis made on the internal consistency of the scale, Cronbach alpha internal consistency coefficient was calculated as α= .96 (Demir, 1989). Within the scope of this research, Cronbach alpha internal consistency coefficient for UCLA Loneliness Scale was α=. 85. This result shows that the scale has a high reliability for this sample

The Flourishing Scale (FS):

The flourishing scale developed by Diener et al. (2010) to measure psychological well-being consists of eight items. Scale clauses (7) are answered in the Likert type ("1=" strongly disagree" to "7=" strongly agree"). The lowest score on the scale is 8 and the highest is 56. Scoring high on the scale is an indication that the person is psychologically good. The Turkish adaptation study of the scale was performed by Telef (2013) (α =. 80). In this study, Cronbach alpha reliability coefficient of this scale was calculated as α=. 87. This result shows that the scale has a high reliability for this sample.

The Satisfaction with Life Scale (SWLS):

The satisfaction with life scale (SWLS), a 5-item and 7-Likert-type scale developed by Diener, at al. (1985), is ranked as (1= "totally agree", 7= "absolutely disagree") to measure subjective well-being. It can be scored between 5 and 35 points on the scale. High scores from the scale show the subjective well-being and positivity of the person. Turkish adaptation study of SWLS was done by Köker (1991) and Cronbach alpha internal reliability coefficient was calculated as α=. 76. Cronbach alpha internal reliability coefficient made within the scope of this study was found to be α=. 82.

Data Analyses

Prior to testing the model, descriptive statistics were conducted to examine the observed scale characteristics, analysis assumptions, and correlations between the study variables. Skewness and kurtosis scores were used to investigate the normality assumption, and these values lower than <|1| are considered as acceptable for normality (Field, 2009). Pearson product-moment correlation was used to examine the association between study variables. After descriptive statistics and correlations were done for the study variables, mediation analyses were conducted to investigate direct and indirect associations between all variables and analyse the mediating role of self-esteem in the association between loneliness and well-being indicators using the PROCESS macro version 3.5 for SPSS (Hayes, 2018). Two independent mediation models (Model 4) were performed to examine the mediating effect of self-esteem on the link of loneliness with psychological well-being and subjective well-being (i.e., life satisfaction). All data analyses were performed using SPSS version 25.

Results

Descriptive Statistics

Preliminary analyses showed that skewness and kurtosis scores ranged between -.82 and .62, supporting that all variables had relatively normal distribution. Pearson product-moment correlation results also showed that loneliness was significantly and negatively associated with self-esteem psychological well-being and subjective well-being. Self-esteem was also significantly and positively related to psychological well-being and subjective well-being. Descriptive statistics and correlation results showing the association between the variables of study are presented in (*Table 1*).

Table 1. Descriptive Statistics and Correlation Results

Scales	1.	2.	3.	4.
1. Loneliness	1	-.46**	-.55**	-.45**
2. Self-esteem		1	.48**	.38**
3. Psychological well-being			1	.48**
4. Subjective well-being				1
Mean	39.097	30.766	42.224	19.387
Sd	10.258	5.788	9.990	6.703
Skewness	.509	-.396	-.822	.229
Kurtosis	.040	-.165	.628	-.443
Internal reliability (α)	.85	.80	.87	.82

**All correlation coefficients significant at level p<.001.

According to Table 1, there was a negative and significant relationship between loneliness and psychological and subjective well-being and self-esteem. On the other hand, there was a positive and significant relationship between psychological, subjective well-being, and self-esteem. Another result, compared to males, females tended to report greater self-esteem, psychological and subjective well-being while they reported lower loneliness.

Mediating Analysis

After examining descriptive statistics and correlation analysis, two mediation analyses were conducted to investigate direct and indirect associations between all variables and analyse the mediating role of self-esteem in association between loneliness and well-being indicators. We firstly investigated the mediating role of self-esteem in the association between loneliness and psychological well-being. The results of these analyses revealed that loneliness was a significant and negative predictor of self-esteem among university students (β = -.46, p<.001) and accounted for 22% of the variance in this variable. Additionally, loneliness was a significant predictor of university students' psychological well-being (β = -.42, p<.001). Self–esteem partially mediated the association between loneliness and well-being and positively predicted psychological well-being (β = .30, p<.001). Loneliness and self–esteem, together, accounted for 38% of the variance in psychological well-being in university students.

Table 2. Unstandardized Coefficients for the Mediation Model

	Consequent			
	M_1 (Self-esteem)			
Antecedent	Coeff.	*SE*	*t*	*p*
X (Loneliness)	–.26	.03	–9.58	<.001
Constant	40.98	1.10	37.17	<.001
	R^2 = .22			
	F = 91.86; *p* < .001			
	Y_1 (Psychological wellbeing)			
X (Loneliness)	–.41	.05	–8.55	<.001
M (Self-esteem)	.51	.08	6.05	<.001
Constant	42.43	3.84	11.04	<.001
	R^2 = .38			
	F = 100.45; *p* < .001			
	Y_2 (Subjective wellbeing)			
X (Loneliness)	.23	.04	–6.54	<.001
M (Self-esteem)	–.26	.06	4.18	<.001
Constant	20.35	2.83	7.18	<.001
	R^2 = .25			
	F = 54.45; *p* < .001			

Indirect effect of suffering on mental health

	Effect	*SE*	BootLLCI	BootULCI
Loneliness–>Self-esteem–> Psychological wellbeing	–.13	.03	–.20	–.07
Loneliness–>Self-esteem–> Subjective wellbeing	–.07	.02	–.12	–.03

Note. *SE* = standard error. Coeff = unstandardized coefficient. *X* = independent variable; *M* = mediator variables; *Y* = dependent variables. Number of bootstrap samples for percentile bootstrap confidence intervals: 10,000.

We secondly examined the mediating role of self-esteem in association with loneliness and subjective well-being. Findings from these analyses showed that subjective well-being was significantly predicted by loneliness (β = -.35, *p*<.001) and self-esteem (β = -.22, *p*<.001), and loneliness and self–esteem, together, accounted for 25% of the variance in university students' subjective well-being. Self-esteem mitigated the negative effect of loneliness on subjective well-being. These results suggest that loneliness is a significant predictor of self–esteem and well-being indicators, and self-esteem has a mediator role in the association between loneliness and well-being. Self-esteem is thus important in promoting the university students' psychological and subjective well-being in the context of loneliness experiences.

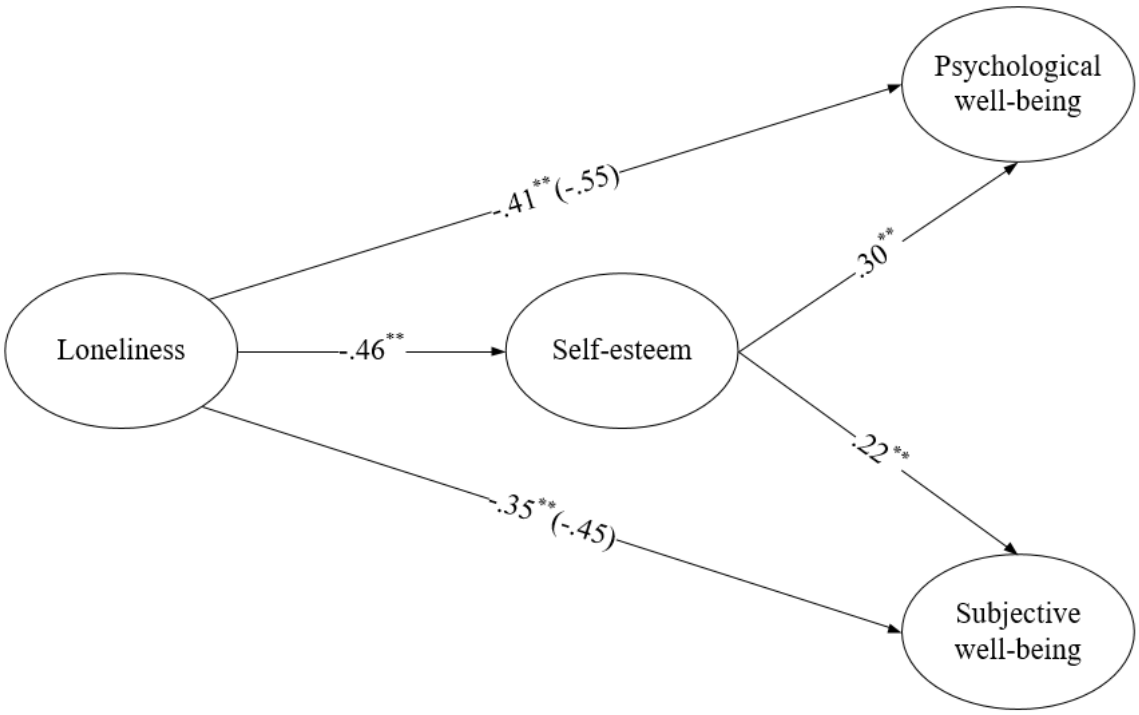

Figure 2. The model showing effects of loneliness on psychological wellbeing and subjective wellbeing via self–esteem.

Discussion

The results showed that there was a negative and significant relationship between loneliness and self-esteem, psychological well-being, and subjective well-being. On the other hand, there is a positive and significant relationship between self-esteem and psychological and subjective well-being. According to the results obtained from the model, self-esteem mediates partially between loneliness and psychological and subjective well-being and predicts psychological and subjective well-being positively and significantly. Loneliness predicted self-esteem, psychological and subjective well-being in a negative direction. As a result, this study supports the importance of self-esteem in explaining the relationship between loneliness and psychological and subjective well-being and reveals that it has a role to enhance well-being.

The results show a negative and significant relationship between loneliness and self-esteem. As the level of self-esteem rises, the level of loneliness declines. This situation shows that loneliness has negatively and seriously effects on the positive sources of university students. Therefore, it is of great importance to know how devastating effect has loneliness on university students. There are findings in the literature that support these results (Hu et al., 2016; Varghese & Pistole, 2017; Yöyen, 2017). Güloğlu & Karaırmak (2010), in their study on university students, found a negative and significant relationship between loneliness and self-esteem. Low self-esteem causes individuals to experience more intense loneliness (Du et al., 2019; Kong & You, 2013; Luo et al., 2020; Vanhalst et al., 2013). It also appears that low self-esteem triggers loneliness and causes the person to be more vulnerable to negative situations (Metalsky et al., 1993). These results show that low self-esteem causes the individual to encounter many psychological problems. Previous studies have found that low self-esteem is associated with depressive symptoms (Masselink, Van Roekel, & Oldehinkel, 2018) and anxiety (Sowislo & Orth, 2013). In this regard, Stillman et al. (2009) noted that a strong self-esteem is part of the system that individuals use to regulate their behaviour and deal with their existential circumstances. And this system has an empowering effect on the individual's well-being when he/she is evaluated positively, making him/her healthier (Orth & Robins, 2014). Another result of the study was that a negative and significant relationship was found between loneliness and psychological and subjective well-being. This result shows that loneliness has a destructive effect on well-being. Also, this study shows similar results to previous studies (Hu, et. al., 2016;

Mellor, Stokes, Firth, Hayash, & Cummins, 2008; Swami et al., 2007; Yan, Su, Zhu, & He, 2013). Bhagchandani (2017), in his research with university students, found that as students' loneliness scores rose, their psychological well-being scores declined. Likewise, those with higher levels of subjective well-being experienced less loneliness (Ye & Lin, 2015). What limits the individual's daily activities such as loneliness, social relationships, emotional well-being and subjective physical health and psychological well-being of the problematic situation using smartphone was determined to have caused a negative impact on the formation of a lower well (Harwood & Angling, 2019)?

The results from this study found that there was a positive relationship between self-esteem and psychological and subjective well-being. It shows that individuals with strong self-esteem have high levels of psychological and subjective well-being. So, it is seen that self-esteem feeds positive sources of university students in many respects. Many studies support these results (Hu, et al., 2016; Kocayörük, & Şimşek, 2009; Tian, 2016; Yıldız, & Duy, 2015; Yao, Chen, Yu, & Sang, 2017). Jiang (2020), in his study on adolescents, found a positive directional and significant relationship between self-esteem and psychological well-being. Results showed that adolescent's self-esteem rises, their levels of psychological well-being also rise. Doğan & Eryılmaz. (2013) revealed in the research that self-esteem positively predicts subjective well-being. At the same time, a high self-esteem enables the individual to have lower depression (Sowislo & Urth, 2013). In summary, having a high level of self-esteem is a function of protecting the person against negative psychological problems and strengthening the person in a positive way.

Finally, self-esteem was found to be partially mediated between loneliness and psychological and subjective well-being. When the literature is examined, no studies have been found that the intermediary role of self-esteem between loneliness and psychological and subjective well-being are investigated. However, the results of this study show that self-esteem, in a parallel way, mediates between the variables of loneliness and positive psychology (e.g., life satisfaction, well-being) (Çivitçi & Çivitçi, 2009). In Hu, Hu, Huang, & Zheng (2016) 's research on adults, they found that self-esteem mediates as the portion between loneliness and subjective well-being. In addition, there are studies in which self-esteem mediates between loneliness (life satisfaction, peer acceptance) (Song, Zuo, Tan, & Dai, 2017; Kapıkıran, 2013). Savi Çakar and Tagay (2017) found that self-esteem and social support together mediate between well-being (life satisfaction) and loneliness. Another result obtained in this study is that loneliness predicts negative self-esteem. There are studies supporting this result when the literature is examined. Uba, Yaacob, Juhari, and Talib (2012) found in their study that loneliness leads to negative self-esteem. This result can be considered as one of the indicators that loneliness has a negative effect on the individual's well-being and positive psychological resources. In addition, it reveals that the concept of loneliness should be studied from a broader perspective and with different variables.

Implications

With this study, it is possible to say that a valuable contribution has been provided to the literature by studying the intermediary role between self-esteem, which takes place among important variables of positive psychology, and loneliness and psychologic and subjective well-being. Another contribution of this study to the literature is that loneliness and self-esteem together form about 50% of psychologic and subjective well-being. Also, the study has shown that loneliness has a negative effect on positive resources of the university students. Finally, the study has showed that the self-esteem scores of the university students make an important predictor for their psychological and subjective well-being. All these inferences obtained from the study are thought to provide significant contributions to the literature.

Limitations and recommendations

It is possible to note several limitations of this study. First, the number of the participants is not so high. For this reason, it will be convenient to study with bigger volume groups in new studies. Second, demographic variables have not been included in the study much. This creates a limitation on the discussion obtained from the variables in the study according to results of demographic variables. Third, the mediating variable in the study can only be thought of as a limitation in that it represents only a small part of positive psychology. Therefore, future studies will examine the role of other variables associated with positive psychology (such as hope, self-sufficiency, life satisfaction) along with self-esteem as an intermediary. Fourth, the fact that the sample group consists of students studying at a rural university can be considered as a limitation in the generalization of the results obtained from this study on all university students. Researchers can work on students studying at universities in different cities related to this topic. Fifth, the scales of self-esteem, psychological and subjective well-being and loneliness covered in the study were self-reports, and participants may have answered some

questions in a biased way. Therefore, in subsequent studies, researchers may be recommended to apply the same scales to the sample group in two time periods. Therefore, in subsequent studies, researchers may be recommended to apply the same scales to the study group in two time periods. Researchers should conduct new research to investigate the positive aspects of university students. In addition, psychological counsellors working in schools can work to strengthen the positive aspects of students. In addition, it would be appropriate to use different therapeutic techniques (Çiçek & Tanhan, 2020). Psychological counsellors may suggest families holding informative meetings on how to improve the positive aspects of their children.

Conclusions

This study showed that self-esteem is partially mediated between loneliness and psychological and subjective well-being. Self-esteem predicts both psychological well-being and subjective well-being in a positive way. Another result from the study was that self-esteem and loneliness together accounted for 38% of psychological well-being and 25% of subjective well-being. In previous studies, loneliness was effective in experiencing physical and mental health problems (Kong & You, 2013), low psychological and subjective well-being (Bhagchandani, 2017) as a result of this study,loneliness is a strong and negative predictor of self-esteem, and that it also has a strong effect on low psychological and subjective well-being. The results of this study showed that loneliness is a strong and negative predictor of self-esteem. Finally, a negative and significant relationship was found between self-esteem, psychological and subjective well-being, which are components of positive psychology of loneliness.

Ethics declarations

The research was approved by Batman University/Turkey Ethics Committee. All procedures performed in study involving human participants were in accordance with the ethical standards the 1964 Helsinki declaration**.**

Informed Consent

Informed consent was obtained from all individual participants included in in the study.

Conflict of Interests

The author declares no conflicts of interest with respect to the research, authorship, and/or publication of this article.

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The Readiness of Primary and Preschool Pre-Service Teachers' for Teaching Profession in Turkey: A Mixed Methods Research

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Abstract

This study aims to examine the readiness of pre-service teachers for teaching in terms of different dimensions. Among the mixed research designs, combined design in which the priority order of qualitative and quantitative methods is equal was preferred for the study. The participants were 127 pre-service teachers in the Faculty of Education. The research data set was obtained from the Preparedness to Teach Scale. In order to determine to what extent pre-service teachers, feel ready for teaching, two focus group sessions and the pre-service teachers were observed. In the study, it was determined that the pre-service teachers' level of readiness for teaching is at a medium level and the pre-service teachers used technology to attract attention and increase participation. It was observed that the pre-service teachers had problems in choosing appropriate teaching strategies, noticing special learning needs or difficulties, and classroom management.

Keywords: Pre-service teachers, preparedness to teach, teacher training, teaching profession, mixed method research

Introduction

In the century, the main objective of education is to help students acquire the knowledge and skills to keep learning for the rest of their lives in the developing and changing world. The practice of the twenty-first century skills is possible with the foundations laid out in schools. Teachers, who have an important role in schools, must meet a range of educational standards including pedagogical, professional, personality and social norms.

Teachers help start the teaching process that requires deep knowledge and understanding for students and the skill of synthesizing, practicing and implementing information in different conditions (Hollins, 2011). The teacher should support not only the development of the academic knowledge and skills of students, but also suggest different ways for them to improve themselves. Identifying teaching skills and knowledge which guide the professional development of teachers is considered crucial in terms of determining successful teaching techniques and unveiling learning activities with clear goals (Organisation for Economic Cooperation and Development [OECD], 2005). In this context, teacher qualifications in the professional sense are defined as knowledge, skills and attitudes that teachers must have in order to provide service efficiently (Ministry of National Education [MoNE], 2017).

It is very important to train effective, qualified and devoted teachers for future learners to achieve academic success since teacher qualifications are an important component in students' success and other education outcomes (Cochran Smith & Power, 2010; Rajić, Hoşgörür & Drvodelić, 2015). The most important way to get pre-service teachers ready to teach is to have a well-designed and strong teacher training program (Brown, Lee & Collins, 2015; Wilson, Floden & Ferrini Mundy, 2002). During the teacher training process that requires planning, pre-service teachers must be prepared to master basic learning, pedagogy and evaluation subjects (Darlin Hammond, 2000; Hollins, 2011). In recent years, pre-service teacher training has been examined to improve the quality of teachers, and pre-service teachers' readiness to the teaching profession has been studied. Different approaches, indicating the quality of teacher training, are, in this context, emphasized in teacher training for individuals with different learning characteristics (Cochran Smith & Power, 2010; Darling Hammond, Chung & Frelow, 2002).

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Conducted studies show that the education on training effective and qualified teachers is inadequate (Peske & Haycock, 2006), that the relationship between the training of pre-service teachers and what schools expect are incompatible (Adamson, 2012), and that teachers are not qualified for pre-service training and do not feel prepared for the teaching process (Ataş-Akdemir, 2019; Aybek & Aslan, 2019; Blomberg & Knight, 2015; Brown et al., 2015; Fontaine, Kane, Duquette & Savoie-Zajc, 2011; Karakaya, Uzel, Gül & Yılmaz, 2019; Liston, Whitcomb

& Borko, 2006). The strongest part of these studies is about the fact that effective and qualified teacher training increases student success (Beare, Torgerson, Marshall, Tracz & Chiero, 2012; Cochran Smith & Power, 2010; Feuerstein, 2011). In this context, many researches show that teachers' training and therefore the characteristics of teacher performance significantly contribute to the achievements of students (Feuerstein, 2011; Goldhaber, Liddle & Theobald 2013; Hattie, 2009; Ramsey, 2000; Rowe, 2004; Wenglinsky, 2002).

Creating and encouraging learning environments that include activities that support students' learning will be possible with a dynamic and interactive process created by teachers (Seidel & Shavelson, 2007). It is thought that teachers' encouragement of desired educational outcomes is related to how ready they are for the profession (Atteberry, Loeb & Wyckoff, 2015). The practical lessons that teachers take during their undergraduate years when they prepare for the profession are very important for them as they give them the chance to experience many different variables. In this context, the process of gaining experience in practice schools is considered as the first step in the practice of teaching knowledge for pre-service teachers. Pre-service teachers' performance in the teaching process increases with the experience they gain before entering the teaching profession (Harris & Sass, 2011). Teaching practice and school experience courses are important in terms of teacher training programs which contribute to the understanding of pre-service teachers by indicating the difference between theory and practice. The importance of pre-school and primary school teachers, who form the basis and the first step of formal education of these hands-on courses, is undeniable because pre-school and primary school education is where the basic knowledge and skills are obtained and social values are gained as well as where children take the first steps of understanding themselves, their environment and the society. In this context, it is aimed to measure the readiness of pre-service teachers in primary education departments to teach in pre-service education in terms of observing their practical practices, such as teaching practices, and of their theoretical knowledge via examining the perception of pre-service teachers for their academic process through interviews. The research has an important place in terms of revealing the nature of teacher education and determining the areas where pre-service teachers are missing. It is also thought that the research will be supportive in the development and improvement of teacher training programs.

Purpose of Research

The aim of this study is to examine the readiness of pre-service teachers for teaching in terms of different dimensions. For this purpose, answers for the following questions were sought:

1. On the preparedness of pre-service teachers for teaching:
- Is there a significant difference in total average scores based on section variables?
- Is there a significant difference in subfactor scores based on the section variable?
2. What is pre-service teachers' level of preparedness to teaching in terms of different departments?
- What is pre-service teachers' level in forming an effective learning atmosphere in terms of different departments?
- What pre-service teachers' level in designing the instructional process in terms of different departments?
- What is pre-service teachers' level on techno-pedagogical competency in terms of different departments?
- What is pre-service teachers' level on understanding the learner in terms of different departments?
3. What kind of behaviors are observed in the process of pre-service teachers' preparedness to teach?

Method

Research Model

The study used a simultaneous mixed research method involving both qualitative and quantitative research methods. This study preferred "combined design", the most common one among the mixed research patterns in which the priority order of qualitative and quantitative methods is equal (Creswell, 2017). The schematic view of the research pattern is shown in Figure 1.

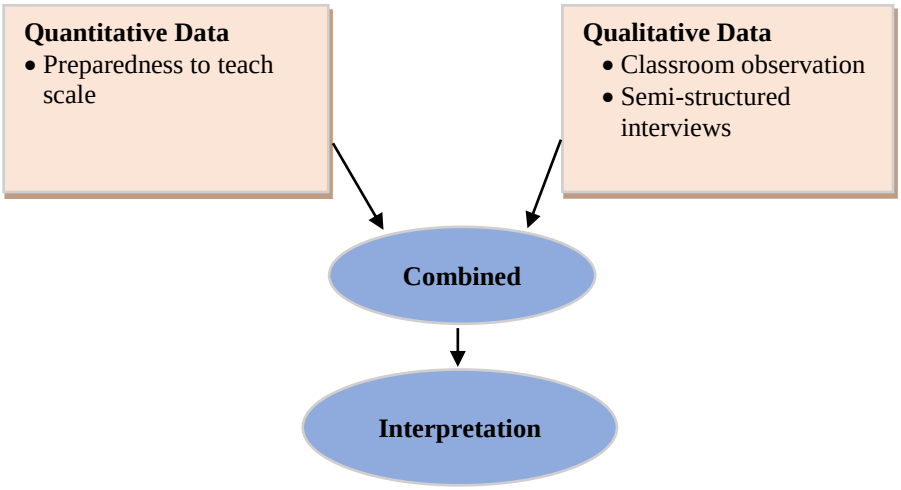

Figure 1. Schematic view of the research pattern (Creswell, 2017)

As shown in Figure 1, while using the combined design in a research, results from qualitative and quantitative data are kept apart during the analysis, then results are combined with general comments. The combined design is more functional than other designs in terms of effectively collecting data and identifying research problems both as qualitative and quantitative, allowing the consideration of a problem's different perspectives by combining the data obtained by means of qualitative and quantitative methods. (Creswell, 2017; Ivankova & Kawamura, 2010; Silverman, 2013).

Quantitative Part

The quantitative part of the research was based on the survey model (Karasar, 2012) which aims to portray existing conditions as they are. In this context, pre-service teachers' preparedness to teach and the examination of this situation according to variable of department were carried out.

Qualitative Part

The qualitative part of the research was based on the case study design (Yıldırım & Şimşek, 2013) in order to examine the quantitative results in detail and in the context of real life. Within the scope of the case study approach, the perspectives and observed behaviors obtained from the pre-service teachers, who were selected by means of purposeful sampling and criterion sampling methods and of focus group interview questions and observation forms prepared by the researchers in accordance with the content of the scale, were examined.

Research Group

Quantitative Research Group

The research group is formed by a total of 127 pre-service teachers studying in the Primary Education Department of the Faculty of Education at a public university in the 2019-2020 academic year. The purposeful sampling method was used in the selection of pre-service teachers. In special cases bearing certain criteria and characteristics, use of this sampling method is recommended (Büyüköztürk, Çakmak, Akgün, Karadeniz & Demirel, 2014). In this study, the pre-service teachers in the primary education department who were in the senior year were chosen as a research group. The features of the research group are included in Table 1.

Table 1. Research group

Gender	**Primary School Teaching**		**Pre-school Teaching**	
	N	Frequency	N	Frequency
Female	48	37,8	61	48,0
Male	12	9,5	6	4,7
Total	60	47,3	67	52,7

When Table 1 is examined, it is seen that 60 (12 male and 48 female) Primary School and 67 (6 male 61 female) Pre-school pre-service teachers participated in the research.

Qualitative Study Group

The stratified purposeful sampling method was used for the interviews carried out within the purpose of the research. This type of sampling is used to demonstrate, identify, and enable associations between relevant subgroups (Büyüköztürk et al., 2014). The interviews were held with 16 pre-service teachers at the senior level of primary and pre-school teaching taking the "Teaching Practices I" course. Thus, it was aimed to obtain different opinions from the pre-service teachers who had the opportunity to participate in classes directly. The genders of the interviewed participants are included in Table 2.

Table 2. Interviewed participants

Pre-service teachers	**Gender**	**Pre-service teachers**	**Gender**
Pri-P_1	F	Pre-P_1	M
Pri-P_2	F	Pre-P_2	F
Pri-P_3	M	Pre-P_3	F
Pri-P_4	F	Pre-P_4	M
Pri-P_5	F	Pre-P_5	F
Pri-P_6	F	Pre-P_6	F
Pri-P_7	M	Pre-P_7	M
Pri-P_8	M	Pre-P_8	F

Pri-P: Participant primary school teacher, Pre-P: Participant pre-school teacher

As seen in Table 2, 10 of the pre-service teachers who participated in the interviews were female and 6 were male. In addition, the observed pre-service teachers were selected among the pre-service teachers participating in the focus group interview according to the criterion sampling method. Within the scope of the Teaching Practices course for primary school teachers, different socio-economic levels of the practice schools and different academic levels of the practice classes were determined as a criterion. For the pre-school pre-service teachers, in addition to the socio-economic level of the schools, age groups were also determined as criteria. The pre-service teachers observed during the research process were given in Table 3.

Table 3. Observed participants

Pre-service teachers	**Gender**	**Pre-service teachers**	**Gender**
Pri -P_2	F	Pre-P_1	M
Pri -P_3	M	Pre-P_2	F
Pri -P_5	F	Pre-P_6	F
Pri -P_7	M	Pre-P_8	F

4 (2 females, 2 males) of the participants are primary school teachers and 4 (3 females and 1 male) of them are pre-school pre-service teachers.

Data Collection Tools

In the study, the quantitative data were obtained by using the Preparedness to Teach Scale which was used to determine how prepared pre-service teachers felt to the teaching profession. Focus group interviews were used to thoroughly examine the perspective of the pre-service teachers in the collection of the qualitative data, whereas in-class observations were used to determine the skills of the pre-service teachers presented during practices. Detailed information about these data collection tools is presented in subheadings: qualitative and quantitative data collection tools.

Quantitative Data Collection Tools
Preparedness to Teach Scale

The original scale was developed by Darling Hammond et al. (2002), and adapted to Turkish by Yıldırım & Kalman (2017). The scale contains a total of 20 items and consists of a four-factor structure. These factors are: "Forming an effective learning atmosphere", "Designing the instructional process", "Techno-pedagogical competency" and "Understanding the learner". There are no negative items coded in reverse on the scale rated as 5-point Likert. The minimum possible score from the scale is 20, whereas the maximum score is calculated as 100.
Yıldırım and Kalman (2017) calculated the Cronbach's Alpha reliability coefficient as .923 based on the total score of the Preparedness to Teach Scale. In this study, the Cronbach's Alpha reliability coefficient is .965. In the sub-factors, it was calculated as follows: α=.895 for 'Forming an effective learning atmosphere', α=.921 for 'Designing the instructional process', A=.909 for 'Techno-pedagogical competency' and α=.817 for 'Understanding the learner'.

Qualitative Data Collection Tools
Focus Group Interview

The focus group interview technique was used to examine the perspective of pre-service teachers on their preparedness to teach. This technique was preferred because a group dynamic can be found, and additionally the data obtained through social interaction is deep and rich (Thomas, McMillan, McColl, Hale & Bond 1995). Focus group interviews were conducted at different times, with two different groups which consist of eight primary school pre-service teachers and eight pre-school pre-service teachers This number is considered ideal for focus group interviews in the field type (Edmunds, 1999).

In the study, for the focus group interview, firstly the topics were sorted by importance; then, the characteristics of the participants, the common characteristics of the individuals, the main topics to be used in the interviews, and the questions were determined. Questions are included in Appendix B. One of the researchers participated in focus group interviews as a moderator, leading to the discussion. Another researcher listened to the interviews carefully and asked additional questions if needed, allowing the participants to express their perspective more clearly. The data obtained from the interviews were summarized, analyzed and reported.

Observation

Observation is used to define any teaching behavior in more detail. Observation in qualitative research allows the researcher to make deep and detailed explanations of the event, case or situation which are the subject of a research (Yıldırım & Şimşek, 2013). Additionally, observations also make the control of data from interviews and surveys (Patton, 2014). It is thought that participants being in their own natural environment is significant in terms of uncovering observed behaviors objectively and identifying the unspoken information through actions (Karasar, 2014; Patton, 2014).

In order to determine how prepared pre-service teachers felt to teach themselves, an observation form was created using the subdimensions of the "Preparedness to Teach Scale" adapted to Turkish by Yıldırım and Kalman (2017). The first section contains items on the school, class level, the number of students, observation date and time, whereas the second section contains items about the preparation of the pre-service teachers for teaching. The third part of the form is designed in a "description section" to make detailed descriptions of how observed behaviors are performed. In the observation form, behaviors are structured as triple ratings: "Observed" (2) "Partially Observed" (1) and "Not Observed" (0).

When the physical characteristics of the practice classes for primary school pre-service teachers were examined, it was observed that the classroom layout was prepared in a traditional method, that students sat in pairs, that the class population varied between 28-38 students, and that technological tools and equipment (computer, printer, smart board, speaker, projection) were available within the classroom. In the classrooms where pre-school pre-service teachers carried out the practice courses, it was seen that different learning centers (music, science, blocks, etc.) were placed in a single room, that the classroom population varied between 20-25 students, that classes had portable tables, and that chairs, and technological tools (computers, printers, speakers, projections) were available.

Data Collection

All the data obtained from the research were collected during the 2019-2020 academic year.

Collection of Quantitative Data

The quantitative data collected for the research was obtained during a 15-minute practice, and the participating pre-service teachers were chosen among volunteers.

Collection of Qualitative Data

The focus group interviews were formed as two separate sessions for primary school and pre-school pre-service teachers, with sessions lasting averagely between 30-40 minutes. The pre-service teachers were asked five questions determined by using the scale sub-dimensions for their preparedness to teach. During the focus group interviews, new ideas were led to emerge, the discussion was not taken off the point and the participants' in-depth perspectives were learned.

The observation process in the study was carried out within an eight-week period within the scope of the Teaching Practice I course, in two different schools (one primary school, one kindergarten) and four different classes (two primary schools, two pre-schools) in total. The days of observation were determined with school principals and teachers' cooperation. The observations were carried out simultaneously and independent from each other as non-participatory observations by two researchers who specialized in the field of education. Non-participatory observation is the type of observation in which the researcher is not involved and is only an observer and in which his/her identity, the research and the duration are clear (Ekiz, 2003). In the research, a systematic approach was aimed to be adopted in terms of teaching principles; so, the commute language was portrayed by a structured observation form. Configurated observations offer a better configuration and systematic approach on the observant (Büyüköztürk et al., 2014).

Data Analysis

The analysis of the quantitative data collected from the Preparedness to Teach Scale was conducted with SPSS. The arithmetic averages and standard deviations of the scores obtained from the scale were calculated by conducting a descriptive analysis to determine pre-service teachers' preparedness to the teaching profession. In addition, the independent t-test was performed to determine the state of the differentiation of the conditions of preparedness for teaching due to the normal distribution of the quantitative data.

Qualitative opinions from the focus group interview were analyzed according to content analysis with the MAXQDA Analytics Pro 2020 program. Combining, organizing and interpreting common opinions (codes), which are similar to content analysis used to access concepts and associated links from acquired qualitative data, were aimed.
To ensure content and face validity in the research, questions from focus group interviews and observation forms were evaluated by a total of six academics (two from educational sciences, two from Turkish education, one from pre-school education and a primary education specialist) in terms of appearance, content and clarity. The final qualitative data collection tools were formed by making necessary corrections in accordance with expert opinions.

It was attempted to express the results of the data with a clear language in a systematic way for the verifiability of the research. Direct excerpts were used to reveal the perspective of the pre-service teachers participating in the research to meet the transmissivity criteria of the research. In the quotations, Pre-P_1 (Participant- Pre-school Teaching) and Pri-P_1 (Participant- Primary School Teaching) codes were used instead of real names. The questions in the observation form and in the focus group interview were resolved by the researchers as well as by another expert in order to contribute to the credibility of the research, and then the results were evaluated together and it was found that there was no divergence. There was no disagreement between the evaluators that could affect the outcome. The credibility calculated by Miles & Huberman's (2015) reliability formula (Reliability = Consensus \ [Consensus + Disagreement] *100] was 86%. Reliability over 70% is considered to be reliable for a research (Miles and Huberman, 2015).

Findings

Under this heading, the readiness level of the pre-service teachers for teaching was examined as separate headings within the framework of the sub-problems of the research.

Findings Concerning the First Sub-Problem

Statistical information showing the preparedness levels of the pre-service teachers on a departmental basis is given in Table 4.

Table 4. Statistical information showing how pre-service teachers are prepared to teach

	N	Highest Score	Lowest Score	$\bar{x}$	Sd
Preparedness to Teach	127	99	30	71.12	16.88

When table 4 is examined, it is observed that the average values calculated over the total score gained by the pre-service teachers from the Preparedness to Teach scale are $\bar{x}$=71.12 and that the standard deviation values are Sd=16.88. The average scores of the pre-service teachers' Preparedness to Teach as low, medium and high were determined by plus-minus .5 standard deviation (X±.5xSd) criterion (Çamlıbel Çakmak, 2012). According to this calculation, 62 and lower scores were calculated as low, scores from 63-80 were calculated as moderate, whereas 81 and higher scores were calculated as high. Accordingly, it can be said that the pre-service teachers' preparedness to teach is moderate.

When the primary school pre-service teachers' preparedness to teach is checked, 16.6% were rated low; 56.7% were rated moderate; 26.7% were rated high. Also, 28.4% of the pre-school pre-service teachers were rated low; 40.3% were rated moderate; 31.3% were found to be highly prepared for teaching. Focusing on all of the pre-service teachers who participated in the study, 23% were rated low; 48% were rated moderate; and 29% were rated as highly prepared to teach. The examination of the pre-service teachers' preparedness to teach according to the departmental variable was given at Table 5.

Table 5. T-Test results according to departmental variable of pre-service teachers' readiness to teach

Preparedness to Teach	**Department**	**N**	$\bar{x}$	**Sd**	**T**	**Sd**	**P**
Forming an effective learning atmosphere	Primary School Pre-Service Teachers	60	21.38	5.36	.725	125	.470
	Pre-school Pre-Service Teachers	67	20.70	5.22			
Designing the instructional process	Primary School Pre-Service Teachers	60	22.30	5.21	1.166	125	.246
	Pre-school Pre-Service Teachers	67	21.13	5.96			
Techno-pedagogical competency	Primary School Pre-Service Teachers	60	17.85	4.89	.810	125	.420
	Pre-school Pre-Service Teachers	67	17.13	5.04			
Understanding the learner	Primary School Pre-Service Teachers	60	11.10	2.20	.683	125	.496
	Pre-school Pre-Service Teachers	67	10.80	2.60			
Total	Primary School Pre-Service Teachers	60	72.63	16.08	.952	125	.343
	Pre-school Pre-Service Teachers	67	69.77	17.57			

From Table 5, it is understood that there is no significant difference between the overall average scores and sub-dimensional average scores of the primary school pre-service teachers and pre-school pre-service teachers ($p>.05$). When looking at the average overall total and sub-dimension scores in the Preparedness to Teach Scale, the average score of the primary school pre-service teachers is higher than that of the pre-school pre-service teachers.

Findings Concerning the Second Sub-Problem

The qualitative findings obtained from the perspectives of the pre-service teachers through focus group interviews were given. Themes and codes obtained from private interviews with the primary school and pre-school pre-service teachers were modeled and presented with the MAXQDA program on the same figure. The aim of presenting both on the same model is to compare the perspective of pre-service teachers and to reveal similarities and differences clearly. In this context, the interview data of the research was given in a complementary and supportive manner of the rest of the research's data. In addition, the codes the most/frequently stated by the pre-service teachers are specified with dark colors in the model.

The model of the skills which the preschool pre-service teachers wanted to develop in students is included in Figure 2.

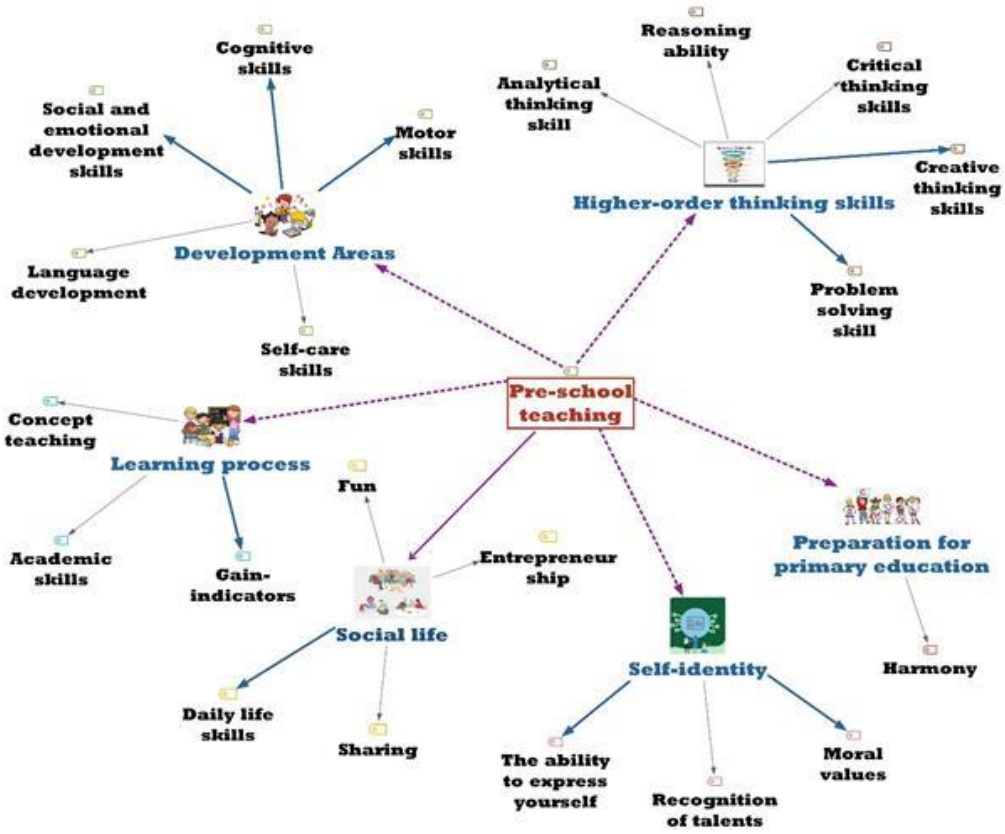

Figure 2. Skills that preschool pre-service teachers wanted to develop in students

The model of the skills which the primary pre-service teachers wanted to develop in students is included in Figure 3.

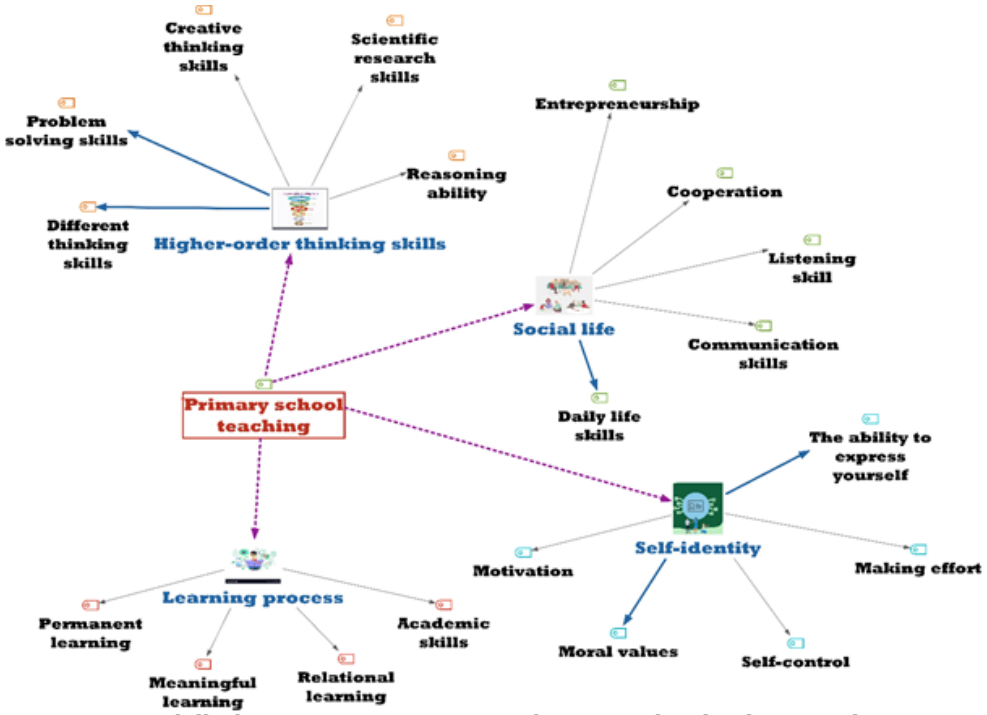

Figure 3. Skills that primary pre-service teachers wanted to develop in students

In Figure 2 and Figure 3, it is seen that the primary school and pre-school pre-service teachers mostly indicated *daily life skills* under the title of "social life", *creative thinking skills* and *problem solving skills* under the title of "higher-order thinking skills", *moral values and the ability to express yourself* under the title of "self-identity" while describing the skills they wanted to develop in students. In addition, *entrepreneurship* under the title of "social life", *reasoning ability* under the title of "higher-order thinking skills", *academic skills* under the theme of "learning process" were encoded less by the primary school and pre-school pre-service teachers. The primary school pre-service teachers drew attention to the development of *different thinking skills* in students, whereas the pre-school pre-service teachers indicated on the *gains, indicators and development areas* mentioned in pre-school teaching program. The examples of direct quotations from the perspectives of the pre-service teachers with featured codes are presented below:

> "First of all, I aim to develop moral skills... I want to develop their skills to be a good person, a good friend, a good child and a good citizen." (Pri-P_5)
>
> "... I think it is necessary to support all development areas of students by adding something to every area." (Pre-P_2)

The points that the preschool pre-service teachers cared about in designing the education process are shown in Figure 4.

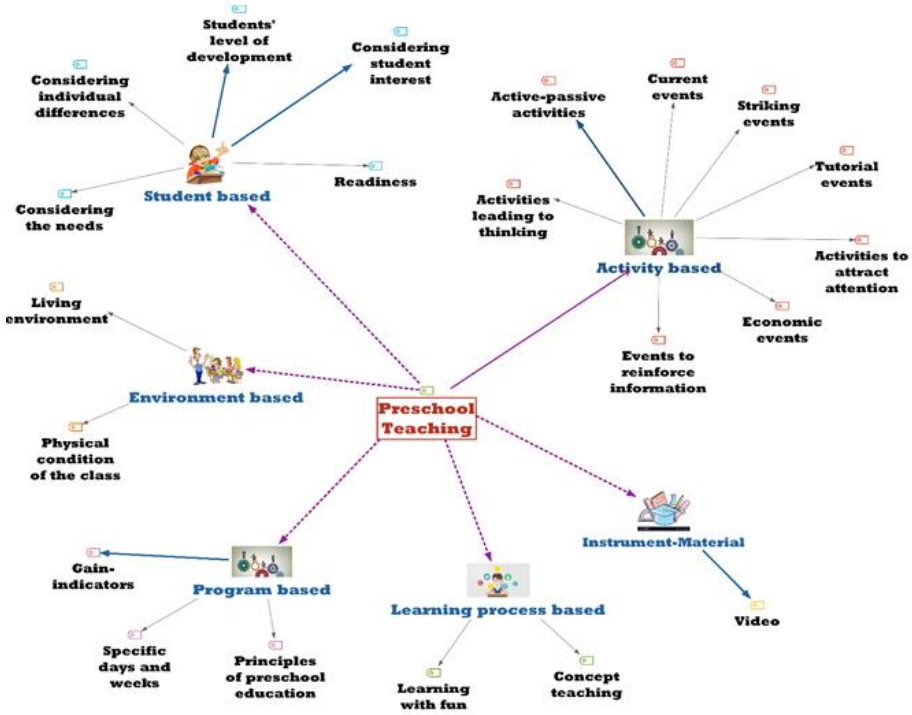

Figure 4. Points that preschool pre-service teachers cared about in designing the education process

The points that the primary pre-service teachers cared about in designing the education process are shown in Figure 5.

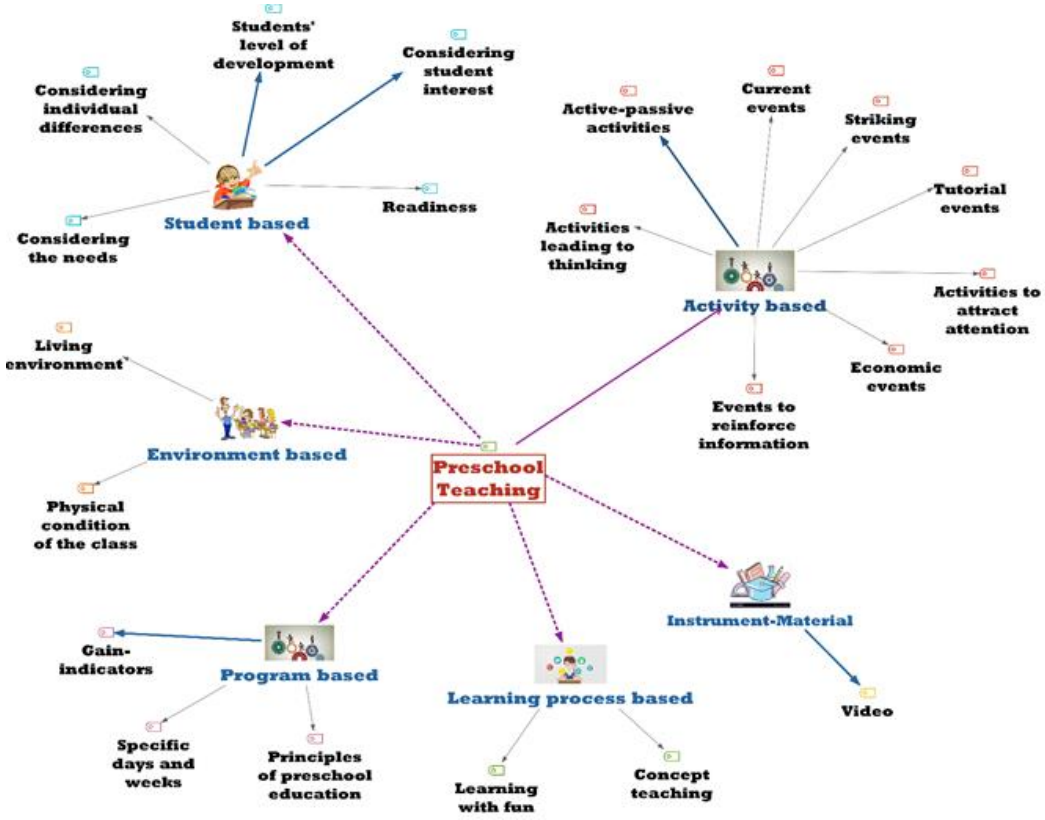

Figure 5. Points that primary pre-service teachers cared about in designing the education process

In Figure 4 and Figure 5, it is seen that the students rely on *Activities and Measurement-evaluation activities* under the title of "Activity based" in designing the education process. In addition, it is understood that the primary school pre-service teachers used *videos, images* and *materials* in this process. Besides, the pre-school pre-service teachers were relying on *considering students' level of development and interest* under the title of "Student based", *Gain indicators* under the title of "Program based" and *videos* under the title of "Instrument material". The examples of direct quotations from the perspectives of the pre-service teachers with featured codes are presented below:

> "I use activities that require active participation of students. With such activities, they will learn by doing and experiencing; so, what they learn will stay permanent in their minds." (Pri-P_3)
>
> "I think it is very important to establish the active-passive balance in the distribution of activities during the day...Children should not feel too tired or too bored." (Pre-P_5)

The preschool pre-service teachers' focus points about program outcomes are shown in Figure 6.

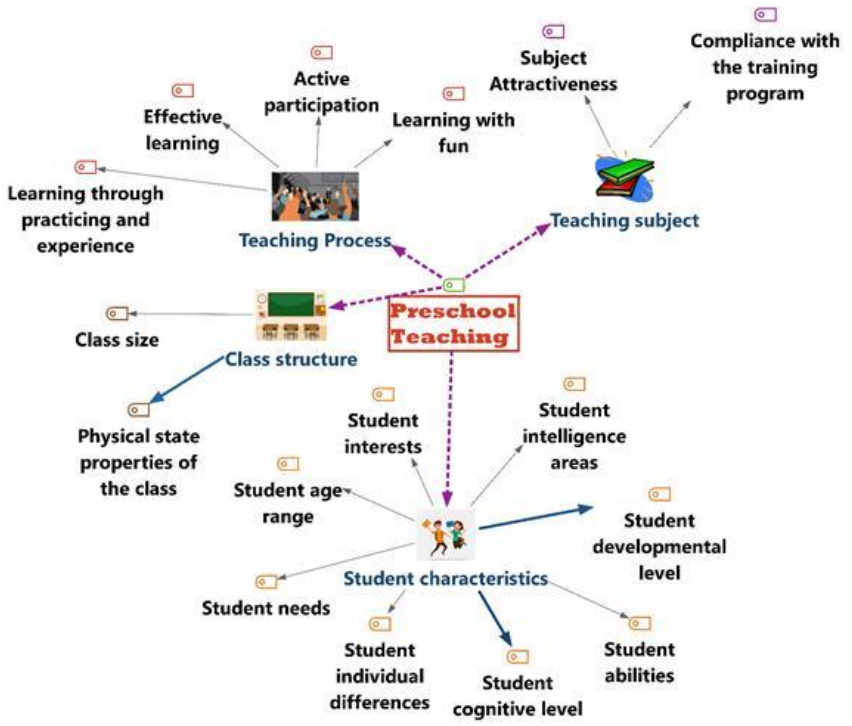

Figure 6. Preschool pre-service teachers' focus points about program outcomes

The primary pre-service teachers' focus points about program outcomes are shown in Figure 7.

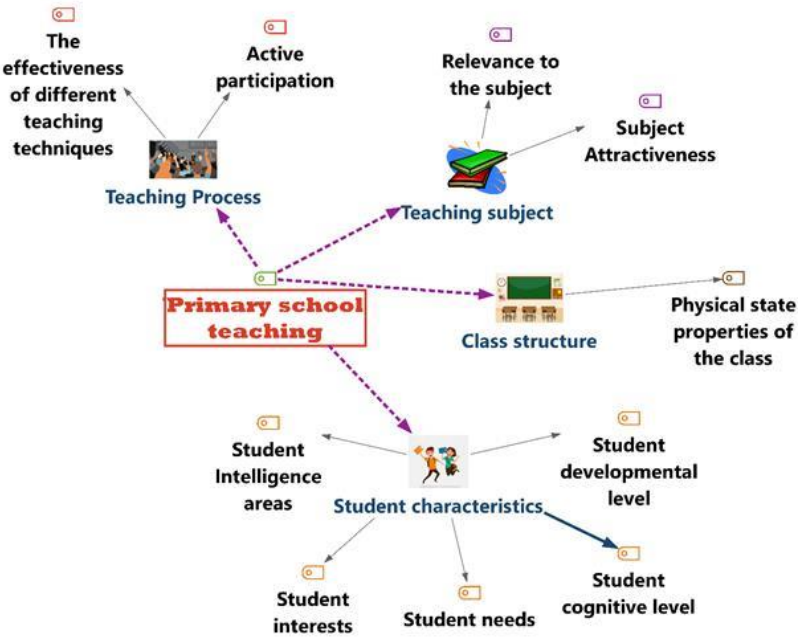

Figure 7. Primary pre-service teachers' focus points about program outcomes

In Figure 6 and Figure 7, it is seen that the primary school and pre-school pre-service teachers emphasize more on *developmental and cognitive levels of students* under the title of "student characteristics" to achieve the educational program outcomes of their students. It was determined that *class size* under the title of "Class structure", *student needs, intelligence areas and interests* under the title of "Student characteristics" and *subject attractiveness* under the title of "Teaching process" were less encoded according to the pre-service teachers' opinions. *Relevance to the subject* under the title of "teaching subject" in the opinions of the pre-service teachers and *Physical state properties of the class* under the title of "class structure" were stated by the pre-school pre-service teachers as the focus point they paid attention to in order to achieve the educational outcomes. The examples of direct quotations from the perspectives of the pre-service teachers with featured codes are presented below:

> "To achieve the outcomes, I first try to understand students' level of development. Then, I'll make the course more interesting according to their needs and make them curious." (Pri-P_6)
>
> "... I pay attention to the physical properties of the classroom. The classroom size limits me in terms of using some methods and techniques." (Pre-P_6)

The preschool pre-service teachers' technology usage during the class is included in Figure 8.

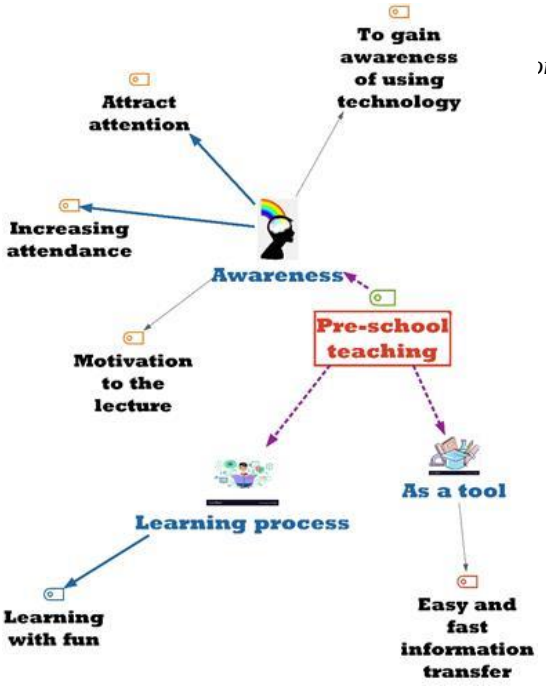

Figure 8. Preschool pre-service teachers' technology usage during the course

The primary pre-service teachers' technology usage during the class is included in Figure 9.

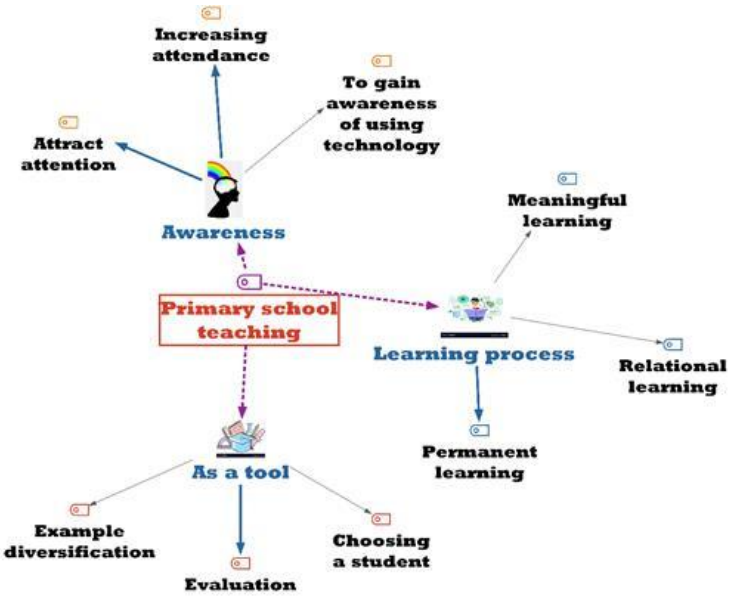

Figure 9. Primary pre-service teachers' technology usage during the course

In Figure 8 and Figure 9, it is understood that the primary school and pre-school pre-service teachers often emphasize *attracting attention* and *increasing attendance* under the title of "awareness" in their opinions that demonstrate the way they use technology in their classes. It is seen that the primary school pre-service teachers often use *permanent learning* under the title of "learning process" and *evaluation* code under the title of "As a tool". It was seen that the pre-school pre-service teachers emphasized *learning with fun* under the title of "learning process". The examples of direct quotations from the perspectives of the pre-service teachers with featured codes are presented below:

> "... I give examples to catch students' attention in the beginning, to strengthen the subject in the middle, and to make evaluations at the end of the class." (Pri-P_4)
>
> "In these times, children are very interested in technology and enjoy using it in classes. With activities that benefit from technological tools, their level of motivation increases and they have a lot of fun." (Pre-P_1)

The preschool pre-service teachers' obtaining information about students' level of learning is shown in Figure 10.

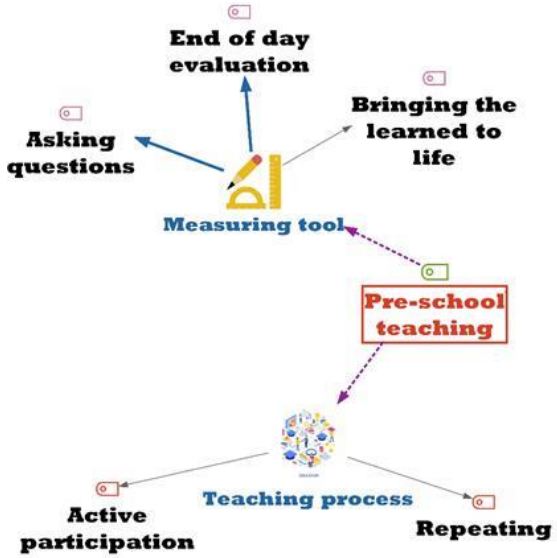

Figure 10. Preschool pre-service teachers' obtaining information about student's level of learning

The primary pre-service teachers' obtaining information about students' level of learning is shown in Figure 11.

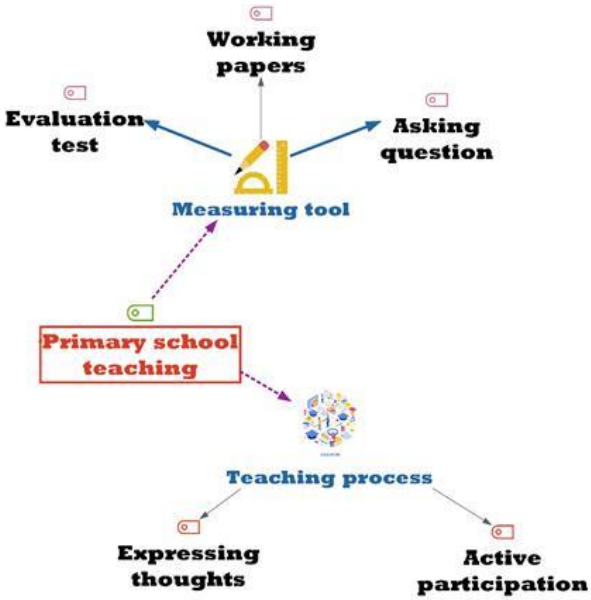

Figure 11. Primary pre-service teachers' obtaining information about student's level of learning

In Figure 10 and Figure 11, it is seen that the primary school and pre-school pre-service teachers frequently emphasize the code of *asking questions* under the title of "measuring tool" while obtaining information about student's level of learning. In addition, the emphasis of the *evaluation test* under the title of "measuring tool" by the primary school pre-service teachers was observed. The pre-school pre-service teachers were determined to maintain an *end-of-day evaluation* under the title of "measuring tool". The examples of direct quotations from the perspectives of the pre-service teachers with featured codes are presented below:

> "... A private time should be given for assessment and evaluation; I dedicate most of my time to this. I think the evaluation tests I did at the end of the class were useful." (Pri-P_1)

> "Children already actively participate in activities when they learn.... I give a chance to speak to children who do not participate actively in activities at the end-of-day evaluation section. In fact, I try to give all children a chance to speak so that I can figure out who understood and who didn't." (Pre-P_8)

Findings Concerning the Third Sub-Problem

The reason why observation was preferred in the study is the thought that pre-service teachers would reflect their professional readiness to their behaviour. In the study, the behaviours of the pre-service teachers within the scope of the Teaching Practice I course in the primary education department were interpreted with the observation form created within the framework of the sub-dimensions of preparedness to teach.

It was noticed that the pre-service teacher with the code Pri-P_1 materialized the course's acquisitions by keeping students active with original materials she prepared and attracted students' attention. Additionally, it was noticed that she maintained a democratic classroom environment where students could express their feelings and thoughts easily. Pri-P_3 coded pre-service teacher used the appropriate teaching methods and techniques for the course content and used various reinforcement types by giving appropriate feedback to students. The pre-service teacher with the code Pri-P_7 failed to manage his time effectively during the course observations and did not give clear instructions to students. Since he did not have sufficient knowledge about the course's concepts, he caused misconceptions. In addition, it was observed that he did not use appropriate assessment and evaluation approaches and did not ask questions to students at different cognitive levels. Therefore, it was seen that they were bored in the class of the pre-service teacher with the code Pri-P_7 and they lost their interest were distracted. Pri-P_5 coded pre-service teacher associated the subject of the course with other courses and took students' individual differences and development levels into account. In this context, it was seen that students were very happy in the class of the pre-service teachers with the code Pri-P_5 and participated in individual or group studies.

It was determined that the primary school pre-service teachers could not identify the special learning needs or difficulties of students in classrooms, did not use many questions at different cognitive levels, did not care enough about the importance of their thinking skill development, could not assist students to collaborate with different individuals using digital tools, and did not offer a high amount of intriguing examples that caught students' attention. It was detected that the pre-service teachers did not ask questions that would inspire students to research and did not use appropriate tools and materials to strengthen their teaching; they, therefore, had difficulties in enriching the content. Nevertheless, it was found out that all the primary school pre-service teachers started their classes with a video and simulation and animation images in order to get the attention of students and to increase their learning levels.

The pre-school pre-service teacher coded Pre-P_1, took advantage of technological tools within the classroom, thus trying to keep students' attention on the course. Compared to this, it was realized that the pre-service teacher had problems in directing children in dynamic music events, planning the subject information according to students' level of development and transferring his knowledge to students. It was also noticed that the pre-service teacher ignored the individual differences of students. Pre-P_2 configured the process by taking the needs and individual differences of students into account. It was seen that s/he planned their activities in a way that students would be active and passive in turns. Pre-P_2 was observed to be successful in configuring her knowledge and skills in a way that students could understand. However, Pre-P_2 and Pre-P_6 had trouble using their voice effectively in the process. Pre-P_6 was observed to be successful in providing suitable environment to allow them to learn as individuals and groups. However, she had trouble in giving students equal chances to participate in understanding how much students learned. Pre-P_8 included different types of activities in the process and allowed students to learn both as individuals and as groups through the techniques they used in the course. In addition to the help of these techniques, the pre-service teacher led students to think with the open-ended questions he directed.

In general, it was determined that all the pre-school pre-service teachers considered students' level of development as well as the gains in the education program while planning their activities. The pre-service teachers prepared intriguing materials that attracted students' attention and actively used them in the classroom environment, thus enriching the teaching activity. The pre-school pre-service teachers were able to direct questions that led students to learn differently and prepared a classroom environment where students could express their thoughts freely. However, the pre-service teachers were seen to have problems while choosing appropriate teaching strategies, identifying specific learning needs or difficulties, exerting their authority in the classroom, and using technology.

Discussion and Conclusion

In the study, pre-service teachers' preparedness to the teaching profession was examined according to the departmental variable. It was determined that the primary education pre-service teachers were at a moderate level of readiness to teach. In contrast to the results of this research, Aybek and Aslan (2019) stated that pre-service teachers in their study were prepared to teach at a high level. Additionally, Crosswell and Beutel (2012) revealed positive results on pre-service teachers' preparedness to teach in their study. Similar results were observed in the study of Croft (2018). There was no significant difference in the total scores of primary education pre-service teachers' preparedness to teach. Similar scores of the primary school and pre-school pre-service teachers in the Preparedness to Teach Scale can be articulated with the presence of similar courses they take in teacher training programs and with the fact that both departments are under the roof of the primary education department.

No significant difference was found between the departments in terms of sub-dimensions of forming an effective learning atmosphere in the Preparedness to Teach Scale. In the focus group interviews, it was stated that the pre-service teachers paid attention to students' levels of cognitive development in the selection of activities and that they focused on individual differences. In addition, they emphasized the necessity of preparing an effective learning environment according to students' interests, needs and type of intelligence. It was observed that the pre-service teachers had difficulties in choosing appropriate teaching strategies and recognizing students' special learning needs or difficulties. The pre-service teachers' problem in determining the appropriate methods and techniques for students within the scope of the teaching application course supports the research results of Karasu Avcı and Ünal İbret (2016). This result coincides with the fact that pre-service teachers in the study of Girmen, Kılıç and Kaya (2016) made mistakes while carrying out teaching methods and techniques in their teaching practice course experience and could not determine appropriate methods and techniques. Pre-service teachers gain teaching skills for teaching strategies they will use in the educational environment before entering the teaching profession. However, while gaining these skills, the theoretical aspect of the work shows the basis whereas the practical aspect shows effectiveness. Unless the theoretical dimension is transformed into experience with practices, it is not possible to raise teachers who own these skills (Çoban, 2015). Another reason for this result is the lack of field practices in the teacher training process (Aktemur Gürler & Tekmen, 2020).

No significant difference was found between the departments in terms of sub-dimensions of designing the instructional process in the Preparedness to Teach Scale. In the opinions of the primary school and pre-school pre-service teachers on the planning status of the teaching process, it was determined that the pre-service teachers emphasized that higher-order thinking skills such as reasoning, creative thinking and problem solving skills should be developed in students. In addition, they expressed the importance of developing daily life skills and stressed the fac that the ability to express themselves was required for students to keep up with social life. The points highlighted by the pre-service teachers also coincide with the development of lifelong learning, information literacy and high-level thinking skills which are the requirements of the twenty-first century (Demirel & Akkoyunlu, 2017). In addition, the pre-service teachers often emphasized that moral education should be seen as important as the education of academic skills and that teachers should be models for students when it comes to moral values (Prancisca & Rizqi, 2018). Especially primary school and pre-school teachers, working with a young group of students, are important actors in moral education. In order for primary school and pre-school pre-service teachers to educate generations properly, they must have knowledgeable qualifications, equipment and ideal values in moral education subjects (Gürdoğan Bayır, Çengelci Köse & Deveci, 2016; Çelik, Esmer & Yilmaz, 2016; Çetin & Ünsal, 2019). In addition, it was noticed that the pre-service teachers did not give students a chance to participate equally during their in-class observations and had class management problems. Different academic studies support this outcome of the research (Bektaş & Ayvaz Can, 2019; Ünver, 2003). In their research, Akyıldız, Altun, and Kasım (2020) revealed that being observed by consultant teachers troubled pre-service teachers at the point of class management, causing them to be distressed and not to be able to feel like teachers. It is thought that the crowded classes in which the pre-service teachers taught were the main reason why they used the reactive model which is one of the traditional approaches to classroom management.

No significant difference was spotted between the departments in terms of sub-dimensions of understanding the learner in the Preparedness to Teach Scale. Nevertheless, it was realized that understanding the learner status varied on the basis of departments in interviews and observations. It was determined that the pre-school pre-service teachers were based on the pre-school education program while designing the instructional process and paid attention to specified gains and indicators for the development levels in the program. Additionally, it was

realized that the pre-school pre-service teachers often indicated that they needed to consider students' main development areas such as motor, cognitive and social-emotional development. While designing activities that pre-school teachers will practice, they must take students' development levels into account (Zembat, 2007). The results of the study show that pre-school pre-service teachers gain this awareness during their undergraduate education. It is seen that primary school pre-service teachers are careful to act in accordance with the subject in activity preferences and to ensure students' active participation. Although the primary school and pre-school pre-service teachers frequently mentioned that they often asked questions to students at the point of evaluation, they did not point questions in the appropriate cognitive structure. In addition, it was found out that they did not spend enough time on alternative measurement and evaluation methods and techniques. In some studies, both pre-school (Karacaoğlu, 2008; Ünver, 2003) and primary school pre-service teachers (Gök & Şahin, 2009) were shown to have problems on measurement and evaluation practices. This conclusion from the study suggests that, although pre-service teachers theoretically learn about alternative measurement assessment approaches in detail, they cannot stop the influence of the traditional approach while practicing these methods and techniques.

No significant difference was found between the departments in terms of sub-dimensions of techno-pedagogical competency in the Preparedness to Teach Scale. The pre-service teachers' level of technology utilization was also examined in the observations and interviews. As a result, it was determined that the primary school and pre-school pre-service teachers used technology to catch attention and increase class participation. It was observed that the primary school pre-service teachers used technological tools such as video, simulation and animation images in the activities both at the start of the class and for evaluation purposes, thus trying to increase the learning levels of their students. The pre-school pre-service teachers were often found to include videos to make students learn by having fun, and other technological tools were used rarely in their classes. This result is also seen in studies that demonstrated pre-service teachers' lack of knowledge, skills and proficiency for technology (Bingimlas, 2009; Zhao, 2007). Use of technology in classes is known to have a positive effect on students' education and development (Couse & Chen, 2010; Yıldız Durak & Tekin, 2020). However, the development of higher order thinking skills such as logical thinking and decision-making skills can be achieved by early use of technology (Kol, 2017). A pre-service teacher should be able to follow technology closely and use it effectively. This is actually an inevitable consequence of being in the age of technology.

Recommendations

Based on the results obtained in the study, activities for forming an effective learning atmosphere, designing the instructional process, understanding the learner, and techno-pedagogical competency can be planned for pre-service teachers in primary education departments before entering the teaching profession. Courses such as school experience and teaching practices should have a bigger importance during teacher training programs, through which pre-service teachers will gain teaching practice. Educational environments based on social cooperation can also be created for primary education department pre-service teachers. This would allow them to share their experiences in professional life, as a consequence of which pre-service teachers would improve their preparedness to teach based on each other's experience. It can also be suggested that workshops and pre-service professional development programs can be created to provide a holistic understanding of the pre-service teachers' preparedness to teach, and to raise awareness regarding the implicit effects of teaching practices, and that, since primary education department pre-service teachers differ from other branches, the reflections of teaching in the educational process regarding their preparedness to teach can be examined in a longitudinal study by considering different variables.

The Limitations of the Study

The limitations of the study were as follows: The research was held in two different schools and four different classes according to the "Teaching Practices I" class of the pre-service teachers from the primary education department, and the observation, as one of the qualitative data collection tools of the research, was performed two hours a week for 8 weeks.

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APPENDIX A: SAMPLE SCALE ITEMS

Forming an effective learning atmosphere
To be able to identify and focus on specific learning needs or difficulties
To be able to choose appropriate teaching strategies for different educational purposes

Designing the instructional process
Using questions to encourage students to learn in different ways
Helping students develop critical thinking and problem-solving skills

Techno-pedagogical competency
To increase student interest and learning level
Evaluating and monitoring student success

Understanding the learner
Teaching field concepts, knowledge and skills in a way that students can understand
To create challenging, appropriate learning and success expectations for students

APPENDIX B: FOCUS GROUP INTERVIEW QUESTIONS

1. What are the focal points of pre-service teachers for achieving educational program outcomes? What are you focusing on?
2. What are the points that pre-service teachers pay attention to/care about while designing the instructional process?
3. What are the skills that pre-service teachers would like to develop in students?
4. How is pre-service teachers' technology usage? How do you use technology?
5. How do you learn about obtaining information about student's level of learning?

APPENDIX C: OBSERVATION FORM SAMPLE ITEMS

Forming an effective learning atmosphere
Recognizes the special learning needs or difficulties in the classroom.

Chooses appropriate teaching strategies for different educational purposes.

Designing the instructional process
Creates environments for students to express their different ideas.
Cares about the development of their thinking skills in students.

Techno-pedagogical competency
Teaches with enrichments.
Increases the level of learning with activities such as videos, simulations and animation images during the class.

Understanding the learner
Identifies learning deficiencies and tries to address them.
Uses questions to measure higher-order student skills such as analysis and synthesis.

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Analysis of the Relationships between Academic Motivation, Engagement, Burnout and Academic Achievement with Structural Equation Modelling

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Analysis of the Relationships between Academic Motivation, Engagement, Burnout and Academic Achievement with Structural Equation Modelling

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Abstract

The aim of this study was to examine the relationships between teacher candidates' academic motivations, engagements, burnouts and academic achievements with structural equation modelling. The participants of the research consisted of teacher candidates studying in the faculty of education at a state university in Eastern Turkey (n=861). The model, which was set within the research, was confirmed. 5 out of 6 hypotheses were accepted, while 1 of them was rejected. In the consequence of the research, it was determined that academic motivation predicted burnout directly and negatively; academic motivation predicted student engagement directly and positively; burnout predicted student engagement directly and negatively; burnout predicted academic achievement directly and negatively; student engagement predicted academic achievement directly and positively, on a significant level statistically. Moreover, burnout had a mediation role in the relationship between academic motivation and student engagement; student engagement had a mediation role in the relationship between burnout and academic achievement; both student engagement and burnout had a mediation role in the relationship between academic motivation and academic achievement. Academic motivation explained nearly 31% of the variance in burnout; academic motivation and burnout together explained nearly 44% of the variance in student engagement; and the confirmed model explained nearly 13% of the variance in academic achievement. Further implications of these findings for practical use and further research are discussed.

Key words: Teacher candidates, Academic motivation, Student engagement, Burnout, Academic achievement.

Introduction

Training process of individuals who will become teachers in the near future is an area which is accentuated in depth around the world and education systems give particular importance to. Teacher candidates' effort, willingness, reluctance, engagement, being innovative in the process of learning and teaching in the classroom; that is, actions in the process of improving themselves during college education are important for their teaching profession in the upcoming years. Thus, it can be expressed that teacher candidates' motivations form, support and affect their pre-service education process. Several definitions and classifications about motivation have been made in the literature. Academic motivation is one of these definitions. Academic motivation affects learning outcomes which students get in the process of education positively and contributes to reducing undesirable behaviour in educational environments (Vallerand, Pelletier, Blais, Briere, Senecal &Vallieres, 1992).

It has been revealed within the studies in the literature that academic motivation has an effect on the concepts like school attendance, reducing dropout rate, memorability of knowledge, academic achievement, fulfilling assignments and duties, researching, focus on courses, not getting bored in class, positive classroom relationships (Clark & Schroth, 2010; DiPerna & Elliott, 1999; Eccles & Midgley, 1990; Litalien, Morin, Gagné, Vallerand, Losier & Ryan, 2017; Wormington, Corpus & Anderson, 2012), enjoying learning (Eccles & Wigfield, 2002; Zimmerman, 2008), student engagement (Green, Liem, Martin, Colmar, Marsh & McInerney, 2012, Roeser, Strobel & Quihuis, 2002, Doğan, 2015), burnout (David, 2010; Chang, Lee, Byeon, Seong & Lee, 2016; Veyis, Seçer & Ulas, 2019) and academic achievement (Guay, Ratelle, Roy & Litalien, 2010, Rodriguez, Castillo & Gandara, 2013).

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Academic motivation has been defined by Bozanoglu (2004) as producing necessary energy for academic duties and affairs. Motivation of students in general view and academic motivation of students in special view play a critical and important role in educational environments and processes. Academic motivations of students are affected by various factors. Many factors like teachers' classroom management, supporting students, relationships with students, the use of rewards and punishment in classroom, classroom climate, students' perceptions of self-efficacy, focus on goals, friend relationships and supports affect academic motivations of students (Rowell & Hang, 2013). It can be stated that motivation of students in all education levels from pre-school to college has positive contributions to educational process. Within the context of this study, various examinations and discussions have been made in terms of positive contributions of teacher candidates' motivation to educational process and reducing negative cases in educational process.

Another variable discussed within the research is student engagement. It has been discovered within the studies that student engagement has an effect on various educational variables. The studies on student engagement discussed observable aspects of engagement previously, but the following studies tried to explain student engagement in more detail by focusing on affective aspects of engagement (Brophy, 1983; Connell & Wellborn, 1991; Finn, 1989). The recent studies discussed engagement as a multidimensional concept (Fredricks, Blumenfeld & Paris, 2004). Behavioural engagement focused on observable aspects of student's engagement in educational processes like following classroom rules, class attendance, active participation in the learning process and fulfilling duties and responsibilities (Finn, Pannozzo & Voelkl, 1995;Walker, Greene & Mansell, 2006). Affective engagement can be defined as combination of feelings for teachers, friends and school like belonging, identification, value, happiness, interest, sadness and anxiety (Connell & Wellborn, 1991; Finn, 1989). Cognitive engagement refers cognitive processes student uses in classroom such as problem solving, organizing knowledge and signifying knowledge (Brophy, 1987; Connell & Wellborn, 1991; Li & Lerner, 2013).

Increasing student engagement affects some variables like academic achievement (Reyes, Brackett, Rivers, White & Salovey, 2012; Storlie & Toomey, 2020), reducing undesirable behaviour (Nelson, 2015), reducing alienation (Wimpenny & Savin-Baden, 2013), reducing level of burnout (Schaufeli, Martinez, Pinto, Salanova & Bakker, 2002), academic effort, motivation, reducing dropout rate (Alexander, Entwisle & Kabbani, 2001; Buhs & Ladd, 2001; Fredricks, Blumenfeld & Paris, 2004; Lam et al., 2014) and positive attitude towards school and learning (Chiu,Pong, Mori & Chow, 2012; Sever, Ulubey, Toraman & Türe, 2014).

It has been determined within the studies in the literature that student burnout has a negative effect on educational processes and academic achievement (Salmela-Aro & Upadyaya, 2017). Student burnout is described as student exhaustion due to studying hard and academic demands, perception of underachievement, negative attitude towards school and school activities and emergence of feeling of incompetence and development (Lee, Puig, Kim, Shin, Lee & Lee, 2010; Salmela-Aro, Kiuru, Leskinen & Nurmi, 2009). Burnout from students' point of view is to feel exhausted due to studying demands and to feel incompetent themselves (Schaufeli, Martinez, Pinto, Salanova & Bakker, 2002). Student burnout can be defined as syndrome showing students' exhaustion, getting themselves stressed of students about school, and duties and responsibilities related to school and state of exhaustion caused by pressure (Aypay, 2012). It can be stated that college students in general view, teacher candidates in special view get exhausted because of various reasons such as future anxiety, beginning to work, projects, duties, keeping away from family, improving themselves, friend relationships and economic problems.

It has been revealed within the studies in the literature that student burnout causes many negative outcomes from an educational perspective. These are decline in academic achievement (Çapulcuoğlu & Gündüz, 2013; Salmela-Aro, Savolainen & Holopainen, 2009), lack of motivation for classes and school (McCoach & Siegle, 2001; Reis & McCoach, 2000), developing negative attitude towards classes and school (Salmela-Aro, Savolainen & Holopainen, 2009), decline in academic self-efficacy (Lee, Puig, Kim, Shin, Lee & Lee, 2010), increase in school dropout rates (Yang & Farn, 2005), increase in school absenteeism (Kutsal, 2009) and decline in student engagement (Fiorilli, De Stasio, Di Chiacchio, Pepe & Salmela-Aro, 2017). According to the results of the studies, it can be stated that burnout affects especially student engagement and academic achievement. Moreover, it can be remarked that increasing student motivation reduces student burnout.

Academic achievement provides an opportunity to make various comparisons about education in national and international context and to evaluate outcomes of educational systems, so it is an important concept in planning and performance of educational processes. Academic achievement can be defined as level of students' goal achievement in an educational institution like school (Aduke, 2015). Academic achievement is individual's performing specific objectives designed specially in a structured environment like university in a desired

competence and level as performance outcomes (Steinmayr, Meißner, Weidinger & Wirthwein, 2015). Academic achievement is affected by many factors based on individual and environment (Atik & Özer, 2020). In the consequence of the studies conducted with teacher candidates, some factors affecting their academic achievement are these: motivation (Eymur & Geban, 2011; Wurf & Croft-Piggin, 2015), student engagement (Castro-Villarreal, Guerra, Sass & Hseih, 2014; Daniels, Radil & Goegan, 2017) and burnout (Balkıs, 2013).

College years are an important period for teacher candidates, in which they acquire professional knowledge and skills for professional development. Teacher candidates mainly acquire theoretical knowledge and contribute to their professional development with applied courses in this period. On the other hand, they contribute to their personal development by socializing. A qualified pre-service training is important for teacher candidates to overcome the problems they will encounter in the early years of the profession and to continue their professional career. An important indicator that teacher candidates have acquired sufficient knowledge and skills related to their profession is their academic achievements. The factors affecting the academic achievements of students at different school levels have an extensive research literature, but the variables of academic motivation, school engagement and burnout that can affect the academic achievements of teacher candidates have been discussed together in a limited number of studies (Cazan, 2014; Wen et al., 2014). Modeling variables that may affect the academic achievements of teacher candidates will contribute to the determination of the content of intervention programs that can be developed for teacher candidates during their university education and thus to the quality of teacher preparation programs.

Hypotheses of the researcher were developed and structural equation modelling was set and drawn in the light of abovementioned literature and the statistical findings of these studies were utilized. Within the scope of this research, the relationships between academic motivation, school engagement, burnout and academic achievement were investigated with structural equation modelling.

H1: Academic motivations of teacher candidates have a negative effect on their burnouts.
H2: Academic motivations of teacher candidates have a positive effect on their engagements.
H3: Burnouts of teacher candidates have a negative effect on their engagement.
H4: Burnouts of teacher candidates have a negative effect on their academic achievements.
H5: Academic motivations of teacher candidates have a positive effect on their academic achievements.
H6: Teacher candidates' engagements have a positive effect on their academic achievements.

Method

Research model

This research is a relational study determining the relationships between teacher candidates' academic motivations, engagements, burnouts and academic achievements. Structural Equation Modelling, one of the analysis methods used in relational studies to determine relationships between variables (Fraenkel & Wallen, 2009), was used within the scope of the research.
Structural equation modelling is a statistical technique showing and testing relationships between one or more than one dependent variable, or one or more than one independent variable all together (Tabacknick & Fidell, 2013).

Participants

The research was conducted with voluntary students studying in the faculty of education at a state university in Eastern Turkey in the 2018-2019 academic year. The final analyses of the research were performed with data gathered from 861 students. Among these students, 609 (70.7%) of them were female, while 252 (29.3%) of them were male and 185 (21.5%) of them were sophomore students, 318 (36.9%) of them were junior students, while 358 (41.6%) of them were senior students.

Data collection tools

Data collection tools consisting of four parts as demographic information (gender, grade level, CGPA= Cumulative Grade Point Average), Academic Motivation Scale, College Students Engagement Scale and Maslach Burnout Inventory- Student Form was used in the study. The scales in the data collection tools were explained below.

Academic Motivation Scale

The Academic Motivation scale, used in order to determine motivations of students studying in faculty of education, was developed by Bozanoğlu (2004). The scale was developed for high school students and also used for various studies concerning college students (Demir & Arı, 2013; Terzi, Uyangör & Dülker, 2017). This scale contains sub-dimensions of "Getting over Oneself", "Using Knowledge" and "Discovery" and 20 items in total. The scale's validity and reliability checks were performed again within the context of the research. Second-order confirmatory factor analysis was performed for the scale and according to the analysis results, the values of goodness-of-fit were these: $\chi 2/df=2.81$, GFI=0.96, AGFI=0.95, NFI=0.96, NNFI/TLI=0.96, IFI=0.95, CFI= 0.97, RMSEA=0.021, RMR=0.034, SRMR=0.039. Cronbach's alpha internal consistency coefficients for the sub-dimensions of "Getting Over Oneself", "Using Knowledge" and "Discovery" and for the whole scale were "0.81", "0.84", "0.84" and "0.82" respectively.

College Students Engagement Scale

This scale was developed by Özer & Atik (2014). The scale consisted of one dimension and 11 items. The fit indices of the confirmatory factor analysis for this scale were these: $\chi 2/df=2.24$, GFI=0.96, AGFI=0.95, NFI=0.97, NNFI/TLI=0.96, IFI=0.96, CFI= 0.96, RMSEA=0.026, RMR=0.034, SRMR=0.028. Cronbach's alpha value of this scale was .90.

Maslach Burnout Inventory- Student Form

Maslach Burnout Inventory- Student Form (MBI-SF), developed by Schaufeli, Martinez, Marques-Pinto, Salanova & Bakker (2002), was adapted to Turkish by Çapri, Gündüz & Gökçakan (2011). The scale had a 3 sub-dimensional structure consisting of 13 items in total. These sub-dimensions were named as "burnout (5 items)", "desensitization (4 items) and "competence (4 items). Second-order confirmatory factor analysis was performed for the scale and according to the analysis results, the values of goodness-of-fit were these: $\chi 2/df=2.52$, GFI=0.94, AGFI=0.93, NFI=0.94, NNFI/TLI=0.94, IFI=0.95, CFI= 0.95, RMSEA=0.039, RMR=0.044, SRMR=0.048. Cronbach's alpha internal consistency coefficients for the sub-dimensions of "Burnout", "Desensitization" and "Competence" and for the whole scale were "0.79", "0.81", "0.77" and "0.79" respectively.

Process and Data Analysis

Data of the research were gathered in the spring semester of the 2018-2019 academic year. The data collection process was applied based on voluntariness. Filling out the scale took 15 minutes on average. The students entered the student information system to learn their grade point averages while filling out the data collection tool. The students were asked to write their current cumulative grade point average (CGPA) into data collection tool. Univariate and multivariate normal distributions of the dataset were checked to conduct structural equation modelling. The results of the analysis are shown in Table 1.

Table 1. Multivariate normality analyses

Variable	Coefficient of Skewness	c.r.	Coefficient of Kurtosis	c.r.
Academic Motivation	-.281	-.365	.172	1.029
Burnout	.346	.149	-.168	-
Student Engagement	-.605	-.253	.294	1.762
Academic Achievement	-.383	-.588	-.246	-
Multivariate			.897	1.899

[c.r.: critical ratio]

At first, univariate normal distribution assumptions (Z scores between +3 and -3 and skewness and kurtosis values between +1 and -1 were selected as the baseline) were checked for the research analyses. It has been determined as a result of the analyses that the dataset is in accordance with univariate normality assumptions. When univariate normality assumption was examined for the dataset, it was accepted as a reference point that skewness and kurtosis values were between +1 and -1 as Şencan (2005) suggested. They were taken as reference points in multivariate normality analyses that multivariate kurtosis value was between +2 and -2, and multivariate critical ratio value was less than 1.96 (Bayram, 2010). It was determined as a result of the analyses

that the dataset was in accordance with both the univariate and the multivariate normality assumptions. Maximum likelihood method in SPSS- AMOS 21 program was used in the process of data analysis.

Findings

Descriptive statistical analysis of the variables was conducted in the first analysis step of the research data. Results of the analysis are shown in Table 2.

Table 2. The results of the descriptive analysis

	$\bar{x}$	sd	1.	2.	3.
1. MOT	3.32	11.37			
2. BUR	2.60	1.71	-.56		
3. ENG	3.72	6.76	.64	-.50	
4. AA	2.82	2.46	.14	-.30	.31

(MOT: Academic Motivation, BUR: Burnout, ENG: Student Engagement, AA: Academic Achievement)

According to the correlation analysis results in Table 2, it is seen that the means of the variables vary between 2.60 and 3.72, and the standard deviation values vary between 2.46 and 11.37.

As a result of the correlation analysis, it has been found that there is a negative, medium level, significant relationship between students' academic motivations and their burnouts (r=-.56; p<.001); a positive, medium level, significant relationship between their academic motivations and their engagements (r=.64; p<.001) and a positive, small level, significant relationship between their academic motivations and their academic achievements (r=.14; p<.001). It has been determined that there is a negative, medium level, significant relationship between burnout and student engagement (r=-.50; p<.001); a negative, medium level, significant relationship between burnout and academic achievement (r=-.30; p<.001). It has been revealed that there is a positive, medium level, significant relationship between student engagement and academic achievement (r=.31; p<.001).

The model, set based on the theoretical knowledge of the research, was analyzed with AMOS 21 program. Standardized regression coefficients and significance levels of regression coefficients of the analysis and the hypotheses of the research are shown in Table 3.

Table 3. Hypotheses of the research and analysis results of the model

Hypotheses	Pathways Between Variables			B	β	t-value	Result
H1	BUR	<---	MOT	-.09	-.56	19.83	Accepted
H2	ENG	<---	MOT	.31	.53	17.06	Accepted
H3	ENG	<---	BUR	-.77	-.20	6.63	Accepted
H4	AA	<---	BUR	-.05	-.19	5.92	Accepted
H5	AA	<---	MOT	.04	.03	1.79	Rejected
H6	AA	<---	ENG	.019	.22	6.63	Accepted

(MOT: Academic Motivation, BUR: Burnout, ENG: Student Engagement, AA: Academic Achievement)

When Table 3 is examined, it is seen that five pathways in the model are significant (p<.05), but the pathway between academic motivation and academic achievement is insignificant (p>.05). Among the hypotheses, developed in the context of this research, 5 out of 6 hypotheses were accepted, and 1 of them was rejected. Goodness-of-fit values obtained from the analysis are shown in Table 4.

Table 4. Goodness-of-fit index results of the confirmed model

Fit Index	**Acceptable Fit**	**Good Fit**	**Goodness-of-fit Values Obtained from the Research**
$\chi 2/df$	$2 \leq \chi 2/df \leq 5$	$0 \leq \chi 2/df < 2$	0.98 (Good Fit)
GFI	$0.90 \leq GFI < 0.95$	$0.95 \leq GFI \leq 1.00$	0.99 (Good Fit)

AGFI	0.85 ≤ AGFI < 0.90	0.90 ≤AGFI ≤ 1.00	0.99 (Good Fit)
NFI	0.90 ≤ NFI < 0.95	0.95 ≤ NFI ≤ 1.00	0.99 (Good Fit)
NNFI/TLI	0.95 ≤ NNFI < 0.97	0.97 ≤ NNFI ≤ 1.00	0.98 (Good Fit)
IFI	0.90 ≤ IFI < 0.95	0.95 ≤ IFI ≤ 1.00	0.99 (Good Fit)
CFI	0.95 ≤ CFI < 0.97	0.97 ≤ CFI ≤ 1.00	0.99 (Good Fit)
RMSEA	0.05 ≤ RMSEA ≤ 0.08	0 ≤ RMSEA < 0.05	0.03 (Good Fit)
RMR	0.05 ≤ RMR ≤ 0.08	0 ≤ RMR <0.05	0.04 (Good Fit)
SRMR	0.05 ≤ SRMR ≤ 0.08	0 ≤ SRMR < 0.05	0.01 (Good Fit)

(Brown, 2006; Çelik & Yılmaz, 2013; Kline, 2010; Sümer, 2000; Şimşek, 2007).

Fit indices in respect of the structural equation modeling are shown in Table 4. The values of χ2/df (0.98), GFI (0.99), AGFI (0.99), NFI (0.99), NNFI/TLI (0.98), IFI (0.99), CFI (0.99), RMSEA (0.03), RMR (0.04) and SRMR (0.01) are regarded as "Good Fit". The model, confirmed by the analyses in the research, is shown in Figure 1.

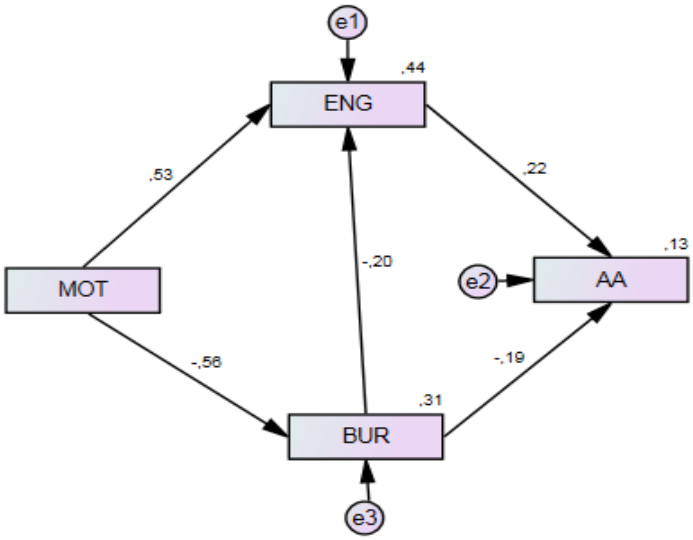

Figure 1. Confirmed structural equation modeling

According to the confirmed model, academic motivation (MOT) predicts burnout (BUR) directly and negatively (β=-.56); academic motivation (MOT) predicts student engagement (ENG) directly and positively (β=.53); burnout (BUR) predicts student engagement (ENG) directly and negatively (β=-.20); burnout (BUR) predicts academic achievement (AA) directly and negatively (β=-.19) and student engagement (ENG) predicts academic achievement (AA) directly and positively (β=.22), on a significant level statistically.

Academic motivation (MOT) explains nearly 31% of the variance in burnout (BUR); academic motivation (MOT) and burnout (BUR) together explain nearly 44% of the variance in student engagement (ENG); three variables (MOT, BUR, ENG) altogether explain nearly 13% of the variance in academic achievement (AA). The direct and indirect effects, standardized for the variables in the structural equation modeling, are shown in Table 5.

Table 5. Bootstrap analysis results of the effects in the confirmed model

Pathways	Bootstrap values		Bias %95 CI**	
	Coefficient	SE*	Lower Limit	Upper Limit
Direct effect				
MOT → BUR	-56	.02	-.59	-.51
MOT → ENG	.52	.03	.48	.59
BUR → ENG	-.20	.03	-.26	-.15
BUR → AA	-.19	.04	-.26	-.14
ENG → AA	.22	.04	.15	.28
Indirect effect				

MOT → ENG	.11	.02	.08	.14
MOT → AA	.10	.02	.08	.13
BUR → AA	-.05	.01	-.06	-.03

*Standard Error, ** Confidence Interval

When bootstrapping coefficients and their confidence intervals are examined in Table 5, it is understood that the direct and indirect pathways are significant. Besides, burnout (BUR) has a mediation role in the relationship between academic motivation (MOT) and student engagement (ENG). Student engagement (ENG) has a mediation role in the relationship between burnout (BUR) and academic achievement (AA). Both student engagement (ENG) and burnout (BUR) have mediation roles in the relationship between academic motivation (MOT) and academic achievement (AA).

Results, Discussion and Recommendations

This research is one of the limited number of studies analyzing the relationships between teacher candidates' academic motivations, engagements, burnouts and academic achievements all together. The model, developed based on theoretical and statistical findings of the literature, was confirmed in the consequence of the research. From this point of view, it can be expressed that the research provides more detailed analyses by discussing teacher candidates' college education process extensively. It has been determined within this research that teacher candidates' academic motivations have a negative significant effect on their burnouts. It has been revealed in the studies in the literature that student motivations support educational process in a positive way. It can be also remarked that motivation reduces problems in educational processes. Pisarik (2009) stated that increasing students' motivations reduce their burnouts. Other studies in the literature supported this result of the research (Chang, Lee, Byeon, Seong & Lee, 2016; Veyis, Seçer & Ulas, 2019). Moreover, it can be said that teacher candidates' academic motivations affect their improving themselves positively when they become teachers in the near future (Altınkurt, Yılmaz & Erol, 2014). Within the context of the research, academic motivation explains nearly 31% of the variance in teacher candidates' burnouts which they will suffer from in the future.

It has been determined within the research that teacher candidates' academic motivations have a positive effect on their engagements. This result of the research shows parallelism with the other studies in the literature (Jang, 2008; Guthrie, Klauda & Ho, 2013). Students' motivations for the class and educational process cause reducing undesirable behaviour (Petlák, Tistanová & Juszczyk, 2019), developing a positive attitude towards school and learning (Ganbari-Taleb, Ghanbari, Yousefi & Botlani, 2013; McCoach, 2002), focusing on assignments and duties (Katz, Kaplan & Gueta, 2009), active participation in educational process in classroom (Jang, 2008), helping peer teaching (Keifer, Alley & Ellerbrock, 2015), improving themselves (Chirkov, Vansteenkiste, Tao & Lynch, 2007; Noels, Clément & Pelletier, 1999), enjoying learning (Abrams, 2005; Benson, 2003), reducing dropout rate (Vallerand, Fortier & Guay, 1997), teacher burnout (Shen, McCaughtry, Martin, Garn,Kulik & Fahlman, 2015), student burnout (Stoeber, Childs, Hayward & Feast, 2011) and increasing academic achievements (Alivernini & Lucidi, 2011; Meece, Anderman & Anderman, 2006).

It has been revealed within this research that teacher candidates' burnouts have a negative effect on their engagements. The results obtained from other studies in the literature support the result of this research (Alarcon, Edwards & Menke, 2011; Fiorilli, De Stasio, Di Chiacchio, Pepe & Salmela-Aro, 2017; Uludag & Yaratan, 2010). It has been discovered by the studies that burnout affects individual's both student life and normal life in a negative way (Maslach, Jackson, Leiter, Schaufeli & Schwab,1986; Salmela-Aro, Kiuru, Leskinen & Nurmi, 2009). From this point of view, it can be said that teacher candidates' burnouts affect their college education, their improving themselves for their school teaching in the future, enjoying their lives and achieving satisfaction with life in a negative way.

Increasing teacher candidates' motivations and energies for educational process contributes to reducing their burnouts (Alarcon, Edwards & Menke, 2011). Thus, things to do in order to increase positive energy of students in general view, of teacher candidates in special view in the educational process and reduce their burnouts are these: making students feel valuable and special, supporting their efforts in educational process, taking care of their problems and helping them solve their problems, designing lessons according to student needs and levels, enabling them active participation in the learning process, developing understanding of lifelong learning instead of the idea that education and learning take place only in schools, making them realize that successes and failures are parts of human life, raising awareness of students about the factors reducing parental, peer and social pressure, guiding them through activities enabling them to have a fun and quality time. In the consequence of the research, academic motivation and burnout together explain nearly 44% of the variance in teacher candidates' engagement.

It has been found within the research that teacher candidates' engagements have a positive effect on their academic achievements. This finding of the research shows parallelism with the other studies in the literature (Collie, Holliman & Martin, 2017; Heng, 2014; Reyes, Brackett, Rivers, White & Salovey, 2012). It can be stated that engagements of students in general view, of teacher candidates in special view have positive contributions to their participation in class debates, their efforts to participate in educational activities in class, their interests and motivations for learning (Fredricks, Blumenfeld, & Paris, 2004; Marks, 2000). It can be expressed that reducing student engagement causes increasing undesirable behaviour in educational environments, reducing the level of achieving goals and academic achievements, increasing dropout rate and alienation from school, and increasing student burnout (Archambault, Janosz, Fallu & Pagani, 2009; Kaplan, Peck, & Kaplan, 1997; Salmela-Aro, Kiuru, Leskinen & Nurmi, 2009). It can be said that Turkey will go on caring about and using instructional programmes providing students' active participation in learning in the upcoming years thanks to tendencies in educational sciences, changes and transformations in education around the world. Thus, it is possible to say that teacher candidates' engagements in pre-service education processes, and experiences about how to encourage students' engagement and which strategies should be followed are important in terms of the teaching profession. It can be stated that teacher candidates in the university see their professors' behaviours affecting student engagement positively or negatively as a role model in the context of social learning theory.

It has been determined within the research that teacher candidates' burnouts have a negative effect on their academic achievements. This result of the research bears a resemblance to the results of other studies conducted by Duru, Duru & Balkıs (2014), Vasalampi, Salmela-Aro & Nurmi (2009) and Yang (2004). Academic achievement can be regarded as a premise to evaluate effectiveness and productivity of schools and education systems, and to follow if the educational goals have been achieved or not (Balcı, 2013; Hoy & Miskel, 2010; Lunenburg & Ornstein, 2013). Academic achievement and the factors affecting academic achievement were discussed in many studies. Intense studies on academic achievement show the importance of the concept for the educational process. It can be expressed that courses teacher candidates took in faculties of education are for increasing their mastering the field, their general knowledge and their pedagogical content knowledge, and adopting the teaching profession. Teacher candidates' successes in these courses enable them to improve themselves in teaching.

The hypothesis, teacher candidates' academic motivations have a direct positive effect on their academic achievements, has not been confirmed. However, when the research results are evaluated it can be said that teacher candidates' academic motivations have an effect on their academic achievements even if it is indirect. This result of the research bears a resemblance to the results of other studies in the literature (Clark, Middleton, Nguyen & Zwick, 2014; Guay,Ratelle, Roy & Litalien, 2010). The results of the research have shown the importance of students' motivations, engagements and burnouts in terms of their academic achievements. Three variables discussed within the research (academic motivation, engagement and burnout) altogether explain nearly 13% of the variance in academic achievement. It is possible to say that this variance explanation is an important result for academic achievement which is a concept affected by many factors. These suggestions can be offered based on the results of the research:

- This research was conducted based on quantitative techniques. Further studies using mixed designs in order to remove this limitation of the research can contribute to evaluating the results of the research better.
- Conducting this research in various universities in Turkey and in the world can contribute to comparing the research results.
- Educational applications affecting teacher candidates' academic and general motivations positively can be increased.
- In order to reduce teacher candidates' burnouts, some measures can be taken such as making the educational process pleasant and entertaining, determining the factors causing stress and burnout in teacher candidates and reducing these factors.
- It is possible to say that making arrangements for examinations and practices causing pressure on teacher candidates during teacher appointment process can reduce their burnouts.
- Awareness of professors who instruct and play a key role in teacher candidates' engagements can be raised by providing training for them on this topic.
- Direct relationships between the variables were analyzed in this research. Moreover, further studies for indirect effects can contribute to clarifying and evaluating this research.

It can be said that this research has some limitations. First of all, since this study focused on personal variables that affect teachers' academic achievements, environmental factors that may affect academic achievement were not included in the model. Adding environmental factors that can affect academic achievement to the model could have increased the variance explained by the model. Second, the sample of the research is limited to teacher candidates studying at a state university in eastern Turkey. Thus, this situation creates a limitation in the generalization of the research results. Finally, teacher candidates' academic motivation, school engagement and burnout levels were determined based on their individual perceptions. This situation is considered as a limitation as it may affect the objectivity of the answers given to the scale questions.

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Program Evaluation Experts' Competencies: A Delphi Study

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Program Evaluation Experts' Competencies: A Delphi Study

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Abstract
Due to the diversity of steps to be followed in program evaluation and knowledge, skills, qualification and competency requirements, the evaluation should be a field of expertise similar to other disciplines. Thus, it is important to consider program evaluation as a field of expertise and to determine the required competencies. This study aimed to determine the competencies of program evaluation experts based on the views of curriculum and instruction experts. A Delphi study was carried out with 23 participants in the first round and each was selected via the purposive sampling method. In the first round of the Delphi study, the open-ended questions were sent to the participants and qualitative data were analyzed with content analysis. At the end of the first round, a 5-point Likert-type questionnaire with 82 items was developed. In the second round, participants were asked to answer questions and also the views of the participants on main and sub-themes and their comments on these concepts were analyzed. In the third round, participants were asked to reevaluate their responses. The study was finalized with an 82 itemed-questionnaire under four main themes: "theoretical professional competencies of program evaluation experts", "practical professional competencies of program evaluation experts", "professional values that program evaluation experts should have", "professional skills that program evaluation experts should have".

Key words: Program evaluation, Program evaluation expert, Curriculum and instruction, Delphi technique

Introduction

In every part of life, the evaluation of the functionality, effectiveness and quality of the products and services based on different perspectives is of great importance to achieve better and current outcomes. Scriven (1996, p.395) stated that although evaluation has been an ancient practice, it is a new professional discipline. It could be suggested that evaluation is a human instinct based on individual taste. However, it is necessary to distinguish the evaluations made in daily life and those conducted with formal disciplines. In other words, professional evaluations should not entail subjectivity.

According to Ornstein and Hunkins (2009), evaluation is a decision-making process on a topic in the broadest sense. For this process to function properly, it is necessary to determine certain standards, to collect and analyze data with adequate methods and techniques, and to implement certain standards in the decision-making process. Program evaluation has been defined in various forms in numerous studies. According to Oliva (1988), program evaluation is a data collection process that requires scientific process skills. Barnes (1982, p.177), who considered program evaluation as a process, argued that it was necessary to seek answers to the questions regarding what will be evaluated, when and where it will be evaluated, why and by whom it will be evaluated in this process. Melrose (1998) also discussed program evaluation as a process where the value or usefulness of a program or its suitability for the individual, group, institution or community is determined. According to Melrose (1998), this analysis process varies based on the collected evidence, the questions asked to relevant individuals, and the value judgments of the practitioners. Özçelik (1992, p. 231) described program evaluation as the process of assigning a meaning to available information, the interpretation of the data based on its suitability for certain objectives, certain conditions, and certain meanings, etc.

Due to the diversity of steps to be followed in program evaluation and knowledge, skills, qualification and competency requirements, the evaluation should be a field of expertise similar to other disciplines. In addition, competition in a rapidly expanding global market requires service and product providers to provide evidence for

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individual or institutional accreditation (Engle, Altschuld, & Kim, 2006). Thus, evaluation experts have a great role to play in the process.

Undergraduate program evaluation departments are available in the USA, Canada, Australia, Iceland, Belgium and the West Indies (LaVelle & Donaldson, 2015). Although program evaluation education is not provided in a particular department in Turkey, program evaluation experts are trained in master's and doctorate programs in Curriculum and Instruction (CI) departments in education faculties in Turkish universities. The discipline of CI was initially introduced in the Educational Sciences Professorial Chair established within Ankara University, Faculty of Education in 1965. The undergraduate CI program, which provided undergraduate and graduate education services until 1997, was decommissioned during the restructuring of education faculties. The CI Program was responsible for the instruction of undergraduate vocational courses, aimed to improve the knowledge, skills and understanding of the students in the field of educational sciences at graduate level, and provide students with expertise in the field of CI through courses that emphasized the design, development, evaluation of programs, instruction design and scientific research skills. Lavelle and Donaldson (2015) reported that evaluators could be trained with various methods, including university programs, professional development workshops, webinars and field studies. Furthermore, Cousins, Goh, Elliott, and Bourgeois (2014) stated that program evaluation experts could be trained within the scope of formal education and special applications such as workshops, seminars, short courses and online training programs organized by private education institutions. Thus, since the evaluation experts are trained at graduate level in Turkey, this is not open to criticism. However, the study conducted by Atik Kara, Kürüm Yapıcıoğlu and Sever (2020) that evaluated CI graduate programs led to the question whether the education allowed the program evaluation experts to acquire the desired theoretical and applied knowledge since program evaluation topics were not adequately included in both master's and doctorate programs.

The consideration of program evaluation, which has a practical history of 50 years, as a field of expertise dates back to the 1980s (King, 2003; Stevahn, King, Ghere, & Minnema, 2005a). Evaluation, which was seen as a feasible job by a person who has an education in any field, was not only considered as an area of expertise, but was also considered important enough to suggest that the competencies that experts should have in this field should also be determined. Stevahn, King, Ghere, and Minnema (2005a) discussed the necessity of determining the competencies that program evaluators should possess and stated that since there was no undergraduate program for evaluation experts, anyone could claim to be a program evaluation expert. On the other hand, those who need a program evaluator may experience difficulties in determining the actual experts. However, individuals who want to be trained as program evaluators may also experience problems in selecting the adequate training program. Universities that aim to train program evaluation experts, on the other hand, could be limited by programs based on personal needs and priorities, when there is no specific qualification framework. Furthermore, the field may lack theoretical and descriptive research to guide effective applications. McGuire and Zorzi (2005) reported that it was also important to determine the field competencies to ensure the professional development of program evaluation experts who have diverse educational backgrounds and experiences.

Evaluation competencies include the skills, knowledge, abilities and qualifications required to evaluate (McGuire & Zorzi, 2005, p.74). It could be suggested that it is very difficult to define a fully competent framework for evaluators, since those who work as program evaluators have different educational backgrounds and experiences. On the other hand, certain studies also argued that the knowledge and skills required for evaluation may vary based on the purpose of the evaluation, employed evaluation model, the context, and the desires of the client or other stakeholders (Cooksy & Mark, 2012; McGuire & Zorzi, 2005; Volkov, 2011). Nevertheless, field experts have agreed that the competencies required for program evaluation, considered as a specialty, should be determined.

Studies on the competencies in program evaluation are available in the literature (Covert, 1992; Mertens, 1994; Scriven, 1996a). Scriven (1996a) summarized the required knowledge and skills for an evaluator in 10 items:

1. Basic qualitative and quantitative methodologies
2. Validity theory, generalizability theory, and meta-analysis
3. Legal constraints on data control and access, funds use, and treatment of the personnel (including the rights of human subjects)
4. Personnel evaluation
5. Ethical analysis
6. Needs assessment
7. Cost analysis

8. Internal synthesis models and skills
9. Conceptual geography
10. Evaluation-specific report design, construction, and presentation (p.154)

It could be suggested that the evaluator competencies determined by the Joint Committee on Standards for Educational Evaluation (JCSEE) in 1994 and the American Evaluation Association (AEA) in 2004 are considered as fundamental criteria by the field experts. However, arguing that the predetermined principles and standards could not clearly indicate the features that evaluators would require, Stevahn, King, Ghere and Minnema developed a classification for basic evaluator competencies in 2001 in their study that aimed to determine the program evaluator competencies (King, Stevahn, Ghere, & Minnema, 2001). They updated their classification in 2005 with a few additions in 6 main categories and called the classification "basic competences for program evaluators." The 6 main categories and their scopes were as follows (Stevahn, King, Ghere, & Minnema, 2005):

1. Professional practice - competencies that focus on foundational norms and values that underlie program evaluation, such as adhering to standards and ethical principles.
2. Systematic inquiry - competencies that focus on the more technical aspects of program evaluation, such as study design, data collection and analysis, interpretation and reporting the findings.
3. Situational analysis - competencies that focus on analyzing and attending to unique interests, issues, and contextual circumstances in any given program evaluation.
4. Project management - competencies that focus on the nuts and bolts of conducting program evaluations, such as budgeting, coordinating resources, and supervising procedures.
5. Reflective practice - competencies that focus on one's awareness of evaluation expertise and needs for growth, including knowing oneself as an evaluator, assessing one's needs, and engaging in professional development for better evaluation practices.
6. Interpersonal competence - competencies that focus on the people skills used in conducting program evaluations, such as communication, negotiation, conflict, collaboration, and cross-cultural skills (p.106).

The classification of the competencies based on the dimensions of knowledge, skills and trends specific to the field and evaluation could lead to overlapping categories (King & Stevahn, 2015), and it is also broadly similar to previously determined principles and standards (Stevahn, King, Ghere, & Minnema, 2005).

Program evaluation is considered a field of expertise in several countries and various and specific training programs are offered by both formal and non-formal educational institutions. Furthermore, both institutional and individual studies have been conducted to determine program evaluation competencies for the effective practices in the field of expertise, to develop a foundation for professional development programs, and formal and non-formal curricula. In Turkey the program has been considered a sub-branch under evaluation expertise CI field, field-specific education is not available, and the curricula rarely include CI program outputs, courses, course objectives and content (Atik Kara, Kürüm Yapıcıoğlu, & Sever, 2020). It should not be forgotten that program evaluation is also an important stage of curriculum development process independent of the field. The program effectiveness would be ensured by the outputs of program evaluations conducted by competent evaluation experts. Thus, it is important to consider program evaluation as a field of expertise and to determine required competencies. The present study aimed to determine the competencies of program evaluation experts based on the views of CI experts. It could be suggested that the study findings would contribute significantly to both theoretical and practical developments in the program evaluation field. It was anticipated that the determined competencies would shed light on the renewal of the objectives and content of program evaluation courses, which are currently instructed in CI graduate programs, the self-assessment of professional competencies by program evaluation experts, and the structure of professional development programs. Furthermore, the distant aim of the present study was the acceptance of program evaluation expertise as a field of expertise in Turkey.

Method

Delphi technique was employed in the current study that aimed to determine the competencies of program evaluation experts based on CI expert opinion. Thus, the question "What are the professional and personal traits that program evaluators should possess?" was posed to field experts. Content analysis was employed to analyze

the responses. The list of items developed in the content analysis was presented to Delphi panelists as a Likert-type scale. Descriptive statistics was utilized to analyze participant responses.

Delphi Technique

Delphi technique, first employed in the military by Dalkey and Helmer (1963, p.458) in the 1950s, is a procedure that aims to obtain the most reliable agreement based on the views of a group of experts by subjecting them to a series of in-depth questionnaires interspersed with a controlled opinion feedback (Dalkey & Halmer, 1963, p.7).

There is a controversy about the research paradigm in which the Delphi technique should be included. Technique could be utilized with qualitative, quantitative and mixed research methods (Skulmoski, Hartman, & Krahn 2007, p.9). Although Delphi technique is considered among quantitative research techniques due to its focus on statistical agreement, collection of the research data based on subjective judgments and views of the experts (Fletcher & Childon, 2014, p.2; Habibi, Sarafrazi, & Izadyars, 2014, p.10). On the other hand, since it requires both quantitative and qualitative research skills in data analysis, it has also been considered as mixed method research technique (Creswell, 2008; Skulmoski, Hartman & Krahn, 2007).

Determination of the participants

The qualifications of the experts who participate in Delphi studies maximize the response quality, reduce stereotypes, and increase the reliability of the study (Powell, 2003, p.378; Okoli & Pawlowski, 2004, p.20; Nworie, 2011, p.25). Thus, it would be accurate to argue that the success of Delphi studies largely depends on the selection of experts. Şahin (2009, p.129) emphasized that the most important variable that improves the reliability of Delphi studies was the selection of adequate experts.

Purposive sampling is often used in the assignment of expert samples in Delphi studies. The assignment of experts or participants could be conducted based on the criteria associated with the research problem (Hasson, et al., 2000, p.1010). However, expertise is the most basic requirement in the assignment of the participants. Another criterion is the capacity and willingness of the assigned experts to contribute to the investigation of a particular problem. Participant willingness to contribute to the study is of great importance in the achievement of the study aim (Powell, 2003, p.379).

Previous studies argued different views on the expert sample size Delphi studies. Rowe and Wright (2001, p.128) stated that Delphi groups could include 5-20 experts. Clayton (1997, p.378) argued that 15-30 individuals would be adequate to represent homogeneous populations and 5-10 individuals could represent heterogeneous populations. According to Şahin (2001, p.217), the group size could be 100 or higher, but the most ideal Delphi group would include 10-20 experts. In conclusion, certain authors claimed that there should be at least 10 participants in certain Delphi studies, there could be more than 100 participants in certain others (Skulmoski, et al., 2007, p. 17-20). The sample size in a Delphi application may vary based on the topic, aim, and the scope of the research, the number of individuals that the author could reach, and whether the study was national or international (Clayton, 1997, p.378).

In the present study, criterion sampling, a purposive sampling method, which allows the assignment of individuals, events, objects or cares with certain qualifications that were predetermined about the problem, was employed to determine the expert participants (Büyüköztürk et al., 2010, p.91). The inclusion criteria were a "PhD degree in Curriculum and Instruction" and "teaching experience". Based on the above-mentioned criteria, the academic resumes of candidate participants were obtained from institutional websites. The review of the resumes led to a list of 50 expert individuals who met the study criteria. Faculty members were contacted via e-mail and invited to participate in the study. A message that included information on the aim, stages, and the response deadline of study was sent to 23 participants, who accepted to take part in the application among 50 experts. The responses to the questionnaires sent in each round and the sample size for each round are presented in Table 1. Twenty-three individuals participated in the first round of the study, 15 individuals participated in the second round and 12 participated in the third round. Participants who did not respond in any round of the study were excluded in the next round.

Table 1. The number of participants and responses in Delphi rounds

	1st round	2nd round	3rd round
Number of invitations	23	15	12

Number of responses	15	12	12
Response rate	%83.3	%80	%100

12 final round participants' demographics from 11 different university reported in Table 2.

Table 2. Participant demographics

		n
Gender	Female	7
	Male	5
Academic Title	Professor	3
	Associate Professor	5
	Assistant Professor	4

Data Collection

The study was conducted with three rounds of Delphi technique. The study conducted in each round is presented in a different section.

First Round

In the first part of the study, a literature review was conducted to determine the theoretical framework of the research. Then, various criteria were determined for the participants that would take part in the Delphi application and a list of experts was made based on these criteria. Invitation e-mails were sent to the experts. Correspondence between the author and the experts was conducted via e-mail. Detailed information on the research process was provided to the experts who agreed to participate in the study. In first phase of the Delphi application, the open-ended questions "What professional competencies should a program evaluator have?" and "What are the personal traits that a program evaluator should have?" were sent to the participants.

Qualitative data collected in the first round were analyzed with content analysis (Creswell & Clark, 2007). In short, content analysis involves the organization of the data to develop a general framework and entails definition, interpretation and classification of all data through reading and taking notes (Bauer, 2000). The main and sub-themes about the program evaluation expert competencies determined based on the agreement as a result of the comparison of the analysis findings with those determined by an another qualitative research and education curricula expert are presented in Table 3.

Table 3. The main and sub-themes

1. Theoretical Professional Competencies of Program Evaluation Experts	2. Practical Professional Competencies of Program Evaluation Experts
1.1. Program Development Theoretical Professional Competencies of Program Evaluation Experts	2.1. Program Analysis Practical Professional Competencies of Program Evaluation Experts
1.2. Program Analysis Theoretical Professional Competencies of Program Evaluation Experts	2.2. Practical Professional Competencies of Program Evaluation Experts on Research
1.3. Theoretical Professional Competencies of Program Evaluation Experts on Research	3. Professional Values That Program Evaluation Experts Should Have
	4. Professional Skills That Program Evaluation Experts Should Have

At the end of the first round, a 5-point Likert-type questionnaire with 82 items was developed based on the participating expert responses to open-ended questions for the themes presented in Table 2.

Second Round

Questionnaires developed at the end of the first round were sent to the experts. Experts indicated the level of their agreement with each item. The data collected in this stage were analyzed with descriptive statistics. Furthermore, the views of the experts on main and sub-themes and their comments on these concepts were analyzed. The new questionnaire form, which was the input of the third phase, were developed separately for each expert, including the individual and holistic analysis results in this stage.

Third Round

In the third round, experts were asked to reevaluate their responses from the previous round by comparing them with the results of holistic analysis. Thus, the participants had the opportunity to change their views based on their own decisions and those of other participants.

Delphi studies have two important criteria: stability and agreement. Stability entails the lack of a statistically significant difference between the responses in two Delphi rounds. Stability is not an indicator of agreement, but the analysis of the agreement level could be initiated only in the presence of stability eved (Dajani, Sincoff, & Talley, 1979). The stability of the participant views could be calculated with various statistical methods. Scheibe, Skutsch, and Schofer (2002) reported that when the percentage of the number of participants who changed their views is less than 15%, there is stability. There is no set criteria for agreement, which could vary based on the number of participants and the aim of the study (Hasson, et al., 2000, p. 1011). Measures of central tendency (means, median and mode) and distribution (standard deviation and quartiles) are commonly employed to determine the agreement level (Hasson, et al., 2000, p.1012). In the current study, the percentage of the number of participants who changed their views was determined as the agreement criterion. Three out of 12 experts changed their views. Although this meant that 25% of the participants changed their views, the fact that experts only changed their views on 1-2 items among 82 items, and the preexisting high agreement criteria allowed the authors to terminate the Delphi process on the third round. In the study, the agreement criterion was determined based on the mean and median, and frequencies of “I agree” and “I strongly agree” expert responses, which are commonly employed in the literature and provide effective feedback to the participants. The agreement criteria employed in the second and third rounds are presented in Table 4.

Table 4. Agreement criteria

2^{nd} round (n=12)	3^{rd} round (n=12)
Mean ≥ 3,7	Mean ≥ 3,9
Median ≥ 4	Median ≥ 4
Frequency 4+ frequency 5 ≥ 9	Frequency 4+ frequency 5 ≥ 9

An average questionnaire item score of at least 3.7 in the second round of the Delphi application, and 3.9 in the third round was considered sufficient for agreement. The requirement for median in the second and third rounds was at least 4. In both rounds, the frequency of the participants who selected "I agree" (4) or "strongly agree" (5) options was required to be at least 9.

Furthermore, a high level qualification criterion was defined based on study data. As presented in Table 5, a high level agreement was concluded when the mean was at least 4.5, the median was at least 5 and the frequency of the experts who responded "I agree" or "I strongly agree" was at least 10 in the third round.

Table 5. High level agreement criteria

3^{rd} round (n=12)
Mean ≥ 4.5
Median = 5
Frequency 4+ frequency 5 ≥ 10

Ethical Concerns

In Delphi studies, the author has an ethical obligation to ensure that the identity and views of the participants were not disclosed to another panel member (participant). The decisions and views should remain anonymous throughout the process. In the present study, due attention was paid to the above-mentioned ethical principle. Furthermore, all participating experts were sent a written consent form, providing detailed information about the process, and their consent to voluntary participation was obtained.

Validity and Reliability

Delphi studies are considered reliable when the process is explained in detail. The participation of the same experts in each Delphi round, that is, the evaluation of the participants who raised certain issues in the first round in the next two rounds would improve the validity of the study (Seuring & Müller, 2008, p.458). In

Delphi studies, the questionnaire developed in each round is organized and sent back to the experts for feedback and re-analysis. Thus, the construct validity is inherent (Okoli & Pawlowski, 2004, p.27).

The measures implemented to establish validity and reliability in the study are listed below:
1. The views of 3 faculty members who were Curriculum and Instruction experts were consulted during the development of the open-ended questions in the first round.
2. The participants were assigned based on certain criteria:
   a. PhD degree in Curriculum and Instruction,
   b. Employment as a faculty member.
3. The data collected in the first round were analyzed with content analysis, and the categories and themes were determined individually by the author and a program evaluation and qualitative research expert. Coding reliability was calculated as 0.93 (Miles & Huberman, 1994).
4. The stages of the Delphi process were explained to the participants in detail before each data collection process.

Results and Discussion

In the first stage of Delphi study, two open-ended questions were posed to the experts, and the content analysis conducted on the collected data revealed the main and sub-themes presented in Table 2 on program evaluation expert competencies.

In the second stage, the questionnaire that was developed based on the views of the experts was sent to the experts via e-mail, and they were asked to critically examine and respond to the 82 items in the questionnaire. Fifteen out of the 23 participating experts responded the 5-point Likert-type questionnaire within the predetermined period. In addition to responding to the questionnaire, the experts also provided suggestions to improve the validity of the questionnaire. For example, they altered certain concepts (process-oriented, eclectic, intellectual courage, political dimension, research audience, etc.) or asked for examples to improve the comprehension. Furthermore, certain experts stated that some items were too broad to be considered as a qualification criterion for program evaluation experts and stated that these should be more focused. A small number of participating experts proposed to restructure the themes. However, since the majority of the experts had positive views on the themes, the themes were not changed. Certain experts suggested the removal of certain questionnaire items in the third round, and these suggestions were implemented based on the statistical values of the items. Furthermore, the views of the experts who suggested that certain items should be added to the questionnaire were meticulously evaluated. After the above-mentioned stages, the questionnaire developed for the third Delphi round was finalized after 3 items were removed and 3 items were added. The revised questionnaires in the second and third rounds are presented in Table 6.

Table 6. Themes and questionnaire items

Theme	Number of items in the 2nd round	Number of items in the 3rd round
1. Theoretical Professional Competencies of Program Evaluation Experts	-	-
1.1. Program Development Theoretical Professional Competencies of Program Evaluation Experts	10	10
1.2. Program Analysis Theoretical Professional Competencies of Program Evaluation Experts	5	6
1.3. Theoretical Professional Competencies of Program Evaluation Experts on Research	4	5
2. Practical Professional Competencies of Program Evaluation Experts	-	-
2.1. Program Analysis Practical Professional Competencies of Program Evaluation Experts	20	19
2.2. Practical Professional Competencies of Program Evaluation Experts on Research	15	15
3. Professional Values That Program Evaluation Experts Should Have	15	15
4. Professional Skills That Program Evaluation Experts Should Have	13	12
Total	82	82

Due to word-count limitations, findings associated with items with high-level agreement in each theme are presented in the following sections.

Under the "theoretical professional competencies of the program evaluation experts" main theme, 8 out of 10 questions met the high-level agreement conditions in “program development theoretical professional competencies of program evaluation experts” sub-theme. Based on these items, the program evaluation expert should have knowledge on the program components and the relationships between these components, the theoretical foundations of the program, the program development process and the theories associated with this process, the dimensions that affect the program development, and the approaches employed to determine requirements. Furthermore, the expert should follow the national literature on program development. Under the same main theme, it was determined that there was high-level agreement in 5 out of 6 items in "the theoretical professional program evaluation competencies of the program evaluation experts" sub-theme. Based on expert opinion, program evaluation experts should have knowledge on the program evaluation process, models and legal regulations (laws, regulations, directives, etc.). They could also explain the relationship between program development and evaluation and follow both national and international literature on program evaluation. The last sub-theme in the first main theme, the "theoretical professional research process competencies of the program evaluation expert", there was a high-level agreement in 3 of the 5 items. Thus, almost all experts agreed that curriculum evaluation experts should have knowledge on quantitative, qualitative and mixed research methods.

Under the second main theme of the questionnaire, "the practical professional competencies of the program evaluation experts", there was a high-level agreement in 15 items in the "practical professional program evaluation competencies of program evaluation experts" sub-theme. According to the participants, program evaluation experts should have knowledge on the functions of the program, could develop a program evaluation research design, and decide on the type, model and approach for program evaluation. Furthermore, they could correlate program evaluation types, models, approaches and designs. They could plan a program evaluation process and decide about the stakeholders (sample/participant) based on the predetermined evaluation model and approach. They could develop the criteria and standards required by the program evaluation model and approach. They could share their knowledge on the process with program stakeholders and work in collaboration with the related experts when necessary. In the program evaluation process, they should employ approaches to determine the requirements based on the conditions. They should decide on the termination, correction and improvement of the program based on the program evaluation research data and develop recommendations to overcome the flaws and deficiencies in the program. It was determined that a high-level agreement was established in 13 of the 15 items in the "practical professional research process competencies of the program evaluation experts" sub-theme under the same main theme. In this context, the program evaluation experts are required to conduct field research, employ quantitative, qualitative and mixed research methods, conduct meta-analysis, determine data sources, develop data collection instruments, collect and analyze data, analyze the validity and reliability of the data. Furthermore, they were expected to interpret the findings and to produce an analysis report based on the employed model.

There was a high-level agreement in 12 items under the main theme of "professional values that a program evaluation experts should have". The experts reported that program evaluation experts should respect the stakeholders, be open to criticism, take responsibility, be open to obtain assistance and participate in teamwork. Furthermore, it was emphasized that the program evaluation experts should be patient, willing to follow the developments in the field, have the intellectual courage to uphold the evaluation process, open to learning and innovation, and have an ethical approach with a versatile perspective.

In the last main theme of the questionnaire, “professional skills that a program evaluation expert should have”, 10 items met the high-level agreement conditions. Based on expert opinion, program evaluation experts should possess investigative identity, logical consistency, high-level thinking, decision-making, problem solving and self-regulation skills. The expert should be objective, work systematically, communicate effectively and have a holistic perspective.

Conclusion

The content analysis conducted on the responses of field experts to the two open-ended questions in the first round of the study that aimed to determine the competencies of program evaluation experts led to a 82-item Likert-type questionnaire which was utilized as the data collection instrument in the second Delphi round. In the second round, 3 items were removed from the questionnaire based on the expert responses and suggestions, and

3 items were added to different themes. In the third round, the authors decided to end the process since there were high-level agreements in 68 out of the 82 questionnaire items, and no items were removed from the questionnaire based on the criteria.

In the study, the program evaluation experts' competencies were categorized in 4 main themes. It could be suggested that the participating experts considered theoretical knowledge on a topic and related practical skills was different competencies. Thus, "theoretical professional competencies of program evaluation experts" and "practical professional competencies of program evaluation experts" were determined as the main themes. Furthermore, "professional values that a program evaluation experts should have" and "professional skills that a program evaluation experts should have" main themes were determined.

In international studies where program evaluation expert competencies were determined, although the classification of the competencies were different when compared to the main themes determined in the present study, it could be argued that certain items were similar in sub-dimensions. The classifications reported in studies conducted by Stevahn, King, Ghere, and Minnema (2005) and Scriven (1996a) to determine program evaluation expert competencies were significantly similar to the findings obtained in the current study. In a study by Stevahn, King, Ghere and Minnema (2005), where program evaluation expert competencies included 61 items under 6 main categories, especially the findings obtained under "systematic inquiry", "reflective practice", "situational analysis" and "interpersonal competence" categories were consistent with the findings of the present study. The "systematic inquiry" category included the theoretical dimension of program evaluation and research paradigms, and the evaluation process analysis and reporting. Similarly, in the present study, the "theoretical professional competencies of program evaluation experts" main theme included theoretical foundation competencies in the field in the dimension of "theoretical professional program evaluation competencies." Furthermore, the theoretical and practical professional research process competences and the research paradigm competency sub-themes were included. Also, in the "reflective practice" category, the authors mainly included program evaluation expert competencies in the dimensions of professional involvement and development. It was observed that similar competences were included in the "professional values that a program evaluation experts should have" main theme in the current study. "Situational analysis" category included competencies associated with items on organizational and political analysis. Although there was no high-level agreement on the above-mentioned items in the study, there were agreements on similar items. Furthermore, it was determined that the "interpersonal competence" category and the "professional skills that a program evaluation experts should have" main theme had similar sub-dimensions such as effective communication, problem solving and teamwork skills.

In the classification by Scriven (1996), it would not be inaccurate to argue that the research methodology, self-assessment, ethical analysis, determination of the needs, conceptual organization and the theoretical and methodological design, planning and maintenance of the evaluation and reporting the findings were significantly similar to the present study findings.

On the other hand, there were also different findings in certain present study dimensions when compared to the competences reported in the above-mentioned studies. Stevahn, King, Ghere, and Minnema (2005) emphasized that evaluation was to benefit the client, participant, and institution in particular, and for public benefit in general, and addressed the program evaluation experts' competencies within the "professional practice" category. Furthermore, items such as development of the required agreements between the evaluation experts and the client, and cost justification included in the "project management" category were not included in the findings of the present study and budgeting the evaluation item was removed in the second round due to the lack of an agreement. The study conducted by Scriven (1996) reported similar competence items on budgeting and common effect dimensions when compared to Stevahn, King, Ghere and Minnema (2005).

As mentioned above, although there are countries with undergraduate programs for program evaluation experts such as the United States, Canada, Australia, Iceland, Belgium and the West Indies (LaVelle and Donaldson, 2015), individuals of different educational backgrounds could be trained as program evaluation experts in professional development workshops, webinars and online courses (Lavelle & Donaldson, 2015; McGuire & Zorzi, 2005). In Turkey, program expertise is not an area of expertise, and the graduates of the graduate programs that include program evaluation courses are not employed as program evaluation experts in the private sector. Abroad, program evaluation experts are not only employed in education but also in human resources departments of corporations that produce goods or services in various industries (McGuire & Zorzi, 2005). Thus, unlike Turkey, program evaluation experts in foreign nations who could find employment in the private sector should possess "customer satisfaction" and "budget" competencies.

In a study on the reasons for the underdevelopment of program evaluation theories, King (2003) reported that the field of program evaluation is a pragmatic field, and customer demands are dominant in program evaluation processes, while the theory and requirements are neglected. This could explain the differences between the present study findings and the findings of international studies. Thus, it would be accurate to argue that the experts in the present study did not consider program evaluation experts as a private sector employee but as an individual with a solid theoretical background in the program evaluation field and employed in education industry based on practical competencies. Thus, concepts such as "customer" and "budget" were not included among the competencies determined in the present study conducted with Turkish participants.

Although the items in the main themes of "professional values that a program evaluation experts should have" and "professional skills that a program evaluation experts should have" determined in the present study did not exist as a separate competency category in international literature, they were included as sub-dimensions in reported categories. Except "assigning significance to evaluation" mentioned in professional values and skills, it could be argued that responsibility, learning, problem solving, and high-level thinking skills were competencies that should be adopted by all occupational groups.

Program evaluation, which was described as an old practice but a new discipline abroad in late 20th century (Scriven, 1996), was a developing field in early 2000s (King, 2003), and is a field of expertise that defines various roles for evaluation experts today (Volkov, 2011). It could be suggested that the development of the field and expansion of the meaning of the field in Turkey would benefit several fields. Thus, various educational opportunities, similar to those provided in other countries, should be provided for program evaluation experts, who are primarily trained in master's and doctorate programs in CI in Turkey. Furthermore, it would be of great benefit to increase the number of program evaluation courses, which are currently quite limited and mostly theoretical in the above-mentioned educational programs, and to restructure these courses to emphasize the acquisition of practical competencies (Atik Kara, Kürüm Yapıcıoğlu, & Sever, 2020).

Recommendations

Updating the job description by altering the perception of "program evaluation expert" as an evaluation expert would allow program evaluation experts to work towards the improvement of service quality and promotion of systemic renewal in various industries. Thus, it could be suggested that program development graduate programs will be more in demand and graduates will have job prospects in various fields. However, as mentioned in the international literature, the uncertainty about the program evaluation expert competencies due to their training in different types of institutions will be eliminated, and the development and diversification of educational opportunities in the field will allow the management and implementation of the programs in the private sector and education by more competent individuals based on the theory and more effective operation of the programs due to the feedback of these individuals.

It could be suggested that the 82 items in 4 dimensions determined in the present study could be employed as a checklist for program evaluation experts. The questionnaire, which could be considered by field experts as a list of program evaluation expert competencies, could also be employed by experts to determine self-competencies or incompetence in certain fields. Thus, experts who determine the fields that they are competent and the fields that they are incompetent could utilize this information to plan their career development. Furthermore, the content of the programs that currently train program evaluation experts could be updated based on the presented items. Also, workshops, webinars or short-term training courses could be organized to train program evaluation experts who could benefit from the content organization dimension.

It was expected that the program evaluation expert competencies determined in the present study would fill a significant gap in the national literature. To improve the validity and reliability of the items, further studies could be conducted with a quantitative approach and larger samples. On the other hand, future qualitative studies could be conducted with experts with significant studies on the field to obtain in-depth information on basic program evaluation expert competences and sub-dimensions. Furthermore, the data collection instrument could be analyzed in a further scale development study on the 82 items in 4 sub-dimensions.

Today, the increasing knowledge base in every field requires individuals to specialize in particular fields. Thus, the program evaluation field should be accepted as a field of expertise in the 21st century in Turkey. Further research findings on program evaluation could be an important stone in the road of progress in the field by reducing challenges such as the lack of human resources and field education.

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An Investigation into Pre-Service Teachers' Self-Regulated Online Learning Perceptions

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An Investigation into Pre-Service Teachers' Self-Regulated Online Learning Perceptions

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Abstract

The sudden outbreak of Covid-19 pandemics has accelerated the process of technological transformation experienced by educational institutions. Traditional face-to-face education has been replaced by distance education as a precaution to minimize physical contact among the teachers and the students. As a result, self-regulatory skills have become a more significant factor for academic success in distance education. In line with this, the main aim of the study is to identify the level of self-regulated online learning perceptions of pre-service teachers in Turkish higher education context. Furthermore, the study also aims to reveal whether the pre-service teachers' self-regulated online learning perceptions differ according to several variables such as their gender, department, class, level of digital literacy and the time they daily spend online. A total of 353 pre-service teachers from various departments have participated in the study. The findings of the study indicate that pre-service teachers' perceptions of self-regulated online learning are at moderate level; thus, it can be argued that the level of their perceptions is far from satisfactory. Additionally, it has been observed that the pre-service teachers' self-regulated online learning perceptions differ according to their gender, level of digital literacy and time daily spent online. To be more precise, it has been noted that self-regulated online learning perceptions of female pre-service teachers are higher than those of male pre-service teachers. In a similar vein, it has been observed that the higher the level of digital literacy and the more time spent online, the higher the self-regulated online learning perceptions of pre-service teachers. The overall results of the study suggest that self-regulation skills of the pre-service teachers need to be emphasized and improved with the aim of contributing to the efficient implementation of distance education.

Key words: Self-regulation, Self-regulated online learning, Distance education.

Introduction

Prior to the global outbreak of Covid-19 pandemics, higher education institutions across the world had already started offering online and technology-enhanced instruction with the main aim of internationalizing the instruction they provide (Krusekopf, 2019); however, the sudden outbreak of Covid-19 pandemics in the first quarter of 2020 accelerated this process and educational institutions at all levels adopted some form of distance education (DE) as a compulsory and emergency alternative to traditional face-to-face education. In line with this, it has even been envisioned that "…the mere concept of eLearning will be obsolete in the near future as there will be no learning without technology" (Obexer, 2017, p. 7). Accordingly, the availability of computers, laptops, smartphones, tablets and easier and faster access to the internet has reformed the concept of DE (McAvinia, 2016; Simonson et al., 2015) and it has come to be seen both as companion and alternative to traditional face-to-face education; thus, distance learners can get exposed to more personalized and self-regulated instruction (Karasu & Sarı, 2019). More precisely, distance learners are expected take on more responsibility of their learning and become more active and autonomous throughout the process. In this context, the concept of self-regulation (SR) has grown to become a more central factor that contributes to the success in the challenging process of DE. Thus, the concepts of DE and self-regulated learning will be dwelled upon in the following section of the article.

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Theoretical Framework

Distance Education

Distance education (DE) is not a phenomenon of the 21st century since it has been practiced in various forms for nearly three centuries (Moore & Kearsley, 2011). As a matter of fact, DE started in the form of written correspondences between the teachers and learners in the 1720s and, in the course of its evolution, innovations such as radio and television have been utilized. The computers and the internet have also made their way into the implementation of DE in the last fifty years and, as a result, DE has become much more effective and widespread. Although a multitude of definitions exist in the relevant literature, DE can be defined as "…the use of the internet to access materials; to interact with the content, instructor, and other learners; and to obtain support during the learning process, in order to acquire knowledge, to construct personal meaning, and to grow from the learning experience" (Ally, 2008, p. 5). To put it differently, DE refers to a broad field of action; however, the distinctive requirement for DE is the physical, geographical and temporal space between the teacher and the learners (Hartnett, 2016). Consequently, DE has currently been adopted by educational institutions at all levels as a direct outcome of the global Covid-19 pandemics as a measure to avoid physical contact among the teachers and the students.

DE has generally been regarded as more democratic, accessible, flexible and open in that it enables learners to study anytime and anywhere in their own pace (Boettcher & Conrad, 2016; Eby, 2013; Jansen et al., 2017). As a result, it would be justified to argue that DE adopts a student-centered (Simonson et al., 2015) and constructivist approach (Boz Yüksekdağ, 2016). Furthermore, by removing the limitations mandated by location and time, DE may provide students with a personalized instruction that is compatible with their learning styles (Kışla, 2016). Potential benefits of DE have been summarized by Simonson et al. (2015) as follows: *a)* DE enables students to progress at their own pace; *b)* It is easier for students to reach the course materials as well as extra materials related to the course content; *c)* It becomes much easier for the teachers to update and upgrade their course materials to catch up with the latest innovations once they have developed them; *d)* DE has the potential to facilitate active learning by encouraging students' intellectual development; *e)* A well-designed online course may cater for a variety of learning styles by offering a range of learning experiences and opportunities; *f)* DE may also improve students' digital literacy skills, which is regarded as a key 21st century skill.

DE is not without its critics, though. As has been pointed out by Eygü and Karaman (2013), Devran and Elitaş (2016) and Simonson et al. (2015), the main weaknesses of DE are: *a)* Whereas DE is effective in improving students' cognitive skills, it has serious limitations in the development of affective and psycho-motor skills; *b)* Courses that have practical components may not lend themselves easily to DE; *c)* For individuals who lack the willingness to take on more responsibility or who lack self-study skills and autonomy, DE may not yield positive results; *d)* The limited interaction between and among the teacher and the students may lead to problems in terms of students' social skills; *e)* Availability of technological tools and access to internet may not be possible for every learner and the phenomenon of 'digital divide' surely exists, particularly, in lower socioeconomic and rural regions; *f)* It may be a challenge for the teachers to design their courses in the best way as it requires time, effort, expertise and resources; *g)* Adopting a student-centered approach may be a novel experience for many teachers, which may also become a limitation; *h)* The provision of feedback may not be as immediate as it is in traditional face-to-face education, which may upset some students.

Considering the advantages and challenges of DE, it would be fair to claim that the shift from traditional face-to-face education to DE requires teachers to master certain competences. To be more precise, they need to be more aware of the individual differences among their students, foster learner autonomy (Karasu & Sarı, 2019), improve their own technological, techno-pedagogical and communication skills, provide a student-centered and cooperative learning environment, guide their learners' self-development and offer timely and constructive feedback (Kavrat & Türel, 2013). Likewise, the availability and efficiency of interaction between and among the teacher and the students have been viewed as conducive to greater interest and motivation in the process of DE on the part of the students (Koç, 2020), which implies that teachers need to be open to communication. In a similar vein, learners are expected to take on more responsibility in DE (Boz Yüksekdağ, 2016; Eby, 2013; Simonson et al., 2015); therefore, teachers should be ready to provide more support for their students by taking their individual characteristics, interests and learning styles into consideration (Bayrak et al., 2017; Özgür, 2013). It should also be noted that learners need to improve their self-regulation skills if they are to get the most out of their experience with DE.

Self-regulation

Although the mystery of how humans learn has not been unearthed yet, it has been argued that learning should be viewed as a social activity that requires active involvement of the learner. In addition, thanks to the internet technology and unprecedented advancements in many fields of study, the quantity of data to be mastered by the learners has become more than manageable; thus, teachers need to focus on *how* their students can learn rather than *what* they should learn (Kramarski, 2017). As has been highlighted by Hattie,

> …we learn by employing effective and flexible strategies that help us to understand, reason, memorize and solve problems; learners must know how to plan and monitor their learning, how to set their own learning goals, and how to correct errors; sometimes prior knowledge can stand in the way of learning something new, and students must learn how to solve internal inconsistencies and restructure existing conceptions when necessary; and learning takes considerable time and periods of practice to start building expertise in that area (2009, p. 246).

As has been aforementioned, DE grants more freedom and autonomy to the learners in comparison to traditional face-to-face education, which implies that distance learners need to regulate their process of learning to a greater extent and make use of a variety of strategies and behaviors such as planning their work, setting goals and monitoring their progress (Jansen et al., 2017; Jansen et al., 2018). In this respect, the concept of self-regulation (SR) in education has been highlighted as a key 21st century skill and it has been argued that SR may yield benefits both in academic and professional contexts (Kramarski, 2017; Pintrich, 2000; Usher & Shunk, 2017; Zimmerman, 2008). The term self-regulation can be defined as "the process of systematically organizing one's thoughts, feelings, and actions to attain one's goals" (Usher & Shunk, 2017, p. 19). According to Hadwin et al. (2017), self-regulated learning "…refers to individual learners taking metacognitive control of cognitive, behavioral, motivational, and emotional conditions/states through iterative processes of planning, monitoring, evaluation, and change" (p. 83). In this respect, regulation has been regarded as a multifaceted skill that assumes human agency; involves cyclical adaptation; draws from personal socio-historical experiences; involves adaptively responding to new challenges, situations, or failure; and is socially situated involving dynamic interplay between learners, tasks, teachers, peers, parents, context, and cultures (Hadwin et al., 2017, pp. 84-85).

In a similar vein, it has been reported that both internal and external circumstances guide the construct of SR and it can be learned via a four-stage process; observation, emulation, self-control and self-regulation (Usher & Shunk, 2017). Furthermore, it has been argued that SR has a tripartite structure (see Figure 1) and self-regulated learners are not only active during the actual process of learning, but also before and after this process (Jansen et al., 2018; Puustinen & Pulkkinen, 2001). While Jansen et al. (2017) employ the terms *preparatory, performance* and *appraisal*, Zimmerman (2000) adopts a social cognitive perspective and prefers to use *forethought, performance or volitional control* and *self-reflection* for the same stages by highlighting cyclical nature of the process. In this respect, the data collection tool utilized in this study comprises of five factors; namely, *Metacognitive Skills, Help Seeking, Persistence, Environmental Structuring,* and *Time Management.* Whereas the factor of *metacognitive skills* extend over three stages, the other factors focus on the performance phase (Jansen et al., 2017). To put it differently, the tripartite structure of SR has also been reflected in the data collection tool.

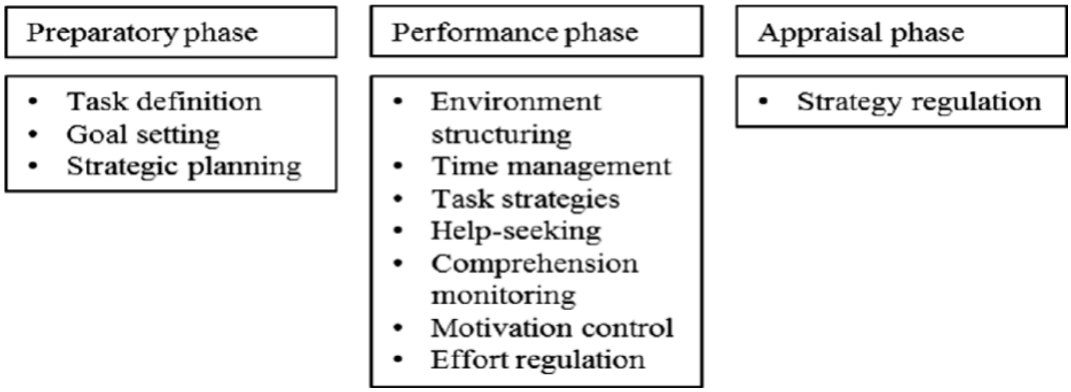

Figure 1. Overview of SRL activities categorized into three phases (Jansen et al., 2017, p. 7).

In traditional face-to-face education learners are usually not involved in the preparatory phase whereas in DE they are expected to define the task, set their own goals and conduct a strategic plan with the aim of achieving their goals. Zimmerman (2000) also incorporates the process of task definition within the stage of forethought and perceives *goal setting* as deciding on particular consequences of learning. In a similar way, *strategic*

planning can be understood as making the best use of "methods that are appropriate for the task and the setting" (Zimmerman, 2000, p. 17). Moreover, learners need to structure their environment in the best way, decide on when and how long they are going to study, employ a variety of strategies to perform the task, seek help if they need, check and monitor their level of comprehension and keep their motivation at the highest throughout the course. Furthermore, learners need to undergo a process of reflection and formative self-assessment on their progress at the end of the task and, if they are not satisfied with their level of their mastery, they may decide to make use of a different strategy in their next experience to attain the goals they have set. Therefore, this tripartite process can be regarded as a cycle and each phase is closely interrelated with the other (Shunk & Greene, 2017).

According to Sinatra and Taasoobshirazi (2017), the construct of SR is built upon three key components; *metacognition*, referring to the knowledge and skill to understand and regulate one's cognition; *cognition*, referring to the knowledge and skill to solve problems and think critically; *motivation*, referring to the beliefs and attitudes guiding the growth and utilization of cognition and metacognition. In a similar vein, Mevarech et al. (2017) draw a parallel between the GPS (Global Positioning System) and metacognition in that, similar to the GPS, metacognition assists learners in the processes of planning, monitoring, regulating and reflection particularly when they need to deal with complex, unfamiliar and unusual problems.

It should be noted that promoting students' self-regulated learning (SRL) has recently been regarded as the main aim of educators and SRL is viewed as instrumental to higher academic achievement (Wolters & Won, 2017). In a similar vein, Kramarski (2017) assigns a dual role to teachers in that teachers must, first of all, become self-regulated learners and, secondly, self-regulated teachers if they are to help their students attain SRL. In plain terms, teachers need to design their online courses in such a way that they can enable their learners to become more active by directing their personal learning experiences in DE. More specifically, learners should be able to spend more time on thinking, reflecting, searching, sharing, collaborating, reading, writing and peer-reviewing (Boettcher & Conrad, 2016). In a similar vein, the software or platform employed with the aim of conducting DE should also provide the students with the opportunities for both classroom learning and autonomous learning following the course (Jansen et al., 2018; Wang, 2019).

Purpose and Significance of the Study

The sudden outbreak of Covid-19 pandemics led to transformations globally in many sectors from healthcare and tourism to trade and education among many others. As a response, educational institutions have adopted DE to minimize and avoid physical contact. However, none of the stakeholders (including administrators, teachers and students) seemed to be ready for such a radical transformation and it brought with it certain challenges for all the parties. Thus, the effects of Covid-19 pandemics on education continue to be investigated from different perspectives. In this context, the main aim of this study is to pinpoint the level of self-regulated online learning perceptions of pre-service teachers in Turkey. In addition, the study also aims to reveal whether the pre-service teachers' self-regulated online learning perceptions differ according to their gender, department, class, level of digital literacy and the time they daily spend online. Consequently, the results gathered by this study will enable teacher trainers and researchers in the field of teacher training to identify the factors that guide the perceptions of pre-service teachers on self-regulated online learning and DE courses can be designed in such a way that will increase the learners' awareness and utilization of self-regulated learning.

Statement of the Problem and Research Questions

The question this research mainly deals with is:
Do pre-service teachers' self-regulated online learning perceptions differ according to their gender, department, class, level of digital literacy and the time they daily spend online?

As a response to this question, this study aims to identify self-regulated online learning perceptions of pre-service teachers by shedding light on the variables that have an influence on their perceptions. Therefore, the research questions to be dealt with in this study are:
1. What is the level of overall perception of pre-service teachers on self-regulated online learning?
2. Do pre-service teachers' self-regulated online learning perceptions differ according to their gender?
3. Do pre-service teachers' self-regulated online learning perceptions differ according to their department?
4. Do pre-service teachers' self-regulated online learning perceptions differ according to their class?
5. Do pre-service teachers' self-regulated online learning perceptions differ according to their level of digital literacy?

6. Do pre-service teachers' self-regulated online learning perceptions differ according to the time they daily spend online?

Method

This section of the study deals with the research design, participants, data collection procedures and tool(s) as well as data analysis processes.

Research Design

In this study a quantitative research method; namely correlational model, one of the scanning models, has been employed. The main purpose of the study is to reveal the current state of a situation that has been experienced or is being experienced (Karasar, 2000). Accordingly, 353 pre-service teachers studying at the Faculty of Education, Süleyman Demirel University have agreed to participate in the study. The participants have been asked to fill in an online self-report questionnaire consisting of two parts; namely, 'demographic information' and 'Self-Regulated Online Learning Scale'.

Participants

The study group of the present research consists of a total of 353 volunteer pre-service teachers studying in six different departments at the Faculty of Education, Süleyman Demirel University. The technique of 'convenience sampling' (Dörnyei, 2007; Nunan, 1992) has been employed within this study in that the participants have been selected because of their convenient accessibility and proximity to the researchers. Since all the participants provided the requested information, there was no lost data. Demographic information of the participants is presented in Table 1.

Table 1. Demographic Information of the Participants

Departments	Number of Participants			
	Female	Male	Total	Department %
English Language Teaching	35	11	46	13
Elementary Mathematics Education	37	5	42	12
Science Education	37	11	48	13
Primary School Teacher Education	75	30	105	30
Turkish Language Teaching	44	16	60	17
Social Studies Education	42	10	52	15
Total	270	83	353	100

Data Collection Tool(s)

The data collection tool employed with the aim of gathering the necessary data for the statistical analyses consists of two sections. In the first section of the tool, participants are requested to provide their demographic information such as their genders, departments, classes, digital literacy levels and time they daily spend online. The second section of the data collection tool aims to collect participants' perceptions of self-regulated online learning; thus, 'Self-regulated Online Learning Scale' (SOLS), developed and validated by Jansen et al. (2018), has been employed. The procedures of adaptation of SOLS into Turkish and details as to the validity of SOLS have been explained below.

Self-regulated Online Learning Scale (SOLS)

SOLS has originally been developed by Jansen et al. (2017) and validated and revised form of the SOLS has been released by Jansen et al. (2018). Existing scales and questionnaires to measure SRL such as the *Motivated Strategies for Learning Questionnaire* (Pintrich et al., 1991), *the Online Self-regulated Learning Questionnaire* (Barnard et al., 2009), *the Metacognitive Awareness Inventory* (Schraw & Dennison, 1994), and *the Learning Strategies Questionnaire* (Warr & Downing, 2000) have been scanned and items of the SOLS have been

collected from these data collection tools. While these scales and questionnaires are designed with traditional face-to-face education in mind, the SOLS has been constructed for online education. The initial version of the SOLS involved 53 items under 11 factors. However, as a result of the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) conducted on two different datasets, the revised version of the SOLS has been structured in a 7-point Likert-type design (1: not at all true for me and 7: very true for me) and there are a total of 36 items in the scale. Items between 1 and 18 (18 items) comprise *Metacognitive Skills* (MS); items between 19 and 21 (3 items) comprise *Time Management* (TM); items between 22 and 26 (5 items) comprise *Environmental Structuring* (ES); items between 27 and 31 (5 items) comprise *Persistence* (P); and items between 32 and 36 (5 items) comprise *Help Seeking* (HS) factors.

Therefore, the revised version of the SOLS has been adopted within this study and it has been translated into Turkish by the researcher. As a next step, the original and the translated forms of the SOLS have been examined by three experts who hold PhDs in English language teaching. Their suggestions for revision have been implemented and final version of Turkish form of the SOLS has been checked by another expert holding her PhD in Turkish language education. The final version of the Turkish form of the SOLS has been achieved in line with the recommendations of the expert holding her PhD in Turkish language education. At the end of this process, it has been regarded by the researchers that the inner validity of the SOLS has been mastered. After the final version of the Turkish form of the SOLS has been arrived at, the first stage of pilot study with seven English language teaching department students has been conducted and the readability as well as comprehensibility of the SOLS has been assured. Ultimately, the second stage of the pilot study has been conducted with 303 pre-service teachers to demonstrate the confirmatory factor analysis (CFA), built upon a structural equation model (see Figure 2).

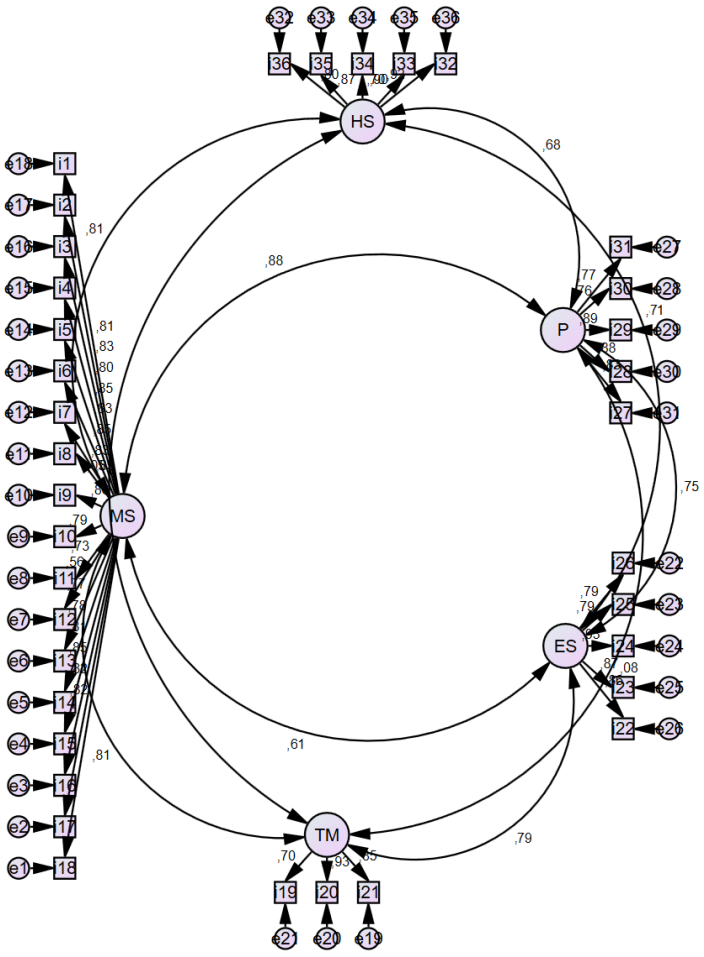

Figure 2. SOLS Factor Analysis
(MS: Metacognitive Skills, HS: Help Seeking, P: Persistence, ES: Environmental Structuring, TM: Time Management)

Figure 2 presents the relationship between the factors of the SOLS and the items in each factor. It has been observed that the correlation coefficients calculated between the factors and their items vary between .67 and .91. According to Büyüköztürk (2002), the relationship coefficient of 0.60 and above can be interpreted as high-level correlation. When the numerical values are examined, it can be argued that the correlation coefficients calculated between the factors and their items are perfectly acceptable. As a result of the analyses, it is seen that $\chi 2 = 1707$, $p = .000$, $df = 566$, $\chi 2 / df = 3.02$ are significant. Furthermore, Figure 2 demonstrates that the adapted form of the SOLS includes five factors and it is compatible with the original form of the SOLS. Results of the confirmatory factor analysis (CFA) have been provided in Table 2.

Table 2. Confirmatory Factor Analysis Results for SOLS

Index	Perfect fit criteria	Good fit criteria	Research finding	Result
x2/df	0-3	3-5	3.02	Good fit
RMSEA	$.00 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .10$	.08	Good fit
SRMR	$.00 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .10$	.06	Good fit
GFI	$.95 \leq RMSEA \leq 1.00$	$.90 \leq RMSEA \leq .95$	.92	Good fit
CFI	$.95 \leq CFI \leq 1.00$	$.90 \leq CFI \leq .95$	.90	Good fit
NFI	$.95 \leq NFI \leq 1.00$	$.90 \leq NFI \leq .95$	.94	Good fit
RFI	$.95 \leq RFI \leq 1.00$	$.90 \leq RFI \leq .95$	.91	Good fit

When Table 2 is examined, the value ($\chi 2 / df = 3.02$) obtained by proportioning the chi-square fit index value to the degree of freedom indicates that it is below 5, which is regarded as an acceptable value (Henson & Roberts, 2006; Stevens, 2002). In addition, when RMSEA, SRMR, GFI, CFI, NFI, RFI values are examined, it is seen that the model is acceptable (Jöreskog & Sörbom, 1993; Hu & Bentler, 1991 ; Schmitt, 2011, Tabachnick & Fidell 2014, pp.712-713).

The internal consistency coefficient, which indicates the reliability of the scale, has been found as stratified coefficient alpha = .98. Likewise, the reliability of the factors are computed as; Metacognitive Skills $\alpha = .97$, Time Management $\alpha = .72$, Environmental Structuring $\alpha = .93$, Persistence $\alpha = .91$, Help Seeking $\alpha = .92$. Therefore, the scale is considered to have internal consistency. It should also be noted that the obtained results concur with the findings reported by Jansen et al. (2018). In this respect, as a result of the CFA conducted, it can be argued that the adapted form of the SOLS is a valid and reliable data collection tool.

Data Collection Procedures

The data collection process for this study started in October, 2020 following the approval of Süleyman Demirel University Ethics Board (September 14, 2020 / 96-6) and ended at the end of November, 2020. Due to the restrictions mandated by Covid-19 pandemic, no physical contact has been allowed; therefore, the data collection tool has been uploaded on an online platform (forms.google.com) and the link has been shared with the pre-service teachers. Participants have been informed about the content as well as the aim of the study and their consents have been obtained before they have been asked to participate in the study.

Data Analysis

For the analysis of the data obtained, independent samples t-test and one-way analysis of variance (ANOVA) are to be employed. Before these analyses have been conducted, the data have been examined in line with the assumptions offered by Mertler & Vannatta (2005), Tabachnick & Fidell (2014) and Thode (2002). More specifically, the number of data collected (N=353) and continuity of the data have fulfilled the assumptions. As a next step, the values obtained by dividing the skewness and kurtosis coefficients of the data into standard errors need to be checked to ensure normality (Howitt & Cramer, 2011; Tabachnick & Fidell, 2014) and it has been observed at the end of this analysis that the skewness value is outside the ± 2 limit. In addition, since the total number of participants is over 50, Kolmogorov-Smirnov test has been implemented and, in line with its results ($p < .05$), it can be argued that it does not meet the normal distribution condition. Similarly, the Q-Q charts also support this finding. Finally, it has been decided that the data are not distributed normally. Since the

data are not distributed normally, analysis of variance homogeneity has been skipped. As a result, Mann-Whitney U test and Kruskal-Wallis H test, which are non-parametric tests, have been employed for the analyses.

Findings

In this section of the study, the findings of the analyses conducted for each research question have been presented.

Research Question 1. What is the level of overall perception of pre-service teachers on self-regulated online learning?

The arithmetic mean and standard deviation values are given in Table 3 with the aim of answering the first research question.

Table 3. Statistics for SOLS and its Factors

Factors / SOLS	N	$\bar{x}$	Percentage of scores (%)	Standard deviation	Minimum and maximum scores that can be achieved
Metacognitive Skills	353	81.03	64.31	25.05	18-126
Time Management	353	13.42	63.91	3.73	3-21
Environmental Structuring	353	24.86	71.03	7.87	5-35
Persistence	353	23.89	68.26	7.62	5-35
Help Seeking	353	23.11	66.03	8.25	5-35
SOLS	353	166.31	66	45.90	36-252

Except for items 19 and 21, which have been scored reversely, all the items in the SOLS are positive and the mean scores of the responses given to the items have been computed. In addition, as the number of items in the factors is different from each other, the total scores that can be obtained are different. With the aim of making a comparison among the factors possible and easier, mean scores have been converted into percentages by correcting them according to the total score. Accordingly, the highest mean score has been observed in the '*Environmental Structuring*' factor with a score of % 71.03. There are 5 items in this factor of the SOLS. The highest score that can be obtained here is 35 whereas the lowest possible score is 5. It can be argued that pre-service teachers' perceptions on the environmental structuring factor of SOLS are relatively high and they mostly agree with the items under the factor of environmental structuring. Similarly, the percentage of scores in the '*Persistence*' factor is % 68.26. There are 5 items in this factor of the SOLS. While the highest score that can be obtained in this factor is 35, the lowest possible score is 5. It can be argued that the pre-service teachers' perceptions on the persistence factor of SOLS are somewhat high. The percentage of scores in the '*Help Seeking*' factor is % 66.03. There are 5 items in this factor of the SOLS. The highest score that can be obtained in this factor is 35 and the lowest possible score is 5. It can be contended that pre-service teachers' perceptions on the help seeking factor of SOLS are at moderate level. Similarly, in the '*Metacognitive Skills*' factor, the percentage of overall scores is % 64.31. There are 18 items in this factor of the SOLS. The highest possible score in this factor is 126 while the lowest possible score is 18. It can be said that pre-service teachers' perceptions on the factor of metacognitive skills are at moderate level. Finally, the percentage of pre-service teachers' scores in the '*Time Management*' factor is % 63.91. There are 3 items in this factor of the SOLS. The highest score that can be obtained in this factor is 21 whereas the lowest possible score is 3. It should be noted that pre-service teachers' perceptions on the factor of time management is the lowest in comparison to the other factors.

When it comes to the pre-service teachers' overall perceptions of the SOLS, the percentage of their scores in the SOLS is % 66. There are a total of 36 items in the SOLS. Therefore, while the highest score that can be obtained in the SOLS is 252, the lowest possible score is 36. Considering the percentage of their mean scores, it can be argued that the pre-service teachers' perceptions on the SOLS are also at moderate level.

Research Question 2. Do pre-service teachers' self-regulated online learning perceptions differ according to their gender?

In line with the second research question, Mann-Whitney U test has been conducted to reveal whether the

perceptions of pre-service teachers on self-regulated online learning differ according to their gender. The findings of the analysis have been presented in Table 4 below.

Table 4. U-Test Results for SOLS according to Gender

Gender	N	Mean rank	Sum of rank	U	p	Effect size
Female	270	183.16	49454.50	9540.50	,041	0.219
Male	83	156.95	13026.50			

*p<0.05

As can be understood from the figures given in Table 4, the mean scores of female pre-service teachers on SOLS (183.16) are higher than those of their male counterparts (156.95). Moreover, findings reveal that this difference between the mean scores female and male pre-service teachers is statistically significant (U = 9540.50; p <0.05). In other words, it can be argued that pre-service teachers' perceptions, to some extent, differ according to their gender in that female pre-service teachers' perceptions on the SOLS are higher than their male counterparts.

Research Question 3. Do pre-service teachers' self-regulated online learning perceptions differ according to their department?

In line with the third research question, Kruskal-Wallis H test has been conducted to reveal whether the perceptions of pre-service teachers on self-regulated online learning differ according to the department they study. The findings of the analysis have been presented in Table 5 below.

Table 5. Kruskal-Wallis H Test Results for SOLS according to Department

Department	n	Mean rank	df	$\chi 2$	p	Significant difference
English Language Teaching	46	172.43	5	9.05	.11	No difference
Elementary Mathematics Education	42	183.85				
Science Education	48	209.04				
Primary School Teacher Education	105	162.94				
Turkish Language Teaching	60	162.98				
Social Studies Education	52	190.50				

Table 5 shows that the mean scores of pre-service teachers studying at the department of science education are the highest (209.04) whereas the mean scores of pre-service teachers studying at the department of primary school teacher education are the lowest (162.94). Nevertheless, Kruskal-Wallis H test results indicate that the observed difference is not statistically significant (χ^2 (5) = 9.05, p>0.05). To put it differently, the perceptions of pre-service teachers on self-regulated online learning do not differ according to the department they study.

Research Question 4. Do pre-service teachers' self-regulated online learning perceptions differ according to their class?

In line with the fourth research question, Kruskal-Wallis H test has been conducted to reveal whether the perceptions of pre-service teachers on self-regulated online learning differ according to their class. The findings of the analysis have been presented in Table 6 below.

Table 6. Kruskal-Wallis H Test Results for SOLS according to Class

Class	n	Mean rank	df	$\chi 2$	p	Significant difference
Freshman	132	169.08	3	3.81	.28	No difference
Sophomore	118	175.51				
Junior	59	177.89				
Senior	44	203.57				

Table 6 indicates that the mean scores of senior pre-service teachers studying are the highest (203.57) whereas the mean scores of freshman pre-service teachers are the lowest (169.08). Nonetheless, Kruskal-Wallis H test results suggest that the observed difference is not statistically significant (χ^2 (3) = 3.81, p>.05). More plainly, the perceptions of pre-service teachers on self-regulated online learning do not differ according to their classes.

Research Question 5. Do pre-service teachers' self-regulated online learning perceptions differ according to their level of digital literacy?

In line with the fifth research question, Kruskal-Wallis H test has been conducted to reveal whether the perceptions of pre-service teachers on self-regulated online learning differ according to their level of digital literacy. It should be noted at this point that the participants have been asked about their self-perceived digital literacy levels and a data collection tool has not been employed with the aim of identifying their levels of digital literacy. The findings of the analysis have been presented in Table 7 below.

Table 7. Kruskal-Wallis H Test Results for SOLS according to Level of Digital Literacy

Digital Literacy Level	n	Mean rank	df	$\chi 2$	p	Significant difference	Effect size
Basic	138	146.60	2	21.51	.00	Good-basic	0.46
Good	181	192.95				Very good-basic	0.56
Very Good	34	215.47					

Table 7 shows that the mean scores of pre-service teachers with basic digital literacy is the lowest (146.60) whereas the mean scores of pre-service teachers with very good digital literacy is the highest (215.47). Furthermore, Kruskal-Wallis H test results indicate that the difference observed is statistically significant (χ^2 (2) = 21.51, p< 0.05). As a next step, Mann Whitney U test has been conducted to determine the level of difference between and among the groups. The findings show that the mean scores of pre-service teachers with good level of digital literacy are higher than the mean scores of pre-service teachers with basic level of digital literacy, with the difference being at moderate level. Similarly, it has been observed that the mean scores of pre-service teachers with very good level of digital literacy are higher than the mean scores of pre-service teachers with good level of digital literacy, with the difference being at moderate level.

Research Question 6. Do pre-service teachers' self-regulated online learning perceptions differ according to the time they daily spend online?

Finally, for the analysis of the sixth research question, Kruskal-Wallis H test has been conducted to reveal whether the perceptions of pre-service teachers on self-regulated online learning differ according to the time they daily spend online. The findings of the analysis have been presented in Table 8 below.

Table 8. Kruskal-Wallis H Test Results for SOLS according to Time Daily Spent Online

Time Daily Spent Online	n	Mean rank	df	$\chi 2$	p	Significant difference	Effect size
1-2 hours	79	146.33	3	13.73	.00	5-6 hour - 1-2 hour	0.52
3-4 hours	140	173.63					
5-6 hours	82	203.26					
7+ hours	52	191.26					

Table 8 indicates that the mean scores of pre-service teachers who daily spend 1-2 hours online is the lowest (146.33) whereas the mean scores of pre-service teachers who daily spend 5-6 hours online is the highest (203.26). Moreover, Kruskal-Wallis H test results show that the difference observed is statistically significant

(χ^2 (3) = 13.73, p< 0.05). Subsequently, Mann Whitney U test has been implemented to determine the level of difference between and among the groups. The findings show that the mean scores of pre-service teachers who daily spend 5-6 hours online are higher than the mean scores of pre-service teachers who daily spend 1-2 hours online, with the difference being at moderate level.

Discussion

The findings demonstrate that pre-service teachers' perceptions are the highest in the factor of *environmental structuring* whereas their perceptions are the lowest in the factor of *time management*. The reason for this finding may be related to the assignment of too much homework or project work on the part of the pre-service teachers. As a result, they may not be able to organize their time properly to fulfill the requirements of various courses they are taking. Furthermore, their overall perceptions of the SOLS have also been observed to be at moderate level. More precisely, in line with the wording of the 7-point Likert-type items in the SOLS, their mean score is somewhere between 'somewhat true of me' and 'true of me' rather than 'very true of me', which implies that pre-service teachers' self-regulated online learning perceptions need to be supported and improved.

The findings also show that pre-service teachers' perceptions, to some extent, differ according to their gender in that female pre-service teachers' perceptions on the SOLS are higher than male pre-service teachers' perceptions on the SOLS, which is consistent with the findings of the study conducted by Weis et al. (2013). Pre-service teachers from six different departments have participated in this study and the findings indicate that the perceptions of pre-service teachers on self-regulated online learning do not differ according to the department they study. In a similar vein, the perceptions of pre-service teachers on self-regulated online learning do not differ according to their classes. Nevertheless, it should be noted that although the observed difference is statistically insignificant, the perceptions of the pre-service teachers increase as they move toward graduation, which implies that their awareness of SR improves as they continue their tertiary education. As has been aforementioned, pre-service teachers have been asked to specify their perceived level of digital literacy and the findings show that there exists a mutual correlation between the digital literacy levels and the SOLS perceptions of pre-service teachers as the higher their digital literacy levels, the higher their perceptions on the SOLS, which is consistent with the findings of Karasu and Sarı (2019), Usher and Shunk (2017) and Jansen et al. (2018). Similarly, it has been observed that SOLS perceptions of pre-service teachers who daily spend 5-6 hours online are higher than those of pre-service teachers who daily spend 1-2 hours online, with the difference being at moderate level. This finding also supports the presumption that as the pre-service teachers spend more time on the internet, their digital literacy level increases and this directly contributes to their perceptions of SR.

Conclusion and Educational Implications

The field of education is characterized by constant change as "learning does not happen in a vacuum but takes place in constantly changing contexts and is reformed every time" (Järvenoja et al., 2015, p. 204). In this sense, the main aim of formal schooling should be to teach students how to learn, which can only be achieved via SR (Hoyle & Dent, 2017). Moreover, it seems certain that the significance of SR will multiply as the integration of technology into the field of education continues.

It has been reported by Winne (2017) that undergraduate students appear to be undereducated in terms of self-regulation; however, it should also be noted that self-regulation skills can be learned without much effort with the help of remedial instruction on certain study tactics and learning strategies (Winne, 2017). When it comes to Turkish context, it can be construed by the findings of the study that pre-service teachers' level of perceptions of self-regulated online learning is far from satisfactory as the percentage of their perceptions are somewhere between 'somewhat true of me' and 'true of me' rather than 'very true of me'. This clearly suggests that pre-service teachers' self-regulated online learning perceptions need to be supported and improved. Furthermore, the findings of the present study also indicate that the gender, level of digital literacy and time daily spent online have an influence on the SOLS perceptions of the pre-service students. To be more precise, it has been observed that female pre-service teachers' perceptions of the SOLS are higher than those of their male counterparts. This finding has been supported by Tseng et al. (2017) who have reported that female students have better control in strategy use than male students in the context of foreign language learning. On the other hand, Gestsdottir et al. (2014) have reported conflicting results at the end of the longitudinal study they have conducted in European context in that while female students have outperformed males in Iceland, the opposite has been observed in France and Germany, which has been attributed to the effect of cultural setting. In a similar vein, Meece and Painter (2008) have examined gender differences in elementary and secondary students' use of SRL strategies

and found that males outperform females; however, they have admitted that cultural stereotypes of male and female abilities may have significant implications. As an example, it has been argued that females are more frequently expected to conform to socials norms; thus, their experience and skill in regulating their emotions and behaviors tend to be superior compared to males (Davis, 1995). As to the relationship between SRL and digital literacy, it has been observed that as the participants' digital literacy levels and the time they daily spend online increase, their perceptions of SRL improve. A recent study conducted by Demirbag and Bahcivan (2021) support this conclusion by highlighting the interrelationship among their participants' epistemological beliefs, self-regulation skills and digital literacy. Similarly, Arias Soto and González Gutiérrez (2019) have aimed to reveal the possible effects of digital literacy training on the participants' SR skills and foreign language speaking skills. Their results indicate that improved levels of digital literacy yield in development in basic SR skills and attitudes as well as foreign language oral skills. As has been argued by Karasu and Sarı (2019) and Usher and Shunk (2017), utilization of technology contributes to SR and, by the same token, deployment of SR also facilitates the process of DE (Cho & Shen, 2013). More specifically, Cho and Shen (2013) explain SRL via several constructs (namely; *goal orientation, academic self-efficacy, effort regulation, metacognitive regulation,* and *interaction regulation*) and report that multiple types of regulations such as effort regulation, metacognitive regulation, and interaction regulation are utilized in students' SRL in online learning environments.

To sum up, DE has entered into the field of education at an unprecedented scale and in the period of new normal in the aftermath of Covid-19 pandemics, it seems that DE may not cease to be employed totally. On the contrary, latest technology and DE will possibly continue to be utilized in some form, especially for the instruction of courses with theoretical content. In this respect, the facilitative effects of technology on SR skills of the learners have been underscored by several researchers (Demirbag & Bahcivan, 2021; Karasu & Sarı, 2019; Usher & Shunk, 2017). The development of students' digital literacy and SR skills stands as a prerequisite for success in DE. Given the importance of SR for academic and professional success, educational institutions of all levels need to aim at improving not only the students' but also the teachers' SR skills (McInerney & King, 2017). To be more specific, both in-service and pre-service teachers should be considered as life-long learners, which comes to mean that they constantly need to be aware of their dual roles as self-regulated learners and self-regulated teachers with the aim of fostering their students' self-regulation abilities (Kramarski, 2017; Perry et al., 2008; Thiede & de Bruin, 2017). To achieve this, strategy training sessions should be planned and conducted for both pre-service and in-service teachers. Additionally, both groups of teachers should be encouraged to develop and support their own students' SR skills.

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Appendix

Öz-düzenleyici Çevrimiçi Öğrenme Ölçeği (ÖÇÖÖ)

	*1	2	3	4	5	6	7
1. Çevrimiçi derslerde bir göreve başlamadan önce gerçekten ne öğrenmem gerektiğini düşünürüm.							
2. Çevrimiçi derslerde eğitime başlamadan önce neye çalışmam gerektiği konusunda kendimi sorgularım.							
3. Hem kısa vadeli (günlük veya haftalık) hem de uzun vadeli (aylık veya tüm çevrimiçi eğitim süresince) hedefler belirlerim.							
4. Çevrimiçi derslerde çalışma zamanımı yönetmeme yardımcı olması için hedefler belirlerim.							
5. Çevrimiçi derslerde bir göreve başlamadan önce özel hedefler belirlerim.							
6. Çevrimiçi derslerde sorunların çözümü için alternatif yollar düşünerek, en iyisini seçerim.							
7. Geçmişte işime yarayan stratejileri çevrimiçi derslerde kullanmaya çalışırım.							
8. Çevrimiçi derslerde kullandığım her strateji için belirli bir amacım vardır.							
9. Çevrimiçi derslere çalışırken kullandığım stratejilerin farkındayımdır.							
10. Günlük olarak derslere katılmak zorunda olmasam da, çevrimiçi derslere çalışma zamanımı yine de haftanın günlerine eşit şekilde yaymaya çalışırım.							
11. Çevrimiçi derslerdeki önemli ilişkileri anlamama yardımcı olması için düzenli aralıklarla ders tekrarı yaparım.							
12. Çevrimiçi dersleri anlama düzeyimi kontrol etmek amacıyla, kendimi düzenli aralıklarla duraksamış bulurum.							
13. Çevrimiçi derslerde bir şeyler öğrenirken ne düzeyde öğrendiğim konusunda kendimi sorgularım.							
14. Çevrimiçi derslerde çalışmamı bitirdikten sonra öğrendiklerim hakkında düşünürüm.							
15. Çevrimiçi derslerde çalışmamı bitirince, hedeflerime ne düzeyde ulaştığımı sorgularım.							
16. Çevrimiçi derslerde ilerleyemediğim zaman kullandığım stratejileri değiştiririm.							
17. Çevrimiçi derslere çalışırken kendimi kullandığım stratejilerin yararlılık düzeyini analiz ederken bulurum.							
18. Çevrimiçi derslerde çalışmamı bitirdikten sonra yaptığım şeyi başka hangi yollarla yapabileceğimi sorgularım.							
19. Çevrimiçi derslerde bir çalışma planına bağlı kalmakta zorlanırım.							
20. Çevrimiçi dersler için haftalık okuma ve ödevleri kaçırmamaya özen gösteririm.							
21. Diğer etkinlikler nedeniyle çevrimiçi derslere çok zaman harcamadığımı sık sık görürüm.							
22. Dikkatimin dağılmasını önlemek için çevrimiçi derslere							

çalıştığım mekanı dikkatle seçerim.							
23. Çevrimiçi derslere çalışmak için konforlu bir yer bulurum.							
24. Çevrimiçi derslere en etkin nerede çalışabileceğimi bilirim.							
25. Çevrimiçi derslere çalışmak için düzenli olarak kullandığım bir yer vardır.							
26. Çevrimiçi derslerde öğretmenimin benden öğrenmem gereken konularla ilgili beklentilerini bilirim.							
27. Çevrimiçi ders çalışırken sıkıldığım zaman, dikkatimi toplamak için kendimi zorlarım.							
28. Çevrimiçi ders esnasında zihnim dersten uzaklaşmaya başladığında, derse tekrar odaklanmak için özel çaba gösteririm.							
29. Çevrimiçi derslere ilgimi kaybetmeye başladığımda kendimi daha çok teşvik etmeye çalışırım.							
30. Yapmam gerekenler hoşuma gitmese de, çevrimiçi derslerde başarılı olmak için çok çalışırım.							
31. Çevrimiçi ders materyalleri sıkıcı olsa bile bitirinceye kadar çalışmaya devam ederim.							
32. Çevrimiçi derslerde bir şeyi tam olarak anlamadığım zaman sınıf arkadaşlarıma fikirlerini sorarım.							
33. Çevrimiçi derslerde sorunlarımı sınıf arkadaşlarımla paylaşarak nerede zorlandığımızı ve sorunları nasıl çözebileceğimizi bulurum.							
34. Çevrimiçi ders eğitmeninden yardım alma konusunda ısrarcıyımdır.							
35. Çevrimiçi ders materyallerinde emin olamadığım bir şey olursa sınıf arkadaşlarımla görüşürüm.							
36. Çevrimiçi derslerde nasıl performans gösterdiğimi öğrenmek için sınıf arkadaşlarımla iletişim kurarım.							

*1. Benim için hiç doğru değil.
2. Benim için doğru değil.
3. Benim için biraz doğru değil.
4. Kararsızım.
5. Benim için biraz doğru.
6. Benim için doğru.
7. Benim için oldukça doğru.

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An Investigation into the Changes and Developments in Teaching Methods Applied in Ottoman Educational Institutions: Sati Bey's Suggestions and Practices

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An Investigation into the Changes and Developments in Teaching Methods Applied in Ottoman Educational Institutions: Sati Bey's Suggestions and Practices

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Abstract

From the perspective of Turkish education history, it can be said that the teaching methods applied in the educational institutions of the Ottoman Empire had deductive characteristics. The application of the deductive method was carried out in various forms including memorization, repetition, comprehension, discussion and note taking. Since the transfer of lessons in primary schools and madrasahs, which were traditional Ottoman educational institutions, was predominant, memorization as a teaching method was also dominant. Along with the modernization period in the nineteenth century, with innovations in the social, economic and military fields of the Ottoman state, there were also changes and developments in the field of education. After the second Constitutional Monarchy, the *Darülmuallimin* (the teachers' school for men), which was established in 1848, started to train more qualified teachers as part of the changes and developments in the historical process. The ideas, suggestions and practices of Sâtı Bey, the principal of the teachers' school in that period, as the key implementer of these changes are still considered important today. In this study, the necessity, importance and characteristics of the methods of *takrir* ('explaining') and *tekşif* ('discovering') in Satı Bey's thinking as opposed to memorization are emphasized. The findings show that the discovering method is more useful than the explaining method in terms of permanent learning as an alternative to memorization. Another finding of the present study is that methods of explaining and discovering cannot be applied in every academic course.

Key words: Sati Bey, teacher school, teaching principles and methods, memorization, explaining and discovering methods.

Introduction

The Ottoman Empire, which had a deep-rooted, historical educational tradition, raised scholars in *akli* ('rational') and *nakli* ('religious') sciences. For example, Murat Bin İshak was famous for his work titled "*Havass-ül edviye"* in the field of medicine, as were Celalettin Hızır, Hekim Bereket, Tacettin İbrahim and Ahi Çelebi. Kadı Zade Rumi was famous in the field of astronomy; Sinan Paşa, Tokatlı Molla Lütfi, Sadrettin Şirazi, Mirim Çelebi and Celal Devvani were prominent in the field of mathematics and Piri Reis and Seydi Ali Reis were famous in the field of geography (Adıvar, 1991). However, because they depended on the *İlmiye* ('learned institutions') which started to deteriorate in the sixteenth century, it was observed that progress in science after that period slowed down and original works were not produced. After the sixteenth century, the abandonment of the *akli ilimler* (rational sciences) such as mathematics, theology and philosophy which had motivated thought in *madrasahs*, or simply putting them aside, also led to the move away from the teaching methods used in previous years. Instead of teaching methods which stimulated thinking and ideas such as debate, adopting the *nakli ilimler* (religious sciences) and focusing on memorization were the principal reasons for the decline in education (Ergin, 1977; Uzunçarşılı, 1988). The reasons for the decline in education were criticized by both senior staff and thinkers of the period, and they worked on measures to be taken to address it. The enlightened Selim III tried to prevent the deterioration of education by issuing edicts in 1789, 1791, 1793, 1794, 1795 and 1798 and tried to consolidate the position of the *İlmiye* (Furat, 2018).

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From the eighteenth century, in the educational institutions whose decline was one of the reasons for the decline of the Ottoman Empire, the courses, the teaching methods used to teach them and the qualifications which they awarded were criticized on the grounds that they were not useful. With the Renaissance and the reform and the rise of humanism which took place in the western world, increasing industrialization contributed to the increase in the number of sciences and the development of teaching methods suitable for the characteristics of each science. By the end of eighteenth century, Turks had to admit that the western states were stronger than the Ottoman empire. The first conscious attempts to introduce westernization and innovation were made in the early nineteenth century by imitating and adopting some elements selected from western European civilization. Recognizing the superiority of the west, Ottoman statesmen established some educational institutions in order to make the state strong again so that it could compete with European powers. These new institutions started to deliver new curriculums and different teaching methods, such as observation, query and teaching by doing and experiencing (Duman, 2002). After the fall of Selim III in 1807, military training was first overhauled and this innovation was followed by the opening of western-style schools, and bringing educators from the west and renewing the curriculums of these schools were seen as important developments in terms of the modernization of education (Akyüz, 2020).

In the *Tanzimat* period, the practices which were carried out in the Ottoman education system were made more systematic by the introduction of the Education General Regulation of 1869 (Kamer, 2017a; 2020). Despite these changes, however, *madrasahs* and *sıbyan* schools (Ottoman elementary-primary schools) continued to exist and rejected innovative effective and efficient teaching methods such as debate, criticism, inquiry-based learning and learning by doing, and continued to teach by memorization, and this dual system caused confusion for some time (Demirtaş, 2007). With the *Tanzimat* period bringing change and development in the field of education, as well as increasing the understanding of the importance of the social and political functions of education, education began to be seen as a science in Ottoman society. Under an instruction of 1847, primary education was increased to six years, life-oriented lessons were included in education programs and the teaching principles and methods regarding how these lessons would be taught were revised. During this period, the most important work on teaching methods was the *Usul-u Cedid* ('new educational method') introduced by Selim Sabit Efendi to replace the *Usuli Atika* ('old educational method'). Selim Sabit Efendi guided teachers in new teaching methods with his work *Rehnuma-i Muallimin* (1870). He stated that there were positive and negative sides of the individual teaching method, the collective teaching method and the mutual teaching method, and he proposed a new teaching method which took the positive aspects of these three former teaching methods (Akyüz, 2020). This view formed the basis for the methods of explaining and discovering which are the subject of the current study.

In 1847, Ahmet Kemal Pasha had introduced a new teaching method in five *Rüştiye* (secondary) schools in Istanbul. In the following years, many books were written on teaching principles and methods; the most significant were *Rehnumai Muallimin* (1870) and *İlmi Terbiye-i Etfal* (1870) by Selim Sabit Efendi, *Rehberi Tedris and Terbiye* (1894) by Musa Kazım, *Usulu Talim and Terbiye* by Ayşe Sıdıka Hanım (1897), *Usul-i Tedris and Tederrüs* (1899) by Melekzade Fuat, *İlmi Terbiye-i Etfal* (1907) by Aristokli Efendi, and *Fenni Terbiye* (1911) by Sati Bey. Ayse Sıdıka Hanım's *Usûl-i Talim and Terbiye* is recognized as the first book in the field of education science and teaching principles and methods in the modern sense as well as being one of the most important references in the fields of sociology and psychology. It was used for many years as a textbook in the curriculums of teacher training schools (Gündüz, 2020). These books on teaching methods expressed a common opinion that the current teaching methods were not effective. It can also be seen that they contained sample lessons suitable for the characteristics of each course in order to show the need for and benefit of applying new educational methods in every educational context.

Muallim Cevdet (1918) stated that the reason for the decline and the obstacles to progress were the traditional teaching methods applied in educational institutions: "In literature and religious sciences, it is necessary to abandon the *dhikr* ('remembering' or 'recollection') method of rules and laws first, and to start with examples and observations, then to apply and spread the procedure of giving rules and laws. The most important reason for not being able to train technical staff that we will be proud of against Europe in our *madrasahs* is the current teaching method. Nobody worked on this subject until Sati Bey". This statement shows how important Sati Bey's views and suggestions on teaching methods were.

Although Muallim Cevdet stated that the only person who had articulated the need for a renewal in teaching methods was Sati Bey, when the writers and works listed above are examined, it can be seen that there were many educators who advocated innovation in teaching principles and methods in the Ottoman educational system. The *Darülmuallimin*, which was founded in 1848 as part of the changes and developments in the traditional structure after the second Constitutional Monarchy, started to provide a more modern education and to train more qualified teachers. It was observed that teachers now taught in accordance with the new educational methods in practical school applications, as well as in the application of examination, research and discussion methods. In addition to his works in different fields such as education, the natural sciences, politics, language and nationalism in the Ottoman lands during the period when the modernization movements and the

schooling processes were most active after the *Tanzimat* period, Sati Bey also wrote important articles on memorization and teaching methods, and these are subjected to evaluation in this study. As a result of his trips to western countries for educational purposes, Sati Bey had the opportunity to get to observe many philosophical and sociological groups which focused on the relationship between education, sociology and philosophy. Within this context, Sati Bey adhered to the individualist philosophy of Herbart Spencer, whereas Ziya Gökalp adopted a socialist view by adhering to the collectivist views of Emile Durkeim. Sati Bey recommended his views on 'child-centered education', especially in contemporary pedagogy, to teachers in his first Turkish work *Fenni (Science) Education* (Şenel & Taibi, 2017).

Sati Bey, as principal of the *Darülmuallimin*, saw education as a solution to stop the decline of the Ottoman empire, and he gave practical explanations about the teaching methods of explaining and discovering to *Dârülmuallimîn* teachers, teacher candidates and also other teachers in the form of in-service training in order to eliminate rote memorization and to achieve full learning, especially for the purpose of increasing the qualifications of the teachers. This current study focuses on the 'discovering' and 'explaining' pedagogy which he applied to replace memorization. Developments in the field of psychology at the end of the nineteenth and the beginning of the twentieth centuries made it necessary to take into account individual differences in education and training and revealed that the method of teaching by memorization did not ensure the permanence of the taught knowledge. Educators therefore developed different teaching methods and techniques, drawing attention to the need to consider learners' individual development periods and the importance of training according to individual differences. This led to a change in teaching methods (Karagöz, 2017).

Sati Bey's explaining and discovering methods were applied in the practice school in the teacher training establishments. The application of these methods, especially in an institution for training teachers, and the comprehension of new teachers about them can be considered as the first steps taken against the traditional method of memorization. Sati Bey's applications and explanations of how to apply the methods of explaining and discovering together with the question-and-answer method, the features, advantages and disadvantages of these two methods, and in which courses these methods would be more appropriate pedagogical developments can be considered as an important pedagogical development both for that period and for today.

General teaching methods in the educational institutions of the Ottoman empire

The teaching methods applied in the educational institutions of the Ottoman empire had the feature of being deductive. The origins of this method came from authorities such as scientists and philosophers, who wrote works on certain subjects and produced ideas. Attempts to resolve existing problems were based on the views of these scientists. The application of the deductive method was carried out in various forms including rote memorization, repetition, comprehension, discussion and note-taking. In the traditional Ottoman educational institutions, from elementary and primary schools to *madrasahs*, memorization was the predominant teaching method due to the exclusively one-way transfer of lessons (Anameriç & Rukancı, 2008; Şanal, 2003). Akgündüz (1997), however, reported that although memorization was used as a principal teaching method, different teaching methods used in *madrasahs* had been taken over from the Seljuks to the Ottoman schools in terms of purpose-structure-operation. The methods and techniques of multiple training were used and an holistic problem-solving approach which involved more than one teaching method and technique, and the main dynamics of education, including *iktisar* (economics) and *istiska*, were of great importance. In this method, short texts read at the beginning of the lesson were called *iktisar*, middle texts were called *ıktısad* ('accumulating and increasing knowledge') and the texts which described the subject in detail were called *istiska*. Student would read the books of these three levels in sequence. Other methods which complemented this theoretical learning method were approaches such as explaining, dictation and memorization.

The teaching method traditionally applied in *madrasahs* involved reading specific texts from a book chosen by the teacher, that is, by the explaining method. This method was called 'teaching from an open book' (Akgündüz, 2002; Uzunçarşılı, 1988).

When the teaching methods employed in Ottoman educational institutions are examined, it can be seen that more than one teaching method was used. These methods can be listed as memorization, comprehension, dictation, repetition, question-and-answer as well as *müzâkere* ('negotiation') and *munâzara* ('discussion') (Açık, 2020; Sarıkaya, 1997). Ebû Amr b. Alâ emphasized the importance of the method of discussion teaching by stating that the first rule of science is calmness, the second is to ask good questions, the third is to listen well, the fourth is to memorize well, and the fifth is to defend the obtained knowledge well against others (Makdisi, 1981).

The explaining method

In the explaining method, which was the basic teaching method in *madrasahs*, the teacher was at the center and explained the course subject in detail. Lessons taught through the explaining method were delivered through texts and explanations read from a book chosen by the teacher. In this method, which was also called *açık kitap*

tedris usulü (''the open-book education method'), students sat in a circle around the teacher, repeated each of his statements and took notes, reproducing what the teacher said in their own copies (Açık, 2020).
This was intended to arouse interest in the course subjects. In *madrasah* practice, the method of explaining was applied by the teachers as a general presentation of the subject to the students, the students then presenting the subjects which they prepared separately to the teacher and to each other.

The memorization (*Ḥifẓ*) method

In the classical format, the question-answer technique is based on the principle that students memorize stereotyped answers corresponding to certain questions and repeat their answers when asked. The most important feature of this method is that it is a repetition process based on memorization. In teaching situations in which the question-answer technique is applied, the main task of the students is to memorize the answers to the questions to be asked and to simply repeat them without changing them (Dündar, 2013; Leife & Rustin, 1974).
Memorization was used as an oral training method. Due to the content of *madrasah* education programs and the Arabic language and literature which was the language of written communication, the memorization technique was frequently used as an education method (Ergün, 2015).
Akgündüz (1997) did not see the memorization technique as a negative technique in terms of its nature and usage in *madrasahs*. Concerning the importance of memorization and repetition, Dündar (2013) expressed the following thoughts in the *Muqaddimah* of Ibn Khaldun: 1. For a student to reach mastery of the subject matter, a three-fold process of repetition is necessary. Some students can reach this level with less repetition because of their individual features and skills, and 2. memorization is especially essential in language learning.
Makdisi (1981) stated that the teaching method followed in traditional Ottoman educational institutions such as Ottoman elementary-primary schools and *madrasahs*, was based on memorization, and saw the understanding of memorization as an invariable feature of improving memory due to the nature of *madrasahs*, and memorization, repetition, comprehension, negotiation and writing were used as teaching methods in *madrasahs*. Makdisi also regarded memorization as appropriate in the circumstances at that time in order to protect the manuscripts.

The dictation (*İmla*) method

Akgündüz (1997) defined the dictation technique as a process used for pedagogical purposes within the framework of mind and brain interaction The first and most important proponent of the dictation method in Turkey was Selim Sabit Efendi, who stated the following points regarding the use of the dictation method in his *Rehbuma-yı Muallimin* ('Teacher's Guidebook'):

> Letters are written on a blackboard, the shapes and names of the letters are taught to the students. After the teacher has pronounced them individually by showing the letters he has written on the board with a thin stick, he asks the students to pronounce them together and so he gets them used to the correct pronunciation as he shows the letters again and pronounces them. After the names of the letters are memorized and [the students are] accustomed to their pronunciation, the differences and similarities between them are shown on the board and explained to the students. After explaining the shape and names of the letters to the students, the letters are written on the board in an irregular and mixed manner in groups of five and exercises are given to the students with the question-answer method. (Buyrukçu, 2002: Selim Sabit, 1883)

The notebook method

Another method used during the education given in *madrasahs* was keeping a notebook (for spelling and writing) or taking notes. In this method, it was necessary to write exactly what the teacher said during the lesson or what was in the books for the course. Keeping a notebook was an important teaching method used alongside the memorization method in *madrasahs* (Taşdemirci, 1989). It is in the writing of the notebook that the student reads and learns the writings of the teacher; it is not simply a routine copying process.

Okçu and Pilatin (2018) reported that other methods such as negotiation, peer teaching, memorization and expressing opinions were also widely used in Ottoman educational institutions. The negotiation method encouraged students to collaborate and supported the permanence of the learning achieved through this interaction. It has been stated that one of the most striking methods in *madrasah* teaching was the peer teaching method, and it is still used today. In the negotiation method, which was applied in the form of question-and-answer, the students were asked questions and gave their answers to the teacher. The negotiation method was

the most common method not only in Ottoman educational institutions but also in the *Nizamiye madrasahs* of the Seljuk period. In those *madrasahs*, students first read the subject matter and then the teacher asked them questions by giving the necessary explanation. At the end of the lesson, students' written questions were answered by the teacher and discussed (Ocak, 2017).

The discussion method, which started in the *madrasahs* and was transferred to mosques and literary meetings over time, had been the source of the development of the academic skill in which both the teacher and the students express their own views (Akgündüz, 1997). The method of memorization was the most criticized aspect of the *madrasahs*. Pilatin and Okçu (2018) supported the views of Makdisi and Akgündüz that memorization was considered necessary because *madrasah* lessons had been kept in the memory mainly by the method of memorizing verses and *hadiths* and memorizing patterns in some grammar books. This is still applied in today's formal education system. For example, some formulas and operations in science, grammar rules and literary works are learned by the memorization method. It can therefore be said that memorization was not a general or dominant method in *madrasahs*; on the contrary, it can be said that it was used when memorization was necessary due to the nature of the acquired knowledge similar to formal education. Another method used was the 'expressing an opinion' method, which involved the studies and activities which students did on their own after taking lessons from the teacher. The students generally tried to solve the logic of the lesson they had received and reinforced the lesson by repeating it and thinking about it. Each student organized his studies individually according to his learning style and tried to increase his/her learning level. In this method, the individual speed and personal learning style of the student became important.

According to Taşdemirci (1984), only verses, *hadiths* and other texts were used based on Aristotelean logic, and unlike the discussion method in *madrasahs* did not include subsequent practice, analysis or discussion. This situation became a scholarly process which valued the word rather than its meaning and gave no importance to the teaching of writing. Teachers could therefore not offer rational solutions to existing problems. Teachers' contentment with the old information led to an increase in the number of people who lacked the ability to think, research and question in *madrasahs*. In a report in 1876 prepared by fifteen teachers on this issue, it was stated that the students in *madrasahs* spent their time unnecessarily by dealing with annotations, and it was observed that the necessity of repeating the previous lesson by question-and-answer before starting the next lesson was emphasized (Şanal, 2003; Zengin, 1993).

Ottoman elementary-primary schools and *madrasahs* were unique educational institutions in terms of the period in which they took place and the course content which they taught. When the teaching methods applied in Ottoman educational institutions in the empire's historical development are examined, it can be seen that it was not just the memorization which was used, especially in *madrasahs*, but that modern teaching methods such as discussion were employed in new schools opened during the *Tanzimat* period. The educational institutions in the *Tanzimat* period and especially in the second. Constitutional Period were opened in the western style and their course contents were created in imitation of the western style. Their teaching methods were therefore also more modernist. Scholars who had acquired experience in western educational institutions and teaching methods gave many opinions and recommendations on teaching methods for their own country(Gündüz, 2010; 2012). One of them was Mustafa Sati Bey. In this study, articles written by Sati Bey on teaching methods such as memorization, explaining and discovering are analysed and discussed (Başar, 2019).

Purpose of the Study

In addition to his works in different fields such as education, the natural sciences, politics, language and nationalism in the Ottoman lands during the period when the modernization movements and new education process were the most active after the *Tanzimat* period, Sati Bey wrote important articles on memorization and teaching methods and these are the area of evaluation in this study. Sati Bey was also one of the educators who had experience in both the traditional and modern educational practices of the Ottoman period. This current study is therefore significant in terms of revealing the similarities and differences between Sati Bey's traditional teaching methods and modernization period teaching techniques such as the memorization, explaining and discovering methods.

The permanence of teaching generally depends on the teaching principles and methods applied in the education and training environment. In the historical process, different teaching principles and methods were used in the teaching of rational and religious sciences. In fact, the discussion, questioning and criticism methods, which are the basis of today's teaching methods, were applied in Ottoman educational institutions, but as the Ottoman empire began to decline, these methods were replaced by the memorization method, which could not respond to the changing conditions of the day. Changes in the educational program made it necessary to use different teaching methods. Various opinions were put forward on the existing teaching methods and the teaching methods which should be employed. To explore this in greater detail, answers to the following questions were sought in this study:

1. What is 'memorization' according to Sati Bey?
2. What are the causes and harms of memorization according to Sati Bey?
3. How should the question-answer method be employed according to Sati Bey?
4. According to Sati Bey, what are the explaining and discovering methods?
5. What are the educational courses in which the explaining and discovering methods should be applied?
6. What are the positive and negative aspects of the explaining and discovering methods?

Method

Method

This is a qualitative study in the form of a review. Documentary analysis, one of the qualitative data collection methods, was conducted in accordance with the qualitative research design. Using this technique, Sati Bey's articles entitled *Usûl-i Tedrisin Kavaid-i Esasiyesi*, *Ezbercilik*, *Tedrisatta İsticevap*, *Usulü Takrir* and *Usulü Tekşif* published in the *Tedrisat İptidai* journal and his articles entitled *Tedrisat-ı Taliyede İstikra* and *Tekşif 1-2* in the *Terbiye* journal were examined. The texts in the Ottoman language were first translated into Turkish, then the titles were determined by the analysis of the texts and these titles are presented in the findings section.

Findings

In this section, the research questions set out above are discussed under separate sub-headings. The findings are presented under 'Memorization', 'Reasons for memorization', 'Question and answer method, the 'Explaining' and 'Discovering' methods, lessons in which the explaining and discovering methods could be applied, and the positive and negative aspects of the explaining and discovering methods..

Memorization in Sati Bey's opinion

The issue of memorization and its effect on negativity in education was discussed in many of his works on teaching methods. Sati Bey evaluated the issue of memorization in detail in his work *Fenn-i Terbiye* ('The Science of Education') under the heading 'Thought Education' (*Terbiye-i Fikrîye*). He also stated that knowledge and wisdom are necessary for reasoning and that education and training are necessary for Thought Education (Sati Bey, 1909; TÜBA, 2017).
Memorization, the general teaching method of the Ottoman educational system, was regarded as the most harmful problem in schools. Many symptoms and disadvantages of this problem were observed in almost all levels of the schools. Sati Bey (1911c) stated that the numbers of especially *Mekteb-i İptidaiye* (primary schools) and *Mektebi Rüştiye* (secondary schools) which were not affected by it were negligible. According to Sati Bey, memorizing without understanding the harms of memorization does not give any benefit. Information remains unfamiliar in the mind and cannot serve the development of any ideas. Sati Bey (1910a) explained this issue as follows in his article entitled 'Basic Principles of Teaching Methods' (*Usulü Tedrisin Kavaidi Esasiyesi*): *... The taught knowledge can serve the development of the mind but must be understood. The habit of memorizing and speaking without understanding leads to the habits of not thinking and speaking without thinking. For this reason, it causes mind-blindness. People have finally lost the connection between speaking and thinking after many years of understanding, memorizing and reciting without thinking. The connection that should exist between the mind and the words and the connection that should be between the mind and the speech is broken through memorization. And now the words that come out of his tongue and through his mind continue without interruption, without warning any thought.*

Sati Bey's greatest aim was to reveal and isolate the causes of memorization as a means of improving education in schools. According to Sati Bey, the most important reason for the continued use of memorization in schools was the teachers. He also stated that the opinion that memorization was harmful had not yet been understood among teachers at the desired level who did not know the difference between teaching and memorization. The number of teachers who were content with having the students memorize the course exactly, who wanted the students to answer the questions with the same words and the same expressions as in the book, and showed favor to the students who acted in this way were particularly high in secondary schools. According to Sati Bey (1911a), who evaluated memorization in terms of its benefit and harm*:*

... above all, memorization is not only useless, but it should also even be considered as harmful. However, the development of this idea is not enough to isolate memorization because some situations and behaviors in teaching naturally lead students to memorization.

The reasons for memorization in Sati Bey's opinion

The prevalence of memorization teaching from ancient times to today is striking. Text memorization continues to exist in the form of memorizing the concepts and rules of positive sciences. Essentialism is seen as representative of this situation. When the philosophical and sociological foundations of educational innovations in the *Tanzimat* period are examined, it can be seen that there are those who advocated Durkeim's view that "education should create social individuals through the formation of values and the creation of social actors adapted to the conditions of the society in which they live" (İnal, 1991), whereas thinkers such as Mill, Kant, Herbert and Spencer stated that the aim of education is to raise the abilities of the individual to the highest level of maturity, and that individualism is of great importance (Tezcan, 1985).

a. Most teachers have the habit of making students write stereotyped questions and answers. This habit encourages the students to memorize, so it is necessary to ask questions in various ways in order to prevent them from memorizing and to enable them to achieve full learning. Stereotypical questions and answers cause information to take a fixed form in the learners' minds and remain undigested.

b. Most teachers do not take the developmental levels of the children into consideration while teaching. Especially when they are teaching, not taking into account the teaching principles of 'from concrete to abstract' and 'phased progress' is the main reason for persisting with rote memorization. When a child does not understand a lesson, he is nevertheless forced to memorize it, but he still cannot grasp it with his mind.

c. The majority of teachers do not see any necessity to make an effort to understand whether children are memorizing effectively. In order to release the child from the obligation to memorize without understanding, it is first necessary to give importance to explaining the lesson well and to act according to the student's needs.

Being negligent while watching or examining students' behavior sometimes causes memorization to become unnoticed. Sati Bey (1911a) conveyed his experience on this issue as follows:

... While I was visiting a primary school, I picked up a reading book in front of a child. I said 'Read this' by opening a page and putting it in front of the child. The boy began to read freely and properly, but when I looked closely, I saw that none of the things which he read were written there. He had started to recite that page, thinking that I had opened the page of the previous lesson ... 'Where is what you just said?' I asked, and taking that book in my own hand, I pointed to the first line with my finger. The boy paid attention for a while and succeeded in reading a few words by making an effort. After these words, he continued to read without needing any help. But this time, my fingers were even following the words and lines that were under my hand ... No doubt, he had understood what the text on the page was from the first line, and since he had memorized it, he started to recite it.

d. This is why it is not enough to believe that only memorization is harmful and to say 'I do not want to memorize'. In order to eliminate memorization, the lessons should be explained thoroughly and the questions and answers should be examined in detail As a result, the careful use of memorization should only be done by following a good new teaching method.

The question-and-answer method in Sati Bey's opinion

One of the most important stages of education and training is undoubtedly asking questions and ensuring that the student answers the questions about the content of the lesson because the teacher can only understand whether or not the student is following the lesson or understands the repeated subjects or not by asking questions and assessing the answers. Whether a student has studied and learned previous lessons can be determined again by means of asking questions. Sati Bey (1911b) recommended that the questions should be as follows:

a. The questions should be specific. They should not cause any confusion in the student's mind. Some teachers ask such ambiguous questions that they are difficult for anyone to understand. A student's inability to answer such questions or giving an incorrect answer might be due to the inability to understand, or to have misunderstood, the question. Otherwise, it does not necessarily indicate that they cannot know or think what is being asked. Teachers should never ignore this situation. They should pay attention to the understanding of the questions shown by the student, and then be prepared to repeat their questions in a more understandable way, not forgetting the possibility that the questions have not been understood when they do not get an answer or receive wrong answers.

b. Avoid haste in expecting an answer to the question asked: when the teacher cannot get an answer to the question he has asked, or gets a wrong or incomplete answer, he should repeat the question in another way or encourage the student to find the mistake himself. If there is a deficiency, the teacher should ask other questions on the same subject in order to help the student to repair this deficiency. If he does not get an answer in this way, the teacher should ask the other students, and only if the question remains unanswered by all the other students should the teacher provide the answer himself.

However, teachers in Turkey follow a completely opposite behavior. They put a question to a student and when they see that the answer is slow in coming, they themselves give the answer. When a student gives an incomplete answer, the teachers complete it themselves.

c. During a question-and-answer session, dealing with only one student for a long time should be avoided. The teacher should try to obtain the answer from all of the students as much as possible. The best action for this is to ask the question to the whole class first, and after you have compelled them to think for a certain amount of time, appoint one of them and say 'Say the answer'. In the seconds which pass between asking the question and the choice of a student who will answer, all of the students will of course have to prepare mentally and examine their mind quickly with the thought that 'Maybe he will ask me'. For this reason, students will not be indifferent to either the teacher's questions or the selected student's answer from the beginning and will focus their attention on the subject. In this way, the teacher prevents the class from being indifferent to the lesson and ensures that the class is interested in the lesson. The teacher should be careful to prevent indifference and to ensure students' interest in the lesson, both to the answers given by the selected student and to the questions asked by him. In this context, the teacher should give importance to making the students find and complete their own shortcomings in the answers by occasionally asking the other students some relevant questions which will arise during the question-and-answer session.

It is necessary to be prepared to act according to other rules within the context of the question-and-answer method. The questions asked to the student during the lesson are divided into three in terms of their purpose:

a. Repetitive questions: These are the questions asked to assess whether a previously taught lesson has been learned or not. After the general principles set out for the subject, the most important situation is to choose questions, especially in the liveliest part of the lesson, which represent different aspects of the subject. Whether the lesson has been properly understood or not can only be recognised by asking questions which do not follow the order of the subject and which are answered in the students' own words.

However, most of Turkish teachers act in the completely opposite way. They ask questions in the order of the subjects in the book, and they never change the form of the questions. Most of the time, they even dictate stereotyped questions and answers to the students. The teachers thus always ask questions and expect the answers in exactly the same format.

b. Repetitive and investigative questions: These are questions asked to determine whether the important points made during the lesson have been understood or not, These questions are also the ones which teachers ask students who facial expressions show that they do not understand the lesson. The point to be taken into consideration here is to not be content to ask 'Did you understand?', but to explain and to ask questions which require comment.

c. Discovering questions: These are questions asked on subjects which were never mentioned or emphasized during a lesson to awaken the students' attention and strengthen their judgment. These questions should imply that what is being asked is essentially unspoken and must be considered by the student. Teachers should use appropriate language, such as 'Think about it; is that what you would say?' and should encourage students with 'I didn't mention it, but if you think, you will find it'. When the teacher sees that the students cannot answer, he should not suddenly attempt to explain the point himself, but should consider guiding the students to think and interpret it for themselves. The point that the teacher should pay attention to here is not to ask the students about things which cannot be found by mental thinking and reasoning (interpretation).

The article *TedriSati Taliyede İstikra ve Tekşif* in the journal *Terbiye* (Education) is of great importance. In the article, old methods are criticized and new ones are suggested instead.

The methods of discovering and explaining in Sati Bey's opinion

The discovering method is *methode intuitive* in French and its equivalent in philosophy is 'intuition'. The word also has links with the Latin verb *intuere*, which means 'to look at, contemplate, wonder at' (Hogarth, 2001; Noddings & Shore, 1998). In Turkish, there is a word 'discoverer' which refers to someone who sees and finds things which do not have concrete form but can only be understood by deep thought. Applied to teaching, this is called the 'discovering method' and it requires making inferences about concrete things and abstract things by making comparisons (Noddings & Shore, 1998).

Sati Bey (1910b) stated that ensuring the participation of the student in the education environment entails adopting the methods of explaining and discovering, which are two different ways to be followed in teaching.

a. Explaining style: This is a way of asking questions in order to show whether the students understand what has been said and have learned the subject or not. When using the explaining method, the teacher tells the students directly what he will teach them.

b. Discovering style: In the discovery style, the teacher should not directly tell the student the information which is going to be taught. The students must try to discover and find the information for themselves before the teacher tells them. In this way, the students should strive to find and discover by using their minds. The teacher should not ask questions to find whether the subject has been understood, but should instead ask questions to enable the students to discover more truths about what he wants to teach.

Courses in which the discovering and explaining methods will be applied

The method of discovering is appropriate for lessons which require only reflection, interpretation and reasoning (Sati Bey, 1910b; 1914a; 1914b), such as language lessons. Language is already used by children and in order to rediscover the rules of a language, attention should be paid to the proper use of the rules of the language.

It is also appropriate to use the discovering method in morality lessons because the sense of morality is present in everyone and the moral code is the sum total of love, respect and proper feelings. In order to rediscover the code of morality, nothing is needed but to examine the relationship between oppositional people who tend to think differently. The discovering method is also appropriate in mathematics and science classes because it is necessary to think, examine and experiment in order to discover the necessities of these sciences. It is not appropriate to use the discovering method in geography lessons. The facts taught by geography are the result of travels and studies carried out all over the world. Since the discovery method would involve carrying out all these trips personally and repeating examinations which have already been done, it is not applied in geography classes.

It is also not appropriate to use the discovering method in history lessons because the facts taught in these lessons consist of information based on narrations whose main content is experiences. In order to discover these experiences on your own, you need to hear, see and live them again for yourself, which is of course impossible. It is not appropriate to use the discovering method in religious sciences: it is suitable for use only in rational sciences. Mathematics, morality and geometry lessons can also be taught by the method of explaining.

Positive and negative aspects of the discovering and explaining methods

After determining the characteristics of the courses in which the methods of discovering and explaining are appropriate, the teacher should think about which method would be more beneficial to use in these lessons. By considering the particular features of these methods, the benefits and harms can be easily understood.

a. When teaching with the method of explaining, the student is simply the listener and does not contribute actively to the process but listens, understands and repeats what the teacher says. In summary, the student imitates the teacher's expressions and reasoning. When teaching with the method of discovering, however, the students actually take an active role in the lesson. They participate not only by repeating and imitating the teacher's expressions and reasoning, but also by actively creating a specific way of thinking, making a judgment and making discoveries on the subject by responding to the questions posed by the teacher.

Generally, the more active an organ is, the more strength it gains. For this reason, porters' calves, boatmen's wrists, and blacksmiths' biceps are fleshy and strong. Just like this, the more active a skill or a natural capability becomes, the more it develops and matures.
Since the method of discovering activates thinking power and reasoning more, it serves the development of thinking skills in children. The discovering method encourages students to explore by means of deep thinking and reasoning. Discovering is incomparably beneficial in terms of making the mind accustomed to reasoning and discovery, constantly revealing the idea of entrepreneurship.

b. When teaching with the method of explaining, the student is responsible only for listening to the lecture, but even listening requires a lot of attention and effort. The ability to pay attention is not very developed in children so a child's mind can be easily distracted during a lesson. Teachers are not easily aware of this situation, they only understands this situation from the students' obvious distance from the lesson. In other words, the teacher is mostly completely unaware of the carelessness and distractions which are not seen. On the other hand, because the students will be active when they are being taught by the discovering method, they feel responsible for being careful in the lessons. They will concentrate on the subject, thinking that questions will be asked. The teacher immediately recognises carelessness and distraction as he constantly asks questions and ensures that the students remain actively involved. As a result, the discovering method is more preferred than the explaining method because it requires the children to pay attention and reveals carelessness.

c. Students genuinely enjoy lesson taught using the discovering method as they can give appropriate answers to the teacher's questions. Their self-confidence develops and this makes them feel happy. This feeling of self-confidence and happiness is similar to the pleasure genuine explorers have from their explorations. This feeling

of joy also has a very beneficial effect on the whole school as it ensures students' commitment to the lessons. The discovering method should be preferred to the *takrir* method in terms of both showing the feeling of joy as children discover every truth and making the lessons attractive.

d. Considering the mental development levels of the students, it is more appropriate to teach using the discovering method. When using this method, the teacher cannot go beyond the level of the students' comprehension ability; if he does, he will find that the children cannot respond and cannot discover what they are expected to discover. The teacher is therefore obliged to adapt the questions to the level of the children's ability. In the *takrir* method, however, if the teacher does not consider the current mental development state of the students, he might not even be aware that he is moving away from them; he can realize this situation only when he finishes the lesson, asks questions about it and does not get an answer. This negative outcome is a waste of time for both the teacher and the students.

e. In the discovering method, the lesson is very fragmented because a straight path cannot be followed in this method. It is therefore possible that the lesson will be derailed if the teacher does not pay attention to this situation. In the explaining method, however, the lesson does follow a straight path and this has a collective effect on the minds of the students. In other words, the discovering method is less convenient as it causes fragmentation of the lesson as a result of its multifaceted nature. It is only possible to avoid this inconvenience if the teacher prepares the lesson well, organizes his questions well and reviews the lesson after it has finished.

f. The discovering method also does not have a big impact on emotions as distractions exist and this affects students' reasoning. At this point, the explaining method is more effective.

Results and Discussion

This exploration of the teaching methods applied in traditional Ottoman educational institutions has shown that many teaching methods were employed in accordance with the characteristics of the lessons. Various different teaching methods and techniques were used in Ottoman elementary-primary schools and *madrasahs* which were the traditional education institutions; methods such as explaining, dictation and memorization were used. However, scientific developments in the western world increased the number of sciences and the variety of educational programs applied in schools and this made it necessary to use different teaching methods for teacher training, which is one of the elements of the program. Since the 1800s (especially during the second Constitutional Monarchy), the fact that these views were expressed by Ottoman thinkers and intellectuals and were recommended to be applied in educational institutions shows that the Ottomans did not simply follow the changes and developments in the field of education from behind. It has been shown in this paper that there were changes and developments in the western countries which were contemporary with those in the Ottoman Empire during the same period. However, the use of the rote memorization method became constant in courses for which that method should not be used as the implementation of other teaching methods was either incorrectly employed or late. In fact, with the modernization of education in the *Tanzimat* period, the inclusion of mental sciences in the programs of Ottoman educational institutions shows that the memorization method did not work and that this led educators to search for alternative and more effective teaching methods. Sati Bey opposed memorization and stated that things memorized without understanding the subject were of no use. He also emphasized that the other negative situation caused by memorization was that it led to the habits of not thinking and speaking without thinking, causing mind-blindness. In addition, he stated that memorization was not only useless but also harmful. He stated that the memorization method was still used in schools because its potential harmful effect had not yet been fully understood by teachers. The reasons for this were explained by him as follows: most teachers were in the habit of making students write stereotyped questions and answers, ignoring their developmental levels when teaching, and not taking enough precautions to understand whether children had actually learned what they had memorized. For these reasons, it was stated that memorization on its own could only be made possible by following a good teaching method. In other words, it was seen that it was necessary and important to use the new methods of discovering and explaining.

It was also observed that the discovering and explaining methods used in teaching did have specific rules, benefits and potential harms. It was stated that the discovering method prevented the students from being distracted from the lesson, enabled them to concentrate on the lesson, and gave them a sense of responsibility for paying attention to the lesson. Since the discovery method requires teaching according to the mental development levels of the students, it also requires teachers to take this into account and to have an understanding of developmental psychology. However, it has been stated that this method also had its drawbacks in that the lessons progressed slowly and this caused potential fragmentation of the lesson. This reduces the effect of the traces left by the lesson on the learners' emotions. When the advantages and disadvantages of the discovering method are compared, it is clear that the discovering method should be

preferred over the explaining method. The advantage of the explaining method over the discovering method is only in terms of its effect on the emotions. When the information taught in the lesson does not appeal to the learners' emotions, it was seen that it is beneficial to temporarily abandon the discovering method and apply the explaining method instead. The discovering method makes children accustomed to exploring, thinking and reasoning, as well as providing twenty-first century skills. In this respect, it is important to use the discovering method which encourages students to think in accordance with the rules in teaching environments.

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EFL Instructors' Attitudes towards Professional Self-Development*

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Abstract

This descriptive study aimed to find out whether instructors practiced self-development activities, whether some factors hindered the practice of self-development activities, and to what extent the instructors implemented self-development activities in their classes to solve a problem. Additionally, it aimed to find out whether the instructors differed in the use of self-development activities in terms of age, gender, experience, education level, and teaching hours. This study was conducted with 348 EFL instructors and four teacher trainers. Three research instruments including a questionnaire, interviews with teacher trainers, and four EFL instructors were used to investigate the self-development activities which were journal writing, self-appraisal, peer-observation, reading, writing a research paper, and action research. The analysis of data revealed that EFL instructors practiced self-development activities on a limited scale except for peer observation, which was carried out as a school policy. The results also showed that the workload was the most important hindrance in practicing self-development activities. Additionally, EFL instructors did not transfer the information gathered from self-development activities in their EFL classes to solve problems and they differed in the use of self-development activities to some extent in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D. and teaching hours.

Keywords: Self-development, Professional development, Action research, Self-appraisal, Peer observation.

Introduction

Due to the rapid changes in the world of education, which also affect the field of teaching English as a Foreign Language (EFL), professional development is receiving more attention at universities all around the world to be able to meet the needs of the educators who follow the latest innovations in this field (Liyanage & Bartlett, 2008). This issue is also very important in Turkey, especially for the preparatory schools of universities (Ünal, 2010). In particular, despite the innovative education systems at universities, there is still a need for continuous learning and improvement for educators since the world of teaching is changing rapidly. This leads to the need of refreshing the knowledge of the instructors with new teaching techniques and approaches so that they could keep up to date and be competent although it may be difficult if instructors have difficulty in implementing new ideas and teaching approaches into their classrooms and teaching philosophies (Ünal, 2010).

Foreign language instructors are expected to be competent to adapt to the changes in their field and are expected to refresh themselves continuously (Ünal, 2010). To keep up with continuous learning, being competent is a necessity. To be competent and raise their awareness of innovations, instructors are expected to pay attention to continuous self-development since a language instructor is assumed to be proficient in using the language and be knowledgeable about the innovations in their field (Liyanage & Bartlett, 2008). These innovations are the results of "changes in Teacher Development". Thus, "the pursuit of better methods" seems to be "a preoccupation of many teachers and applied linguists throughout the twentieth century" (Richards & Rodgers, 2001). Therefore, for being more professional, a continuous process of Professional Self Development (TD) is necessary for better outcomes. Therefore, instructors should professionally take responsibility which means that they should seek self-managed strategies of professional development.

Most of the English language instructors working at preparatory schools of universities receive some forms of teacher training for their professional development (Ünal, 2010). On the other hand, little is offered despite the considerable advances in language teaching approaches, methods, and strategies and that leads to a lot of

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difficulties. Although there are many informative journals, books, online articles on second/foreign language instruction, instructors can only reach them through individual efforts. That is why instructors have to deal with various changes in the ELT field (Alwan, 2000). Another problem is that most of the instructors working at the same university have different levels of language competency, and some instructors do not have a chance to practice the foreign language out of the school. Additionally, some of them do not read more than a few resources which are a part of a project conducted by a training program (Alan, 2003). If teacher training programs (TTPs) do not provide enough support to solve such problems, instructors are expected to improve themselves by using self-development activities (Alan, 2003).

In a study conducted by Balcıoğlu (2010), TTPs in universities are assessed and it is claimed that although they aim to help instructors to develop their skills and freshen themselves for the sake of their self-development, they seem to have short-term effects on instructors. Although many teacher trainers embrace peer observation, many instructors do not want their colleagues to observe them. There is also a huge need to find out why many instructors do not favor this type of self-development and provide some solutions. Also, to compensate for the lack of teacher training programs and to uphold present training programs, instructors should be informed about the potential professional development activities (Alwan, 2000). The present study also aims to find out the reasons for the lack of self-development activities and whether these activities are used to solve problems in EFL classes and to find out whether instructors differ in self-development activities in terms of age, gender, experience, education level, and working hours.

Teaching and learning English is considered as a big problem in Turkey. Students in Turkey study English for at least 10 years up to the university and at university, so they are expected to develop a total command of the language. After graduation, most of the students are not able to use the language appropriately. As a result, the blame is constantly laid on preparatory schools of universities for having unqualified instructors and inefficient curriculum (Balcıoğlu, 2010). Furthermore, it is claimed that preparatory schools' administrators blame their instructors although it seems that they have ineffective teacher training programs (Personn, 2014). Consequently, they look into the ways of activating the role of the instructors and helping them to improve themselves by making the language instructors be accountable for their professional development (Alwan, 2000). The need for the present study stems from this point.

One form of professional development that may be beneficial to teachers is self-development which is defined as professional development efforts toward self-fulfillment, either through formal study programs or on one's own (Villegas - Reimars, 2003). Self-development is a voluntary action that teachers do for their professional development. Professional awareness and continuous professional development are two basic requirements for achieving self-development (Villegas - Reimars, 2003). Recent studies and discussions on the theory and practice of self-development for English Language teachers underline the importance of contextualized experiences and decision-making skills (Burns & Richards, 2009; Richards, 2010; Gebhard, 2005; Johnson, 2009; Richards & Farrell, 2005). It is claimed that self-development is expected to help language teachers to analyze and evaluate their teaching and learning experiences and to improve appropriate teaching strategies accordingly. Namely, language teachers are to take a critical and reflective approach to their teaching. Moreover, they are expected to acquire the necessary knowledge and skills to be able to conduct research and decide what is best for their students (McKay, 2009).

To achieve this aim, one of the most important ways of helping language teachers is to integrate critical thinking and reflection into their self-development. This can be managed through a lot of activities such as journal writing, self-assessment, peer observation, team teaching, action research, etc. (Gebhard, 2005; Burns & Richards, 2009; Richards, 2010; Richards & Farrell, 2005). The need for continuing self-development brings about the rise of teacher-led initiatives as action research and reflective teaching. Continuing self-development eases the growth of teachers' understanding of their teaching as well as of themselves as teachers and gives them a chance for reflective review since it involves strategies such as documenting different teaching practices; reflective analysis of teaching practices, and examining beliefs, values, and principles (Korucu, 2011). As Richards and Farrell (2005) state, teachers are continuously exposed to a large number of opportunities for self-development, some of which are obligatory and imposed by teacher training programs, while others are undertaken by the teachers voluntarily. These volunteer opportunities include reflection by journal writing and self-appraisal, peer observation, professional reading, writing a research paper, and action research.

There are many studies conducted on self-development. Doghonadze (2016) researched to analyze the motives for instructors to be engaged in self-development and to find out what they did for professional self-development in Georgian schools and universities. They found out that the quality of training was not good enough and the instructors did not do much to improve themselves. Gheith and Aljaberi (2018) also conducted a

study to investigate the levels of teachers′ reflective practices and their attitudes toward professional self-development in terms of gender, several workshops attended, and experience. They found out that teachers′ attitudes toward professional development were positive. Also, Lejonberg, *et.al.*, (2018) analyzed the relationship between mentors' effort, self-development orientation, and theory use. They found out that pre-service teachers' perceptions of school mentors' effort and self-development orientation were positively associated with their perceptions of developmental support in mentoring. Additionally, Ferris and Samuel (2020) claimed that the professional development offerings for educational developers were sparse and they created a self-defined professional development approach. Grabsch *et al*. (2019) aimed to find out professionals' survey responses to investigate their self-reported needs for professional development and found out that there were some competency areas of inconsistency and other clear needs for professional development and emphasis in graduate preparatory programs. Moreover, in their research, Roberts, *et al*. (2020) aimed to analyze the effect of online professional development on preschool teachers' self-efficacy, burnout, and stress. The analysis of results showed that all teachers tended to focus on personal challenges within the course, however, teachers who participated in the conference and reflective writing supports benefited from the availability of emotional outlets and opportunities for feedback.

This study aims to find out whether any self-development activities are conducted, to investigate the factors that hinder the practice of self-development activities, and the frequency of using self-development activities in the presence of problems in EFL classes. It also aims to find out whether instructors differ in the use of self-development activities in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D., and workload.

The research questions in this study are:

1. To what extent do the instructors engage in self-development activities?
2. What are the factors that hinder the practice of self-development activities?
3. To what extent do the instructors implement self-development activities in their classes to solve a problem?
4. Do the instructors differ in the usage of self-development activities in terms of age, sex, teaching experience, ELT qualifications like BA, MA, or Ph.D., and teaching hours.

Method

The present study is a descriptive study that uses a mixed-method design including both quantitative and qualitative research for the triangulation of data.

Participants

The participants for this descriptive study included teacher trainers and all EFL instructors working at preparatory schools of four foundation universities in Ankara. Additionally, four trainers and teacher trainees who were chosen with a convenient sampling method were interviewed. There were several reasons for choosing them as participants. First of all, teacher trainers were chosen since they were responsible for designing the teacher training programs. They also had a say as to whether the trainees needed instruction and what their performance was. Secondly, EFL instructors, the trainees, were chosen for this study since self-development was the main aim of the study. Not only the teacher trainers but also the trainees were accountable for their professional self-development since it was expected to be a joint responsibility.

The main issue for this study was choosing the group of representative samples of the research population. There were several reasons for choosing the participants from four foundation universities. In the first place, it was found out that although some Professional Development Units were established in preparatory schools of state universities in Ankara, they were not active. In other words, teacher training activities were not being conducted by teacher trainers working at state universities for the contribution to the professional and self-development of EFL instructors. Accordingly, trainers and trainees working at foundation universities were chosen as the representative samples of the research population. Another reason for choosing four foundation universities was that in some of the foundation universities, teacher training units had not yet been established. Additionally, some of the foundation universities with teacher training units did not want to share any information about their institutions with the researchers. Consequently, teacher trainers and instructors working at these four foundation universities were chosen as the representatives of the research population.

Four teacher trainers, 348 EFL instructors working at preparatory schools of four foundation universities in Ankara and four instructors who were chosen with a convenient sampling method participated in the study.

23,9% of the participants were aged between 20-30, 33,3% of them were aged between 31-40, 32,8% of them were between 41-50 and only 10,1% of them were 51-60. 77,6% of the participants were females, while 22,4% of them were males. 80,2% of the participants were teaching between 12-18 hours per week, 12,1% of them were teaching from 5 to 11 hours and only 7% of the instructors had more than 19 teaching hours per week. As for years of experience, 50,3% of the instructors had more than 16 years of teaching experience, 35% had six to fifteen years' experience, and 14,7% had less than six years experience. in terms of qualifications, 57,8% of the participants had bachelor's degrees in EFL, 37,9% of them had master's degrees in ELT while only 4,3% of them had Ph.D. degrees. As for certificates or diplomas related to ELT, only 5,2% of the participants got CELTA, and 6% of them had DELTA Certificates. 88.8% of the participants didn't have any certificates or diplomas related to ELT. In terms of the participation in conferences, seminars, or workshops for self-development, it is obvious that 92,8% of the participants were not attending any of them while 7,2% participated in less than 5 seminars in a year. This table shows that most of the instructors working at preparatory schools did not prefer attending conferences for their self-development.

Data Collection Tools

One of the instruments used was a structured questionnaire which was prepared to collect data about current self-development methods practiced by the instructors. The questionnaire used by Alwan (2000) was adapted. The questionnaire consisted of 2 parts. The first part was Part I which aimed to gather personal data. There were nine questions prepared to identify the respondent's personal, academic, and work characteristics. The purpose of this was not only to provide an easy start but also to see whether there was any correlation between any of these factors and the responses to the rest of the questionnaire. Furthermore, Part I ensured that the sample consisted of subjects who had the characteristics of the research population.

The second part was called Part II which aimed to gather information about Self-Development Activities. It consisted of five sub-groups of questions that dealt with the most well-known self-development activities which were journal writing, self-appraisal, peer observation, academic reading and writing, and action research. Each sub-group of questions aimed at gathering as much information as possible regarding the activities that were practiced on an individual basis, and whether they could be generalized. To be able to test the validity of the scale, SPSS 22 was used. The results revealed that all items in the questionnaire were validly proven by the score of Correlation Item-Total Correlation ≥ 0.30. Additionally, the reliability of the whole scale was measured at 90% (0.90). This was accepted as highly reliable for social sciences. Although it changes according to the scale type for social sciences, more than 60% Cronbach Alpha reliability analysis coefficient is accepted as a proof of reliability (Ural & Kılıç, 2006). So, the questionnaire was valid and reliable to be used.

In this study, interview questions for teacher trainers were firstly aimed at gathering personal information, which was essential for the study. Then, the interviews focused on gathering information about self-development activities practiced in a year from the perspective of the trainers. Interviewees were consulted on what might be done to boost professional self-development by introducing self-development activities. Interviews for instructors were conducted with four volunteer instructors from different institutions. The interviews were structured in that the instructors were asked to expand on their responses to the questionnaire. Moreover, they were encouraged to elaborate on matters relevant to their self-development. All unstructured interviews were dynamic and comprised of open-ended questions. Open-ended questions were necessary since a variety of responses were expected. To collect data and investigate the use of self-development activities as journal writing, self-appraisal, peer-observation, reading, writing a research paper, and action research, the instruments including a questionnaire for EFL instructors, interviews with teacher trainers and EFL instructors were utilized.

Data Collection Procedure

In this study, data were collected through three research instruments, the questionnaire, interviews with four teacher trainers, and interviews with four instructors. All were of equal importance to the study, as they were mutually complementary and offered accurate information.
For triangulation, three research instruments were used in this descriptive study; the questionnaire was used to collect quantitative data while interviews with teacher trainers and trainees were used to collect qualitative data.

Analysis of Data

SPSS 22 was the basis for analyzing the data acquired through questionnaires. In addition, interviews with instructors and trainers were analyzed and used for triangulation through in-depth content analysis. It took roughly 15 minutes to complete each interview in English. Interviews were recorded and transcribed for analysis. The permission for recording the interviews was granted by the entire sample. The findings were evaluated using qualitative interview data, and the corresponding literature assisted to interpret the conclusions.

With the SPSS 22 program, the data were analyzed. The Kolmogorov-Smirnov test examined whether the normal distribution was reached in the sample. The analysis showed that the data provided a normal distribution (p>-05).

After the piloting phase, the reliability of the whole scale was measured at 0.90. This was accepted as highly reliable for social sciences. The variables were also measured higher than 0.60 which shows that the scale used was reliable.

Results

Journal Writing

Table 1 presents the instructors' usage frequencies of journal writing, the factors that hinder the practice of it, to what extent the instructors implement it in their classes to solve a problem, and whether the instructors differ in the usage of in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or PhD., and teaching hours.

Table 1. Journal writing

1. Do you write your reaction to teaching events and analyze your work for reflection?	YES 20 (5.7%)	NO 328(94.3%)
1.1. How many hours do you spend on writing a journal each week?		
a.1-3	19	
b.4-6	1	
c.More than 6 hours	-	
1.2. How many times a week do you write a journal?		
a. When I have a problem	18	
b. Daily	-	
c. 2-4 times a week	-	
d. Once a week	2	
1.3. Which of the following may be the reason for not keeping a journal? You can choose more than one option.		
a. It is a burden on time		155
b. It is useless		121
c. It requires energy		151
d. I have not heard of it		51
e. Other		18
2. How did you learn about keeping a journal?	Frequency	Percentage
a. I have never heard of it before	95	27.2%
b. I have read about it	109	31.3%
c. In a teacher training course in my institution	15	4.3%
d. From a colleague	60	17.2%
e. At university	69	19.8%
f. Other	-	0
3- To what extent do you implement journal writing in your classes to solve a problem?	Frequency	Percentage
Never	328	94.3%
Rarely	18	5.1%

Sometimes	2	0.6%
Always	-	0

As it is indicated in Table 1, a very small number of participants (5.7%) claimed that they had written journals. All the instructors who practiced journal writing were males and had MA or Ph.D. degrees. All of them had more than 11 years of experience. 5.4% of the instructors spent 1 to 3 hours on writing journals each week. One of them spent 4 to 6 hours each week. Moreover, 5.1% of them preferred writing journals when they had a problem, while two of them were doing it once a week. As the results showed, only 5.7% of the instructors wrote journals. Interviews with teacher trainers and instructors also revealed a parallel finding as none of them mentioned positively about this practice. While only 5.7% of instructors were writing journals, 94.3% of them were not doing it. As regards the issue of the reasons for it, it was clear that the time and effort required were the major factors that affected the practice of writing journals. Additionally, most of the instructors thought that it was useless and they did not need to do it. Cross tabulation revealed that there was no significant factor such as age, gender, academic qualification, or year of experience which affected the findings. 5.1% of the respondents stated that there were other reasons for not conducting journal writing. 4% of them stated that it was unnecessary. Interviewee instructor (T.8) also mentioned the obstacles in practicing self-development activities by saying: "As you know, we need time and energy for self-development as well as a supporting environment. Unfortunately, school activities take up most of our time and we have little time for development activities. If we do any, be sure that it is done at our inconvenience. I believe that our workload is to be minimized". Similarly, the interviewee instructor (T.5) said: "I cannot do journal writing since I do not have enough time. I don't have enough time as I am overworked. In better work conditions, I believe that it will be possible for us to practice other self-development activities. As instructors, we need encouragement and support".

As regards the issue of the source of learning about journal writing, while 27.2% of the instructors stated that they had not heard of it before, 31.3% of them stated that they had read about it. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the results obtained. Only 4.3% of the instructors stated that they learned it in a teacher training course in their institutions. This indicated that Teacher Training Programs did not include self-development activities such as journal writing as a part of the content. The interviews also backed up this finding. All trainers interviewed claimed that the content of the course was planned according to the needs of the instructors in their classes although none of them had mentioned that self-development activities were covered even theoretically. Similarly, the interviewee trainer (T.4) explained that: "In my opinion, instructors must know more about the opportunities or possibilities available for them. Moreover, teacher training programs are to aim at informing them of different means of self-development. Unfortunately, this is missing in most of our programs. We really would like to do more for our instructors but we have to adhere to what is assigned to us by the institution or what the instructors need in their classes".

Concerning the issue of the frequency of implementing journal writing in EFL classes to solve a problem, a vast number of instructors, 94,3%, stated they never used it in their classes, while only 5.1% of them rarely used it to solve a problem. Just 2, out of 348 instructors stated they sometimes used it. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the results obtained. The interviewee instructors' responses also verified this finding. All of them stated that they never implemented journal writing in their classes to solve a problem. Interviewee instructor (T.5) said: "I can never implement journal writing, self-appraisal, or action research in my classes to solve a problem. Journal writing is a time-consuming process. I do not have enough time to write a journal".

Self-Appraisal

Table 2 presents the instructors' usage frequencies of self-appraisal, the factors that hinder the practice of it, to what extent the instructors implement it in their classes to solve a problem, and whether the instructors differ in the usage of in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D. and teaching hours.

Table 2. Self-appraisal

1. Do you assess your performance by writing, filling in a form, or completing a checklist of required criteria for reflection and self-development?	YES – 34(9.8%)		NO – 314 (90.2%)	
	Frequency	Percentage	Frequency	Percentage
1.1. How many times do you assess your performance?				

a. When I have a problem	26	7.4%		
b. Daily	1	0.2%		
c. 2-4 times a week	5	1.4%		
d. Once a week	2	0.5%		
1.2. Reasons why you do not practice self-appraisal, you can choose more than one option.				
a. It is a burden on time			201	64%
b. It is useless			52	16.5%
c. It requires energy			183	58.2%
d. I have not heard of it			191	60.8%
e. Other			9	2.8%
2. How did you learn about self-appraisal?				
a. I have never heard of it before			191	54.8%
b. I have read about it			65	18.6%
c. In a teacher training course in my institution			20	5.7%
d. From a colleague			46	13.2%
e. At university			26	7.5%
f. Other			0	0
3- To what extent do you implement self-appraisal in your classes to solve a problem?				
Never			314	90.2%
Rarely			30	8.6%
Sometimes			4	1.2%
Always			0	0

As Table 2 shows, 34 participants claimed that they assessed their performances by writing, filling in a form, or completing a checklist of required criteria for self-reflection and self-development. In the practice of self-appraisal activities, there was no significant difference between male and female instructors of all ages. On the other hand, 8.2% of the respondents who practiced self-appraisal were experienced instructors whose working experiences ranged from 6 to 10 years. 1.6% of them were also experienced instructors who had been working for 11 to 15 years. As the results indicated, only a very small number of instructors (9.8%) were conducting self-appraisal activities for reflection and self-development. Interviews with teacher trainers and instructors also revealed a parallel finding as none of them mentioned positively about this practice. Interviewee teacher trainer (T.4) said: "The instructors working at our institution are evaluating themselves from time to time. They are aware of their weaknesses and they are trying to find out ways to improve them. On the other hand, they do not observe their development since they do not register anything."

As regards the issue of the frequency of self-appraisal activities, 7.4% of the respondents stated that they were assessing their performances when they had a problem. While 1.4% of them were assessing their performances 2-4 times a week, 0.5% of them were doing it once a week and 1 of them was assessing his performance daily. Since the responses of male and female respondents were similar, it could be claimed that there was no significant factor that affected the findings of the study.

While only 9.8% of the instructors were assessing their performances, 90.2% of them were not doing it. As regards the issue of the reasons for it, it is clear that the time and effort required were regarded as the major factors that affected the practice of self-appraisal. Furthermore, 16.5% of them thought that it was useless and they did not need to do it while 60.8% of them had no idea about what self-appraisal was. There were other reasons mentioned by the instructors in the questionnaire. One of the reasons was that instructors did not care about the results of their teaching experiences. In other words, they were just teaching and ignoring the rest. Another reason was that some of the instructors did not want to face their weaknesses. The third reason mentioned was that the self-appraisal technique required sincere attempts, so instructors were to overestimate themselves. Besides, another reason for not doing self-appraisal was the burden of conducting this process as a written activity. An instructor wrote that self-appraisal could be done orally, so there was no need for the writing process. The fifth reason was the lack of self-confidence. The last reason stated by the instructors was that self-awareness was not a necessity; as a result, the instructors did not have to conduct such activities. Cross tabulation revealed that there is no significant factor such as age, gender, academic qualification, or year of experience which affected the results obtained. Interviewee instructor (T.7) conducted self-appraisal yet she mentioned time restrictions by saying: "I have used self-appraisal and peer observation. In my opinion, the instructors can do anything if they have enough time and energy for it. Most of the instructors are responsible for preparing extra materials and exams. Additionally, there are lots of ex-curricular activities that are a burden for them. As a result, they do not have enough time to assess themselves. As instructors, if we have extra time, we can practice all self-development activities". Similarly, the interviewee instructor (T.8) said: "Except for peer observation, I have not tried the other self-development activities since they are time-consuming and I do not need them. I do want to be encouraged to assess my performance by the trainers; this

element is missing in the current TT activities. As you know, we need time and energy for self-development as well as a supporting environment. Unfortunately, school activities take up most of our time and we have little time for development activities. If we do any, be sure that it is done at our inconvenience. I believe that our workload is to be minimized"

As regards the issue of the source of learning about journal writing, 54.8% of the instructors stated that they had not heard of it before while 18.6% of them stated they had read about it. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the findings. Only 5.7% of them stated that they learned it in a teacher training course in their institutions. This indicated that Teacher Training Programs did not include self-development activities such as self-appraisal as a part of their contents. While 13.2% of them learned about self-appraisal from their colleagues, 7.5% of them learned it during their academic studies. As it is clear, in addition to the university, a work colleague could be an informative resource for self-development.

As regards the issue of the frequency of implementing self-appraisal in EFL classes to solve a problem, a vast number of instructors, 90.2%, stated they never used it in their classes, while only 8.6% of them rarely used it to solve a problem. Just 1.2% of them sometimes used it. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the results obtained. Although most of the interviewee instructors stated that they never used self-appraisal to solve a problem, only one of them (T.7) said: "I can never implement any of them except self-appraisal and peer observation. Unfortunately, I do not have enough time to implement them."

Peer Observation

Table 3 presents the instructors' usage frequencies of peer observation, the factors that hinder the practice of it, to what extent the instructors implement it in their classes to solve a problem, and whether the instructors differ in the usage of in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D. and teaching hours.

Table 3. Peer observation

1. Do you practice peer observation?	YES- 328 (94.2%)		NO- 20 (5.7%)	
	Frequency	Percentage	Frequency	Percentage
1.1. How many times do you practice peer observation in a year?				
a. 1-3	242	73.7%		
b. 4-6	60	18.2%		
c. More than 6 times	26	7.9%		
1.2. What is the main reason for observing your peers?				
It is recommended by the trainers.	89	27.1%		
I feel a need for learning from my colleagues.	46	14%		
It is a school policy.	190	57.9%		
Other	3	0.9%		
1.3. Is there a focus of observation?				
I observe everything in the lesson without writing anything.	5	1.5%		
I focus on some of the important points in the lesson and take notes.	153	46.6%		
I use a checklist provided by the trainers.	170	51.8%		
1.4. Do you have a post-meeting after the observation?				
Yes	288	87.8%		
No	9	2.7%		
In some cases	31	9.4%		
1.5. Reasons why you do not practice peer observation, you can choose more than one option				
It is a burden on time.			20	100%
It is useless.			4	20%
We are criticized by our colleagues who observe us.			18	90%
I have not heard of it.			4	20%
Our timetables are overlapping.			16	80%
Our timetables are overloaded.			19	95%
I feel anxious when I am observed.			6	30%
It is boring to observe my colleagues.			5	25%
Only new instructors are to observe more experienced instructors.			6	30%
We cannot learn something new from old instructors.			4	20%
I do not need to visit my colleagues' classrooms.			6	30%
Other			0	0

2. How did you learn about peer observation?	Frequency	Percentage
a. I have never heard of it before	4	1.1%
b. I have read about it	66	18.9%
c. In a teacher training course in my institution	198	56.9%
d. From a colleague	38	10.9%
e. At university	36	10.3%
f. Other	6	1.7%
3- To what extent do you implement peer observation in your classes to solve a problem?		
	Frequency	Percentage
Never	20	5.7%
Rarely	268	77%
Sometimes	50	14.3%
Always	0	0

As Table 3 shows, only 5.7% of the instructors did not practice peer observation for their self-development. As it was clear, peer observation appeared to be the most widely used self-development activity in the preparatory schools of foundation universities in Ankara. 94.2% of them were observing their colleagues 1 to 3 times in a year. Cross tabulation revealed that female instructors had a more tendency to practice peer observation than the men since 22 out of 26 instructors who observed their colleagues more than six times were females. When the other factors were taken into consideration, it could be claimed that there was no significant factor that affected the results obtained.

The most common reason for practicing peer observation was the school policy. It was clear that the instructors were urged to observe their colleagues improve themselves. Another important motive was the recommendations of teacher trainers. Only 46 out of 328 instructors were practicing peer observation as they wanted to learn something from their colleagues. Cross tabulation revealed that there was no significant factor such as age, gender, or academic qualification which affected the findings. As for the number of years of experience, there was a significant difference between the experienced and inexperienced instructors. While experienced instructors were practicing peer observation as a school policy, the ones who considered it as an opportunity for learning were inexperienced instructors.

These findings were backed up by the interviewee instructor (T.5) who said: "Most of the instructors working at universities are experienced ones. As a result, the more experience they have, the least they are willing to observe their colleagues. On the other hand, they have to practice peer observation as a school policy. That is, it is a duty that should be done". Similarly, the interviewee teacher trainer (T.2) said: "Experienced teachers usually imply that they are fed up with peer observations as they have been practicing it for too many years so two years ago, we introduced some new forms of reflective teaching activities". Additionally, most of the interviewee instructors said that they had experienced peer observation since it was a school policy. Although it was a school policy and the instructors were asked to practice peer observation, they were not conducted as asked. Interviewee instructor (T.8) explained this situation by saying: "I tried peer observation since it is a school policy. The trainers ask us to observe our colleagues' classes. Most of the time we are not observing our colleagues, we are just writing reports as if we did the observation. It is unnecessary".

As for the focus of peer observation, 98.4% of the instructors were using a checklist provided by the trainers, focusing on some important points in the lesson and taking notes. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the findings. Policies of peer observation might vary from university to university. Interviewee teacher trainer (T.4) explained that by saying: "I think, peer observation makes up for the lack of the practical aspect in training courses. Principals in this field recommend that instructors are to observe each other's lessons to be able to complement the training on the aspect of performance. Instructors are classified according to their instructional skills. As a result, the observers are asked to focus more on these points. Some instructors are great in some aspects of performance. It is a great chance for the observer instructors to focus on these aspects during peer observation process". On the other hand, interviewee teacher trainer, T.1, assured that, in her institution, "When the peer observations are focused, they work better as teachers focus on one specific area. We give them a checklist and ask them to focus on these points".

87.8% of the instructors were having a post-meeting after the observations, which showed that there was a systematic approach concerning peer observation. There was no significant difference in responses concerning nationality, years of experience, or gender. Interviewee instructor (T.6) focused on the importance of checklists and stated that: "After each peer observation practice, we conduct post observations which are very important with the observed instructors. Teacher trainers give us a checklist to help us focus our

attention on certain aspects of teaching and we use them to discuss the lesson". As he stated, holding post-observation meetings was also a school policy. On the other hand, another interviewee instructor, working at another institution, T.8., referred to time constraints that the workload caused and said: "When it comes to post-observation meetings, we do not have enough time for such extra activities. If we have time, they can be conducted easily."

These reasons related to not practicing peer observation, which measured the instructors' attitudes, were listed to find out the ways of improving the peer observation process. There was no significant difference in responses concerning nationality, years of experience, or sex. All of the instructors who did not practice peer observation (n.20) considered it as a burden on time. However, 4 instructors found it useless. They considered it as a useful practice. Additionally, 90% of the instructors did not want to practice peer observation so as not to be criticized by their colleagues, although peer observation was a school policy.

Four of the instructors stated that they had no idea about what peer observation was. Overlapping and overloaded timetables were considered as the main reasons connected with the work environment that affected the practice of peer observation while anxiety and boredom were not regarded as major factors that affected the practice of peer observation. 70% of the instructors thought that peer observation was not for only novice instructors. Moreover, they were aware of the learning opportunities when observing more experienced instructors. Similarly, 70% of the instructors thought that they needed peer observation to develop themselves.

Considering the issue of the resource for learning about peer observation, 56.9% of instructors stated that they had learned about the peer observation process in a teacher training course in their institutions. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the findings. Only 1.1% of the instructors stated that they had not heard of it while 18.9% of them had read about it before. 10.9% of them had learned it from their colleagues while 10.3% of them had learned it at university. As it was stated, peer observation was a school policy and teacher trainers were giving importance to it. The instructors who had chosen others stated that they had learned about peer observation on their CELTA and DELTA courses.

Concerning the issue of the frequency of implementing peer observation in EFL classes to solve a problem, a vast number of instructors, 77%, stated that they rarely used it in their classes, while 14.3% of them sometimes used it to solve a problem. Just 5.7% of them never used it. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the results obtained. Although all of the interviewee instructors stated that they had to observe their colleagues since it was a school policy, they did not use them to solve a problem in their classes as (T.6) He said: "I can never implement journal writing, self-appraisal, action research or reading and writing in my classes to solve a problem. When there is a problem, I just talk to my colleagues or teacher trainers to solve it. Twice a year, we have to conduct a peer observation, but they do not help me to solve the problems I have encountered in my classes since we cannot choose the focus of the lesson to be observed. As a result, none of these activities help me to solve the problems in my classes”

Academic Reading and Writing

Academic Reading

Table 4 presents the instructors' usage frequencies of academic reading, the factors that hinder the practice of it, to what extent the instructors implement it in their classes to solve a problem, and whether the instructors differ in the usage of in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D. and teaching hours.

Table 4. Academic reading

1. Do you read books, articles, etc. on teaching techniques to improve your teaching skills?	YES – 167 (48%)		NO – 181 (52%)	
	Frequency	Percentage	Frequency	Percentage
1.1. How many books related to your field do you read in an academic year?				
a. 1-5	141	84.4%		
b. 6-10	16	9.5%		
c. More than 10	10	6.1%		
1.2. Why do you feel the need to read?				
When there is a problem.	77	46.1%		
When I write a paper for my academic studies.	78	46.7%		

For self-development.	10	5.9%
Other	2	1.1%
1.3. Where do you get books and journals from? (More than one option can be chosen)		
School or public library.	32	19.1%
Internet	118	70.6%
A teacher resource center	6	3.5%
Trainers	13	7.7%
Own library	86	51.4%
Colleagues	75	44.9%
Other	5	2.9%

1.4. Which of the following may be the reasons for not reading educational references?		
I have enough experience.	1	0.5%
I cannot find enough sources to read.	10	5.5%
I do not have time for reading.	33	18.2%
It is not necessary.	81	44.7%
All the resources are repeating themselves.	4	2.2%
I do not like reading academic articles.	52	28.5%
Other.	0	0

2. What can be done to encourage reading for self-development? (Please rank the following statements according to the order of importance. Put 1 for the most important one)

	1	2	3	4	5
a. An assignment to complete can be given to instructors.	76	138	50	50	34
	21.8%	39.6%	14.3%	14.3%	9.8%
b. Instructors can be asked to prepare presentations.	85	186	30	39	9
	24.4%	53.4%	8.6%	11.2%	2.6%
c. A resource room can be provided for easy access to the necessary materials.	250	75	11	7	5
	71.9%	21.5%	3.2%	2%	1.4%
d. A timetable of free time can be made for reading.	146	118	53	25	6
	42%	34%	15.1%	7.2%	1.7%
e. Workload can be reduced.	256	72	10	6	4
	73.5%	20.6%	2.8%	1.7%	1.1%

3- To what extent do you read to solve a problem in your classes?		
Never	180	51.7%
Rarely	160	46%
Sometimes	8	2.3%
Always	0	0

As it was indicated in Table 4, nearly half of the instructors, 48%, claimed that they were reading books, articles, etc. in their fields to improve themselves. While there was no significant difference in responses concerning nationality, years of experience, or sex, 88% of them who read for self-development had MA or Ph.D. degrees. As these qualifications required reading a lot, it could be claimed that instructors were reading as a part of their post-graduate studies.

When the results of the number of references read in an academic year were analyzed, it was clear that 84.4% of instructors read 1-5 books in an academic year. While there was no significant difference in responses concerning nationality, years of experience, or sex, all the instructors who read more than 6 books for self-development had MA or Ph.D. degrees. Interviewee instructors (T.5) who had Ph.D. degrees and (T.6) who had MA degrees verified these findings. Interviewee instructor (T.5) said: "I read articles, a huge number of articles indeed and wrote a lot of articles and research papers. I did them since I wanted. No one told me to do so".

Regarding the issue of the reasons for reading on methodology, while 46.1% of instructors preferred reading when there was a problem, 46.7% of them who had MA or Ph.D. degrees were reading for their academic studies. Although there was no significant difference in responses gathered concerning nationality, sex, or years of experience, academic qualifications played a great role as motives of reading. Moreover, 5.9% of the respondents stated that they were reading books for self-development. Other reasons mentioned were the need to update themselves and enrolment for post-graduate studies. Additionally, reading was encouraged in some institutions. Interviewee teacher trainer (T.3) said: "We have a reading club activity; it is called a discussion club. We read articles each week with volunteer instructors and we come together, share our ideas and reflect on those articles that we read. In this module, we have also integrated the IATEFL conference sessions there. We watch the videos on the British Council website since they are available and we come together with the instructors and we watch them. Beforehand, we come together and reflect on the ideas in

those plenary sessions. It also part of my job to organize these. It is voluntary. About ten instructors are attending in discussion club. We have about forty instructors so ten out of forty is a good number. There are lots of instructors attending. Sometimes depending on nature or the hectic workload specifically, the number of instructors is less than ten, but sometimes more than ten instructors are attending, but usually, we have 8 to 10 teachers attending each module"

As stated, reading activities could be encouraged by the trainers although they were voluntary activities. 70.6% of instructors got reading materials from the internet, 44.9% of them got books from their colleagues, and 51.4% of them read the books in their libraries.

Regarding the issue of reasons for not reading educational references, 44.7% of instructors stated that it was an unnecessary activity. 28.5% of them stated that they did not like reading academic articles and 18.2% of them said they did not have enough time to read, while 5.9% of them had problems with finding enough sources to read. These are the main reasons for not reading for self-development. Similarly, the interviewee instructor (T.8) said: "I also do not have enough time to read academic references. By reading, instructors may develop themselves, but like me, most of them do not read due to the overloaded timetables".

Considering the ways of encouraging reading, the most important factor was the reduction of the workload then came providing a resource room for easy access to the necessary materials. Following these two important factors, then making a timetable of free time came. Preparing presentations was considered as another important factor that encouraged reading. The least important factor encouraging reading was giving the assignment to be completed.

Concerning the issue of the frequency of reading academic references to solve a problem, 51.7% of them stated they never read to solve a problem in their classes, while 46% of the instructors rarely read. Just 8, out of 348 instructors stated they sometimes read academic references to solve problems. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the results obtained. Although most of the interviewee instructors stated that they did not like reading academic references, only one of them (T.5) said:" I can never implement journal writing, self-appraisal or action research in my classes to solve a problem. When there is a problem, I just read to solve it"

Table 5 presents the instructors' usage frequencies of writing research papers, the factors that hinder the practice of it, to what extent the instructors implement it in their classes to solve a problem, and whether the instructors differ in the usage of in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D. and teaching hours.

Academic Writing

Table 5. Academic writing

1. Have you ever written a research paper?	YES – 156(44.8%)		NO – 192 (55.2%)	
	Frequency	Percentage	Frequency	Percentage
1.1. How many references approximately do you use to write a research paper?				
a. 1-5	28	18%		
b. 6-10	16	10.2%		
c. More than 10	112	71.8%		
1.2. Why do you write a research paper?				
When there is a problem.	4	2.5%		
When the trainers ask me to do it.	5	3.2%		
For my academic studies.	147	94.3%		
Other	0	0		
1.3. What is the approximate length of a research paper you write?				
a. 1-5	109	68.9%		
b. 6-10	32	20.5%		
c. More than 10	15	9.6%		
1.4. What is the reason for not writing a research paper?				
a. I have enough experience.			26	13.5%
b. I do not have easy access to the materials.			6	3.1%
c. I do not have enough time for writing.			80	41.6%
d. There is nothing new to learn.			29	15.1%
e. I am not interested in writing.			46	24%

f. Other.			5	2.6%
2. Do you have easy access to the following?				
	A computer		An internet	
	YES	NO	YES	NO
	340	8	313	35
	97.7%	2.3%	90%	10%

3- To what extent do you write a research paper to solve a problem in your classes?

	Frequency	Percentage
Never	348	100%
Rarely	0	-
Sometimes	0	-
Always	0	-

44.8% of the instructors had written a research paper, while 55.2 % of them had not done it. While there was no significant difference in responses concerning nationality, years of experience, or sex, out of 156 instructors who had written a research paper, 147 of them had MA or Ph.D. degrees. As these qualifications required reading and writing academic papers a lot, it could be claimed that instructors were writing a research paper as a part of their post-graduate studies. In the questionnaire, some of the respondents wrote: "I have written a research paper to be able to graduate from the university". This was the proof that they had written research papers for academic reasons. Interviewee teacher trainer (T.3) supported this finding by saying: "The instructors doing DELTA are aware of some of the professional development activities. They try something that they have not tried before in their classrooms and they see if it works or not. Doing research and writing a research paper is a part of Module 2 and they do that as a part of it. For others, who are not doing DELTA, we haven't introduced the professional development activities, yet".

71.8% of the instructors stated that they used more than 10 references to write a research paper. After cross-tabulation, it could be claimed that the ones who used more than 10 references had MA or Ph.D. degrees while there was no significant difference in responses concerning nationality, years of experience, or sex.
As table 5 suggests, the main reason for writing a research paper was academic studies. After cross-tabulation, it could be claimed that all respondents who said they were writing for academic reasons had MA or Ph.D. degrees while there was no significant difference in responses concerning nationality, years of experience, or sex. Interviewee instructor (T.5) who had a Ph.D. degree verified this finding by saying: "I read articles, a huge number of articles indeed and write a lot of articles and research papers for academic reasons. I did them since I wanted. No one told me to do so".

68.9% of the instructors produced short research papers. The ones who wrote more than 10 pages were Ph.D. candidates. The major reason for not writing a research paper was time. Another important reason was that the instructors were not interested in writing. One of the respondents wrote: "I am not interested in doing an MA or Ph.D." as a reason for not writing. Additionally, an interviewee instructor (T.7) said: "I didn't write a journal or a research paper since it is unnecessary. I didn't conduct an action research study. I do not like reading academic articles. I used other techniques efficiently so I did not need to use them". As she had stated, most of the instructors found it unnecessary.

97.7% of the instructors had a computer either at home or at school. However, 10% of them did not have access to the internet. Cross-tabulation results showed that all the instructors who did not have an internet connection were aged between 51-60.

Regarding the issue of the frequency of writing a research paper to solve a problem in EFL classes, all of the instructors stated they never used it in their classes. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the results obtained. It was considered a time-consuming activity. Similarly, the interviewee instructor (T.8) said: "I can never implement any of them in my classes to solve a problem. They are all time-consuming and unnecessary. We have to observe our colleagues as a school policy, but they are not useful. We are observing our colleagues just to do what the trainers ask us to do. Especially, journal writing and writing a research paper are the most time-consuming activities. I can never use them to solve a problem"

Action Research

Table 6 presents the instructors' usage frequencies of conducting action research, the factors that hinder the practice of it, to what extent the instructors implement it in their classes to solve a problem, and whether the instructors differ in the usage of in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D. and teaching hours.

Table 6. Action research

1. Have you ever conducted an action research to solve an immediate problem in the classroom?	YES 18 (5.1%)		NO 330 (94.9%)	
	Frequency	Percentage	Frequency	Percentage
1.1. What was the aim of the action research study that you conducted?				
To improve listening/speaking skills	4	22.2%		
To improve reading/writing skills	5	27.7%		
To improve vocabulary	6	33.3%		
To avoid the use of L1	3	16.6%		
1.2. What is the reason for not conducting an action research study?				
a. It is a burden on time.			74	22.4%
b. I have no idea about it.			139	42.1%
c. It does not help us in any way.			20	6%
d. It requires a lot of energy.			50	15.1%
e. It is not necessary.			42	12.7%
f. Other.			5	1.5%
2. How did you learn about action research?	Frequency		Percentage	
a. I have never heard of it before	137		39.3%	
b. I have read about it	43		12.3%	
c. At a training course	12		3.4%	
d. From a colleague	71		20.4%	
e. At university	63		18.1%	
f. Other	22		6.3%	
3- To what extent do you implement action research in your classes to solve a problem?				
	Frequency		Percentage	
Never	338		97.1%	
Rarely	10		2.9%	
Sometimes	0		0	
Always	0		0	

94.9% of the instructors had not carried out an action research study while only 5.1% of them had experienced it. After cross-tabulation, it could be claimed that all respondents who said they had conducted an action research study had MA or Ph.D. degrees while there was no significant difference in responses regarding concerning nationality, years of experience, or sex. Although the interviewee teacher trainer (T.1) said "We have collaborative projects such as action research, special interest group, article club, video coaching, and team teaching", the instructors stated they had not experienced it so far. Additionally, interviewee teacher trainer, T.3., emphasized the importance of action research by saying: "Instructors are attending courses, conferences and discussion activities but other self-development activities are not introduced, yet. However, action research is very helpful for them. Conducting any kind of research in the classroom to reflect on their teaching is also helpful. In the future, I want to have active research groups and ask them to conduct action research to solve some specific problems that they encounter in their classes. That is one of the things that I have in mind".

An action research study was carried out to solve an immediate problem in a classroom. As Table 6 indicates, the most common problem that instructors faced in their classes was vocabulary and reading/writing skills. Not having an idea about what action research was the main reason for not carrying out an action research study. Another important reason was not having enough time and energy. In the 'other' section, some instructors wrote: "I do not know how to conduct an action research" which showed that it had not been introduced in Teacher Training Programs.

As regards the issue of how the instructors learned about action research, 39.3% of the instructors stated that they had never heard of it before. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the findings. Only 3.4% of the instructors stated that they had learned it at a training course while 12.3% of them had read about it before. 20.4% of instructors had learned it from their colleagues while 18.1% of them had learned it at university. In the 'other' section, some instructors wrote: "I do not know what it is but I have heard of it before" As Table 6 suggests, most of the instructors had no idea about what action research was. Additionally, the interviewee instructor (T.8) emphasized the importance of time constraints and workload by saying: "Except for peer observation, I have not tried the

other self-development activities since they are time-consuming and I do not need them. I do want to be encouraged to assess my performance by the trainers; this element is missing in the current TT activities. As you know, we need time and energy for self-development as well as a supporting environment. Unfortunately, school activities take up most of our time and we have little time for development activities. If we do any, be sure that it is done at our inconvenience. I believe that our workload is to be minimized".

Regarding the issue of the frequency of conducting action research to solve a problem in EFL classes, a vast majority of the instructors, 97.1%, stated they never used it in their classes, while only 2.8% of them rarely used it. There was no significant factor such as age, gender, academic qualification, or year of experience which affected the results obtained. It was considered a time-consuming activity. The responses of all interviewee instructors verified this finding. As they stated action research was not preferred in the presence of a problem.

Discussion

Findings are discussed over the related literature in the light of each research question.

Research Question 1: To what extent do the instructors engage in self-development activities?
The first research question investigated the usage frequencies of self-development activities by the instructors working at the preparatory schools of four foundation universities regarding interviews with instructors and questionnaire, the analysis of research results indicates that the instructors working at the preparatory schools of four foundation universities in Ankara are not very familiar with and do not use self-development activities such as journal writing, self-appraisal, reading academic references, writing a research paper and action research. The only self-development activity which the instructors are familiar with and use frequently is peer observation since it is a school policy. However, the interviews with instructors reveal the fact that instructors do not learn a lot from observing their colleagues. Very few instructors know about action research. Instructors consider self-development activities which are essential for being reflective and critical about their teaching as a burden on time and unnecessary. This, in turn, explains why they do not use them for their self-development. This result is in line with the results of the article of Genç (2012). In her study, she states peer observation is the most widely used self-development activity among EFL teachers. The findings of the questionnaire and interviews are quite important if the current trend in self-development, which consists of an exploration of instructors' teaching processes in an attempt to understand what they do and why they do it, is considered. As a result, it can be claimed that instructors have to conduct self-development activities to become better teachers.

Research Question 2: What are the factors that hinder the practice of self-development activities?
The second research question investigated the factors that hinder the practice of self-development activities by the instructors working at the preparatory schools of four foundation universities in Ankara.
As the results of the study indicate, the instructors are not using self-development activities such as journal writing, self-appraisal, reading-writing, and action research to improve themselves. Therefore, the second question of this descriptive study was designed to investigate the factors that hinder the practice of these self-development activities.
The "workload" is considered as the most important hindrance in practicing self-development activities. Most of the instructors agree that they do not have sufficient time at school to practice self-development activities. The "effort required" to conduct self-development activities is the second most important cause of less frequent participation in these activities. When these activities are examined one by one, the reasons for not using them are explained as follows; Journal writing is one of the least used self-development activities. "Time" and "effort required" are regarded as the major factors that affect the practice of it. Additionally, it is considered a "useless activity". Self-appraisal is not practiced by the instructors, either. Again, "time" and "effort required" are regarded as the most important hindrance in practicing this self-development activity. Another most important factor that hinders the use of it is "not having an idea about what it is". Although peer observation is the most widely used self-development activity, the most important reasons for not practicing it are "time", "overloaded timetables", and "the critics of observers". These factors can be used to find out the ways of improving the peer observation process. While some instructors in particular those with MA or Ph.D. degrees prefer reading educational references to develop themselves, most of the instructors are not doing so since they consider it as an "unnecessary activity". Other reasons are stated as "not liking the process of reading" and "not having enough time for academic reading". When it comes to writing, the major reason for not writing research papers is "time". Another important reason is "not being interested in it". "Not having an idea about what an action research is" the main reason for not carrying out action research. Other important reasons mentioned in the questionnaire and interviews are "not having enough time and "energy".

The results are in line with the results of the article conducted by Yaşar (2019). In her study, she claims that cost and time are the most important factors that hinder the practice of self-development activities. Similarly, in their studies, Kulbak (2019) and Yüksel (2021) find out that time is the most important barrier to self-development activities.

Research Question 3: To what extent do the instructors implement self-development activities in their classes to solve a problem?
This research question was designed to find out whether self-development activities were preferred by instructors to solve their problems in EFL classes. In the questionnaire, instructors were asked to rate four scales from never to always regarding their views about the implementation of self-development activities into their classrooms to solve a problem they have encountered. As drawn from the responses given to this item, it is clear that the rates equally gathered around two scales "never" and "rarely". That is, out of 348 instructors, a noteworthy number of them believe that they never or rarely transfer the knowledge they get from self-development activities into their teaching contexts.

To provide more insight into this issue, 4 instructors were selected among the participants and interviewed. The main aim of this process was if or to what extent teachers were able to use self-development activities to solve their problems in their classes. As a result, they were requested examples and explanations from their classrooms as to how they could implement the knowledge they gained from self-development activities in real teaching circumstances or which problems they encountered most in transferring that knowledge into classroom situations. The responses of these interviewee instructors could be gathered into two groups. The first group involved instructors who believed that they were not able to implement at all what they got from self-development activities into their classes to solve a problem. The second group consisted of instructors who sometimes could apply what they acquired from these activities and who sometimes could not manage it. During the interviews, interviewee instructors listed two reasons, which are crowded classes and worry about covering the pacing on time, as to why self-development activities do not help them solve their problems in EFL classes. As a result, the information gathered from self-development activities is not implemented in classes to solve problems. The findings of this study are in line with previous studies conducted (Yüksel, 2021; Yaşar, 2019).

Research Question 4: Do the instructors differ in the usage of self-development activities in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D., and teaching hours?
This research question is designed to find out whether factors such as age, gender, teaching experience, academic qualifications, and teaching hours have a role in using self-development activities. According to the findings gathered from questionnaires and interviews, all these factors play a great role in the self-development process.

a. Age; In general, cross-tabulation results show that nearly all of the instructors who have no idea about self-development activities except peer observation and who do not use any of them are aged between 41-50. Especially, the ones aged between 51-60 have not practiced any of them and find these activities unnecessary. Similarly, the ones aged between 20-30 have not practiced self-development activities such as journal writing, self-appraisal, and action research.

b. Gender; The gender of the participants is not a significant factor that affects the use of self-development activities since 78 males and 270 females participated in the research. However, cross-tabulation results indicate that all the instructors who practice journal writing are males. Additionally, it is found out that female instructors have a more tendency to practice peer observation than men since 22 out of 26 instructors who observe their colleagues more than six times are females

c. Teaching experience; Teaching experience is an important factor in the practice of self-development activities. The more experienced the instructors are, the less they give importance to self-development activities. More experienced instructors have no idea about what n action research is. Moreover, they have not written journals, evaluated themselves by writing self-appraisal reports, and read or written academically. The only self-development activity they engage in is peer observation. While experienced instructors are practicing peer observation as a school policy, the ones who consider it as an opportunity for learning are inexperienced – novice - instructors. What is more, the instructors who read and write academically have 11-15 years of experience while all of the instructors who write journals have more than 11 years of experience.

This result is not in line with the results of the article of Sarıyıldız (2017). The results of her study revealed that "There are few differences between the perceptions of novice and experienced teachers towards self-

development like teachers' taking the action for their professional development, teachers' being involved in the evaluation of their teaching skills and knowledge, and willingness' being important in this process, on which experienced teachers were found to agree more than novice teachers". However, as for the issue of teachers' trying to keep themselves up to date changes and improvements in ELT, novice teachers were found to agree more than experienced teachers. On the other hand, this study found out that neither novice nor experienced instructors give importance to self-development activities.

d. ELT qualifications like BA, MA, or Ph.D.; This is the most significant factor that affects the practice of self-development activities. Most of the instructors who read academic references for self-development and write research papers by using more than 10 references have MA or Ph.D. degrees. As these qualifications require intensive reading, it can be claimed that instructors are reading as a part of their post-graduate studies. When the results are analyzed, it is clear that a vast majority of instructors who have BA read 1-5 books in an academic year, while all the instructors who read more than 6 books for self-development have MA or Ph.D. degrees. Similarly, while some of the BA level instructors prefer reading when there is a problem, the instructors who are reading for their academic studies have MA or Ph.D. degrees. It is also the same concerning writing. While most of the MA-level instructors write short research papers, the ones who write more than 10 pages are Ph.D. candidates. In addition to reading and writing academically, all respondents who say they have conducted an action research study have MA or Ph.D. degrees.

e. Teaching hours; One of the most important factors that hinder self-development is the workload. The instructors who consider all self-development activities as a burden on time are working 19 or more hours a week while the instructors who work 5-11 hours a week have experienced all self-development activities. As a result, it can be claimed that the more the instructors work, the less they practice self-development activities. All in all, it can be claimed that the instructors differ in the usage of self-development activities to some extent in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D., and teaching hours.

Conclusion

This study aimed to investigate the usage frequencies of self-development activities by the instructors. The results indicate that instructors practice self-development activities on a limited scale. The most widely practiced self-development activity is peer observation in all four institutions since it is a school policy. Academic reading and writing are practiced just for postgraduate studies. Self-development activities such as journal writing, self-appraisal, and action research are rarely practiced. It has been discovered that some instructors do not even know that such activities exist. On the other hand, the ideas are welcomed by instructors on the basis that work conditions are improved to allow for the time and effort needed for these self-development activities. The second finding in this study shows that workload is considered the most important hindrance in practicing self-development activities. Most of the instructors agree that they do not have sufficient time at school to practice self-development activities. The effort required to conduct self-development activities is the second most important cause of less frequent participation in these activities. The third finding of this study shows that, although it is necessary, instructors do not implement the information gathered from self-development activities in their EFL classes to solve problems. The last finding in the study was that instructors differ in the usage of self-development activities to some extent in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or Ph.D., and teaching hours. As the results suggested, most of the instructors, aged 41-60, have no idea about self-development activities except peer observation and do not use any of them. Similarly, the ones aged 20-30 have not practiced self-development activities such as journal writing, self-appraisal, and action research. Since 78 males and 270 females participated in the research, the gender of the participants is not a significant factor that affects the use of self-development activities. As for teaching experience, the more experienced the instructors are, the less they give importance to self-development activities. Besides, the most significant factor that affects the practice of self-development activities is the ELT qualifications like BA, MA, or Ph.D. Most of the instructors who read academic references for self-development, write research papers by using more than 10 references and conduct action research in their classes have MA or Ph.D. degrees. As for teaching hours, the more the instructors work, the less they practice self-development activities.

In conclusion, instructors practice self-development activities by themselves on a limited scale. Since peer observation is recommended as a school policy, it is the most widely practiced self-development activity. Time and workload are considered as the most important hindrances in practicing self-development activities. As another finding, instructors do not implement the information gathered from self-development activities in

their EFL classes to solve problems. Finally, it was found out that instructors differ in the usage of self-development activities to some extent in terms of age, gender, teaching experience, ELT qualifications like BA, MA, or PhD., and teaching hours.

Recommendations

Based on the findings presented, this study holds the following overall implications for educational practice:
It seems that self-development activities are not introduced or practiced in TTPs. Teacher trainers are expected to introduce certain self-development activities such as journal writing, self-appraisal, academic reading and writing, and action research for the sake of better educational practices. It is also essential that educators become aware that each self-development activity has a good effect. Instructors need to be able to perform these activities and be encouraged to keep a portfolio to record a record of development. Additionally, planning for presentations is a prerequisite that facilitates the instructor's attempts at self-development. Moreover, providing well-resourced libraries and making the internet available for instructors to benefit from the vast databases and teaching resources that it encompasses may encourage them to develop themselves. Self-development practices such as research writing and presentations can also be encouraged. Instructors may also be encouraged to create a resource file with a collection of new instructional strategies and activities gained at training courses or by individual reading efforts.

As the findings of the study show, peer observation is the most common self-development activity. When there is an emphasis such as writing a description of the lesson or utilizing a checklist, the observation results improve. It turns out that all instructors are familiar with peer observations. It does not, on the other hand, pursue a systemic approach that increases its benefits. There is greater opportunity for improvement of peer-observation practice by giving time for post-observation discussion, by not focusing on bad characteristics of the instructors observed, and lowering working hours.

As for the possible factors which hinder the practice of self-development activities, instructors were found to mostly agree on excessive workload and time. Constructing flexible timetables to allow for professional self-development activities to take place is a necessity for each institution.

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Appendices

Appendix-1. Interview Questions for Teacher Trainers

1

1- How long have you been working as a teacher trainer?
2- As a trainer, what are your job responsibilities?

2

1. What is your opinion of the current teacher training program in your institution?
2. Who plans the training activities for the instructors in your institution?
3. What topics are usually covered in teacher training activities?
4. What form do the teacher training activities take?
5. Who runs these teacher training activities?
6. How do you decide on the needs of your instructors?
7. Do you use any evaluation systems for these training activities? What do you do for evaluation?
8. To what extent has this approach in teacher training helped in teacher development? How do the instructors respond to inter-visitations in general?
9. How do the instructors respond to peer observations?

10. What other forms of self-development activities do your instructors practice?
11. How can you encourage instructors to take up their professional accountability? Would you like to add anything?
12. Which self-development activities are introduced in your training courses? What else can be introduced?

Appendix-2. Interview Questions for Instructors

1

1- How long have you been working as an instructor?

2- Are you pursuing any further degree? (MA, Ph.D., etc.)

2

1. Do you think the activities of Teacher Training Units in your institution are sufficient enough for self-development? Why/Why not?
2. Are you familiar with the self-development methods such as journal writing, self-appraisal, peer observation, reading articles, and writing research papers and action research? Could you describe them shortly?
3. Have you ever used any of them for self-development? Which ones did you use?
4. If you did not participate in these activities, which ones were they? What were the reasons for not participating in them?
5. To what extent do you implement these activities in your EFL classes to solve a problem? Why?
6. What do you expect from self-development activities?
7. Do you implement the information you gathered from self-development activities into your EFL classes to solve your problems? If yes, could you give an example? If no, what is the reason?

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The Role of Job Satisfaction in Predicting Teacher Emotions: A Study on English Language Teachers

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The Role of Job Satisfaction in Predicting Teacher Emotions: A Study on English Language Teachers

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Abstract

This study aimed at investigating teacher job satisfaction as a predictor of teacher emotions. To this end, in a mixed method study, data were collected via the Job Satisfaction Survey and Teacher Emotions Inventory from 2,013 English language teachers across Turkey in addition to qualitative data collected from 145 teachers. By conducting statistical correlation and regression analysis, the findings revealed that job satisfaction correlated positively with teacher emotions, including negative ones. Also, contrary to the common understanding, it was found that job satisfaction is a predictor of negative emotions in terms of sadness, anger, and fear, indicating that schools as the workplace of teachers cause interplay of emotions under similar conditions. Negative emotions, particularly the fear dimension, exhibit a bidirectional feature in motivating teachers to a certain extent, thus increasing job satisfaction. It is concluded that job satisfaction involves not only positive but negative emotions, too since they are experienced in a temporal way.

Key words: Teacher emotions, Job satisfaction, Prediction, English language teachers, Negative emotions

Introduction

The teaching activity is regarded as a domain involving emotions on the part of the teachers (Šedová et al., 2017), making emotions ubiquitous in education (Trigwell, 2012). Thus, teachers' emotions are seen at the very center of any teaching activity (Chen, 2019a). There have been several definitions of the term "emotions" due to the complex nature of emotions (Chen, 2019a; Ersan & Tok, 2020; Fried et al., 2015; King & Chen, 2019). As Pekrun et al., (2002) explain, emotions can be regarded as sets of psychological processes which are interrelated and are the feelings that an individual experiences towards certain stimuli. In addition to being an individual domain, emotions are also socially bound, but experienced personally based on each person's judgment of the context. Thus, social constructs as well as the cultural aspects influence the way people experience emotions (Chen, 2019a). Although there are some variations, emotions have certain features, as clarified by Šedová et al. (2017). These features may be summarized as follows: emotions have a beginning and an ending (episodic), are intentionally created to achieve something, based on appraisal, and related to changes in the body.

Regarding the classification of emotions, they are based on four domains: affective, cognitive, motivational, and expressive. To clarify, an emotion is accompanied by thoughts, physiological variations in the body, action preferences, and expressive behaviors, in addition to feelings of affection (Frenzel et al., 2016). According to Pekrun et al., (2007), emotions are dynamic and involve all these multicomponent domains. From a general point of view, emotions are divided into two major categories, positive and negative. Based on this view, joy, satisfaction, pride and excitement fall into the positive category while anger, frustration, anxiety and sadness are negative emotions (Chen, 2016). However, in a more comprehensive classification there are six basic emotions, encompassing surprise, love, fear, joy, sadness and anger (Chen, 2019a; Hagenauer et al., 2015). Thus, emotions vary based upon their classification, ranging from positive to negative, and basic emotions consisting of happiness, anger, sadness and fear as well as the ancillary ones such as frustration and disgust, as expressed by different theories from different perspectives in terms of evolutionary, cognitive appraisal or socio-cultural feelings (Akan & Barışkın, 2018).

The act of teaching and teachers' emotions towards this act are dependent on each other rather than being different constructs. As Pekrun et al., (2002) clarify, various teaching conditions may create different emotions,

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creating a link between emotions and all teaching and learning activities. The joy or pleasure of teaching is expressed by teachers as arising from student interaction and cooperation to aid learning or receiving support from colleagues or managers. As a positive emotion, love of teaching involves student growth and achievement in addition to receiving social respect. At the same time, student misbehavior, rule violation, inattentiveness, and lack of support from colleagues and students' parents as well as work-related conditions are known to create negative teaching emotions in teachers (Chen, 2016; Trigwell, 2012). Thus teachers experience various emotions in the workplace connected mainly with the act of teaching as well as the students, classroom atmosphere, school administration, colleagues and students' families (Chen, 2019b).

Teacher Job Satisfaction

One of the aspects that teacher emotions are linked with is their satisfaction with the teaching activity (Fried et al., 2015). According to Locke (1976, p.1304 as cited in Pepe et al., 2017) satisfaction is "an enjoyable or pleasurable emotional state which is the result of the valuation of work or employment experiences of a person." In a general sense, job satisfaction is the emotional state, attitude and appreciation that a person attributes to their job (Crisci et al., 2019; Saiti & Papadopoulos, 2015; Spector, 1997). According to Spector (1997), job satisfaction is the extent to which individuals enjoy the components of a job. Spector (1985, 1997) explains that there are nine facets of job satisfaction and these are pay, promotion, supervision, fringe benefits, rewards, operating conditions, co-workers, nature of work and communication; which this study also takes as the base for teacher job satisfaction. Job satisfaction is thus a multi-faceted issue and various factors including the job and working conditions, colleagues and administration affect an individual's satisfaction with their job.

Teachers' job satisfaction is linked with a number of aspects in educational settings. From the work-related aspect, job satisfaction influences teacher retention, cohesion at school, increasing the status of teaching as a profession (Nalipay et al., 2019; Tabancalı, 2016; Toropova et al., 2020), administrative control and organizational culture (Pepe et al., 2017). In terms of the teaching process, job satisfaction on the part of the teachers contributes to effectiveness and efficiency in teaching, the well-being of both teachers themselves and their students in the classroom environment (Baluyos et al., 2019; Sahito & Vaisanen, 2020; Toropova et al., 2020), teaching competence, quality and job performance (Toropova et al., 2020) as an indicator of student success, school success and overall educational quality (Crisci et al., 2019; Li et al., 2018; Pepe et al., 2017). Also, job satisfaction creates a positive working environment for all teachers in the same school; this increases their dedication to teaching, i.e. job commitment and organizational performance (Pepe et al., 2017). Teaching programs or educational reforms may require teachers who show willingness to change and cooperate with others to revise the curriculum or school system; this is found to be dependent on teacher satisfaction (Saiti & Papadopoulos, 2015). Considering all these constructs, it is apparent that teachers' job satisfaction is crucial for their overall teaching performance and educational standards. Commitment to the job indicates decreased rates of leaving the profession, student achievement, and organizational well-being.

Related Literature on Job Satisfaction and Teacher Emotions

Teacher emotions have been linked to several factors and some research has been carried out regarding these aspects. Initially, it is shown that teachers' emotions have an obvious effect on students and their learning (Hagenauer et al., 2015; Rodrigo-Ruiz, 2016; Stephanou et al., 2013). Rodrigo-Ruiz (2016) found that teachers' positive emotions influence students in a positive way while emotions to the contrary cause adverse effects on students in terms of their mood, motivation, learning and social behaviour. According to Pekrun (2002), emotions in education trigger affective, cognitive, physiological and motivational aspects both for the students and teachers. This relationship between teachers' and learners' emotions is also highlighted by King and Chen (2019), who state that the learners' attention and learning process were triggered by emotions they had experienced. It was also reported by Rodrigo-Ruiz (2016) that students' attention and positive learning experiences were enhanced by instructors' positive emotions while teaching. Similarly, Frenzel et al. (2016) and Hagenauer et al. (2015) emphasized that teachers' emotions contributed positively to classroom management, student engagement in activities, and the teacher-student relationship. Thus, it is evident that students' learning processes and achievement were activated by teachers' emotions (Frenzel et al., 2016; Rodrigo-Ruiz, 2016; Saunders, 2012). Next, from the teaching perspective, emotions are seen to influence teachers' performance and teaching efforts (Tabancalı, 2016), their behaviours in the teaching process, and teaching practice in terms of student-centeredness and teacher-centeredness (Chen, 2019a; King & Chen, 2019; Saunders, 2012; Šedová et al., 2017; Trigwell, 2012).

According to Saunders (2012), teachers' emotions direct their thought processes and act as a mediator in their teaching behaviors. Similarly, Rodrigo-Ruiz (2016) also highlighted that emotional competence has to be incorporated into teacher education programs since teachers' emotions have a clear effect on the student-teachers' understanding, and regulation of their own emotions has the possibility of decreasing burnout, and increasing job satisfaction and classroom efficiency. One of the most surprising findings regarding teacher emotions was found by Šedová et al. (2017). They found in an intervention study to change teachers' teaching practices that teachers experienced emotions different from each other, yet the most interesting finding was that negative emotions were not necessarily linked to negative teaching practices. Instead, although positive self-esteem and self-image were connected to positive emotions in the change process, negative emotions fuelled the change. Thus, negative emotions could trigger changing teaching practices for the better.

Apart from the above examples, research shows that teacher emotions contribute positively to the effectiveness of educational reforms (Saunders, 2012), their well-being (Frenzel et al., 2016; Nalipay et al., 2019), and teacher identity (Schutz & Lee, 2014; Kocabaş-Gedik & Ortaçtepe Hart, 2020). For these reasons, research into teacher emotions has attracted special attention, especially in the last 20 years (Chen, 2016, 2019a; Fried et al., 2015) but this is still limited and slow (Frenzel et al., 2016). As explained by De Costa et al. (2019), constructs such as anxiety and motivation were extensively studied, but the blossoming of interest in researching teacher emotions started around the 2000s, particularly for language teachers. In terms of language teacher emotions, there is a quite limited number of studies in the literature despite the fact that teaching a foreign language is a challenging task, turning this job into an emotionally demanding profession.

In the related literature, job satisfaction and teacher emotions were found to be correlated constructs (Atmaca et al., 2020; Judge & Bono, 2001; King & Chen, 2019; Nalipay et al., 2019; Parveen & Bano, 2019). Teachers' positive emotions in teaching are reported to be pertinent to job satisfaction (Atmaca et al., 2020). In the field of education, teachers may regard their profession as satisfying or unsatisfying, rewarding, frustrating and fulfilling in various aspects (Demirtaş, 2010). Based on this, teachers' positive or negative emotions have a mediating role in terms of teachers' satisfaction or dissatisfaction with teaching as a job (Parveen & Bano, 2019). Although performance in teaching is dependent on job satisfaction (Baluyos et al., 2019), studies have generally focused on job satisfaction based on teacher emotions as an independent variable or teacher emotions have included satisfaction only as a subcategory (Atmaca et al., 2020; Nalipay et al., 2019; Rodrigo-Ruiz, 2016; Paul A. Schutz & Lee, 2014). However, as Collie et al. (2016) explain, work and workplace-related issues intervene in teachers' psychology and work engagement. Accordingly, it is acknowledged that various circumstances stemming from the workplace may cause fluctuations in the work-related emotions of the individuals (Bledow & Schmitt, 2008).

This study assumes that job satisfaction predicts teacher emotions; however, there is no comprehensive study in educational research regarding this aspect. There is therefore a need for a comprehensive study to analyze teachers' job satisfaction in predicting teacher emotions considering the impact of teacher emotions in the field of education. Since teacher emotions involve joy, love, sadness, anger, and fear (Chen, 2016), elucidating how these emotions are predicted by teachers' job satisfaction has so far been largely under-researched. This gap creates a need for a study such as ours, given the demanding nature of teaching as a profession (Daniels & Strauss, 2010). In particular, the context of teaching "English as a Foreign Language" (EFL), where students may not have a positive attitude towards learning the language, makes this profession a very challenging one (Anyiendah, 2017; Songbatumis, 2017) with less satisfied teachers vulnerable to experiencing various emotions in teaching. Thus, this study analyses English language teachers' job satisfaction as a predictor of teachers' emotions based on joy, love, sadness, anger, and fear of teaching based on the teacher emotion inventory developed by Chen (2016).

Method

This study makes use of mixed method research whereby both quantitative and qualitative methods were incorporated to collect and analyze the data to gain an in-depth understanding of complex phenomena (Creswell, 1999; Schoonenboom & Johnson, 2017). The quantitative part involves a descriptive-correlational survey design; in which the purpose is to identify and analyze the relationships between the dependent and independent variables to define the state of nature at a point in time (Koh & Owen, 2000), and to put forward the affecting and affected variables by also explaining the degree of the total variance (Fraenkel, Wallen & Hyun, 2012). The independent variable of the study was teacher job satisfaction and the dependent variables were teacher emotions. In the qualitative part, English language teachers were asked for their opinions and experiences

regarding job satisfaction and their teaching emotions to obtain an in-depth understanding of how teachers' job satisfaction predicts their teaching emotions to support the quantitative data.

Participants of the Study

The participants of this study, chosen through convenience sampling, were composed of 2103 Turkish teachers of English language working in state schools across Turkey, 145 of whom also participated in the qualitative part.

Table 1. Distributions of demographic variables

Variable	Frequency	Percentage
Gender		
Female	1430	68
Male	673	32
Age		
21-25	185	8.8
26-30	480	22.8
31-35	511	24.3
36-40	415	19.7
41-45	278	13.2
46-50	133	6.3
50+	101	4.8
Graduation		
English Language Teaching	1555	73.9
English Language & Literature	374	17.8
American Language& Literature	52	2.5
Linguistics	31	1.5
Translation Studies	25	1.2
Other	66	3.1
School Type		
Primary	276	13.1
Secondary	980	46.6
High School	813	38.7
Public Education Center	12	.6
Other (Science Art Education Center)	22	1
School Location Type		
Village/Town	294	14
County	868	41.3
City	941	44.7
Region		
Marmara	564	26.8
Central Anatolia	380	18.1
South-Eastern Anatolia	276	13.1
Eastern Anatolia	243	11.6
Mediterranean Region	224	10.7
Aegean Region	229	10.9
Black Sea Region	187	8.9

The demographic data in Table 1 shows that 68% of the participants were female (n=1430) and 32% (n=673) were male. Among these teachers, those between 31-35 years of age ranked the highest in percentage (24.3%) and this was followed by teachers between 26-30 years of age (22.8%). Only 4.8% of these actively working teachers were 50 years old or more. In terms of the department from which they graduated from university, a great majority of them were English Language Teaching (ELT) graduates (73.9%, n=1555), followed by English Language and Literature (ELL) graduates with 17.8% (n=374). The rest of the teachers graduated from departments such as American Language and Literature (ALL) (2.5%, n=52), Linguistics (1.5%, n=31), Translation studies (1.2%, n=25) and other departments, for example, classroom teaching (3.1%, n=66). Regarding the school at which they worked, secondary school teachers ranked first (46.6%, n=980) and teachers working in high schools ranked second (38.7%, n=813) while primary school teachers comprised 13.1% (n=276. A great majority of the participants worked in cities (44.7%), counties (41.3%), and 14% of them worked in rural villages. As the final demographic variable, the participant teachers in this study were employed in all seven geographical regions across Turkey (Marmara Region, 26.8%, n=564; Central Anatolia, 18.1%, n=380; South-Eastern Anatolia, 13.1%, n=276; Eastern Anatolia, 11.6%, n=243; Aegean Region, 10.9%, n=229; Mediterranean Region, 10.7%, n=224; and Black Sea Region, 8.9%, n=187).

Data Collection Tools

The quantitative data used in this study were gathered via a job satisfaction survey and teacher emotions inventory. The qualitative data were gathered using an opinion form. Firstly, to collect participant data, a teachers' personal and professional information form was constructed (see variables in Table 1). Next, to assess the level of teachers' satisfaction with teaching English as a profession, the Job Satisfaction Survey (JSS) developed by Spector (1985) was administered in English. On this scale, there are 36 items to assess nine facets of job satisfaction. In addition to measuring these nine facets, the survey was also designed to reveal overall satisfaction with their job. The JSS is utilized in many fields of work life but it is also preferred in the field of education to measure teachers' job satisfaction since it encompasses not only the major facets but also detailed facets of work life in terms of satisfaction. The JSS contains 19 negative items and 17 positive items which offer six response choices ranging from "Disagree very much" to "Agree very much" (Spector, 1997).

To collect data regarding the participant teachers' emotions, the Teacher Emotion Inventory (TEI) developed by Chen (2016) was used. The 26-item TEI involves 5 factors of teacher emotions consisting of two positive emotions including joy (7 items) and love (4 items) and three negative emotions of sadness (4 items), anger (4 items) and fear (7 items) (Chen, 2016, 2019a). Items in the inventory were evaluated based on a 6-point frequency response scale ranging from "never" to "almost always". Atmaca et al. (2020) clarified that the TEI is a promising data collection tool to be used regarding education in Turkey. Thus, it was used in this study as a valid and reliable data gathering tool to measure English language teachers' emotions.

Following the quantitative analysis of the JSS and TEI data collected from 2103 participants, a set of both open-ended and semi-structured questions addressing English language teachers' job satisfaction and their teaching emotions was pooled, and after consulting three experts in the field of foreign language education in three different universities in Turkey, a total of 13 questions were selected in the final step.

Data Collection Procedure and Data Analysis

For gathering the quantitative data, initially, the questions in the personal and professional information form and the items in the JSS and TEI were transferred to a digital platform and with the help of the Ministry of National Education (MoNE), the online tool was distributed to every school across the country in the fall term of 2019-2020 teaching year. The process of data gathering took place around three months and at the end of December 2019 the process was completed.

For analysis of the data, an initial reliability check for the data collection tools was conducted and the reliability coefficient for the JSS was found to be. 89 and for the TEI, Cronbach's alpha coefficient was .78, which showed that both tools were reliable. Next, the normality of the distribution of data was checked making use of Skewness and Kurtosis coefficients (See Table 2). Since data were normally distributed, further analyses were conducted. To measure teachers' job satisfaction levels in predicting their teaching emotions, Pearson product-moment correlation coefficient was run to find out if there was a relationship between the independent and dependent variables. Other than this, taking each emotion type into account, 5 different models were created and tested making use of regression analysis in SPSS 20.

The survey form distributed to the teachers had a question which asked participants whether they would also participate in the qualitative part, and 145 teachers who agreed to participate were sent an online opinion form with 13 open-ended and semi-structured questions. The qualitative data were analyzed utilizing theoretical coding consisting of open, axial, and selective coding. The data were coded, thematically grouped, and common themes and categories were identified and formulated as specified by Kolb (2012).

Findings of the Study

Depending on the analysis of the quantitative data, the total sum of teachers' job satisfaction and each teacher emotion type (joy, love, sadness, anger, fear) were computed for correlation at .01 significance level, as seen in

Table 2. The relationship between job satisfaction and teacher emotions

Variables	Mean	Std. Deviation	Skewness	Kurtosis	1	2	3	4	5	6
1.Job Satisfaction	121.20	23.01	-0.02	0.43	-	,110**	,228**	,290**	,274**	,381**
2. Joy	27.50	3.04	-1.34	1.26		-	,552**	-,142**	-,171**	-,120**
3. Love	26.99	3.02	-1.18	1.19			-	-,153**	-,154**	-,083**
4. Sadness	9.43	3.74	0.87	0.66				-	,636**	,471**
5. Anger	9.44	3.58	0.86	0.75					-	,494**
6. Fear	14.72	5.22	0.34	-0.07						-

Table 2 contains descriptive statistics for the variables used in the study (average, standard deviation, Skewness and Kurtosis). Pearson correlation analysis was applied to test the relationship between these variables. According to the correlation analysis result, there is a statistically significant and positive relationship between job satisfaction and some teacher emotions, namely, joy ($r=0.110$, $p<0.01$) and love ($r=0.228$, $p<0.01$). In terms of the relationship between job satisfaction and negative teacher emotions, it is surprisingly to see that there is a statistically significant and positive relationship between job satisfaction and sadness ($r=0.290$, $p<0.01$), anger (0.274, $p<0.01$) and fear ($r=0.381$, $p<0.01$). This is one of the most significant findings of this study; showing that English language teachers' job satisfaction levels are positively related to negative teacher emotions.

There is a positive relationship between joy and love ($r=0.552$, $p<0.01$), a negative relationship between joy and sadness ($r=-0.142$, $p<0.01$), anger (-0.171, $p<0.01$) and fear ($r=-0.120$, $p<0.05$). A statistically significant and negative relationship exists between love and sadness ($r=-0.153$, $p<0.01$), anger (-0.154, $p<0.01$) and fear ($r=-0.083$, $p<0.01$). There is a statistically significant and positive relationship between sadness and anger ($r=0.636$, $p<0.01$) and fear ($r=0.471$, $p<0.05$). Finally, a statistically significant and positive relationship was found between anger and fear ($r=0.494$, $p<0.05$).

In order to check whether job satisfaction predicted teacher emotions significantly, a stepwise multiple regression analysis was used; the results of which are shown in Table 3 below. Stepwise regression analysis aimed at determining which emotion types were significantly predicted by job satisfaction and how much these variables explained the total variance. In the analysis, five different models were created and tested for job satisfaction predicting joy, love, sadness, anger, and fear.

Table 3. Regression analysis results about job satisfaction predicting teacher emotions

Model	Joy	B	SE	β	t	p	R	R^2	F	P
1	Stable	25.739	.356		72.367	.00	.11	.01	25.265	.00
	Job Satisfaction	.014	.003	.110	5.026	.00				
	Love									
2	Stable	23.362	,346		67.582	.00	.22	.05	114.350	.00
	Job Satisfaction	,030	,003	,228	10.693	.00				
	Sadness									
3	Stable	4.279	.405		10.565	.00	.27	.07	168.479	.00
	Job Satisfaction	.043	.003	.274	12.980	.00				

	Anger									
4	Stable	3.727	.421		8.861	.00	.29	.08	190.742	.00
	Job Satisfaction	.047	.003	.290	13.811	,00				
	Fear									
5	Stable	4.235	,568		7.461	.00	.38	.14	353.771	.00
	Job Satisfaction	,087	,005	,381	18.809	.00				

In the stepwise regression analysis, models consisting of teacher emotions were added to the existing one and a total of five models were tested. As Table 3 shows, the initial stepwise analysis was run to investigate the extent to which English language teachers' job satisfaction predicted "joy" as the teacher emotion. According to the results, the established model is statistically significant ($F=25.265$; $p<0.01$) and teachers' job satisfaction accounted for 1% of the total variance in terms of teacher emotions based on joy ($R=0.11$, $R2=0.01$). Thus, findings show that job satisfaction significantly predicts "joy" as a teacher emotion ($t=5,026$, $p<0.01$).
In the second model, love as a teacher emotion was added to Model 1 and the variance in teachers' job satisfaction predicting teacher emotions rose from 1% to 5% ($R=0.22$, $R2=0.05$). It is also seen that Model 2 is statistically significant ($F=114.350$; $p<0.01$), and the beta coefficient value, t value and significance level of the independent variable show that job satisfaction significantly predicts the "love" factor as a teacher emotion ($t=10.693$, $p<0.01$). This is also shown in the correlation analysis, which reveals a positive relationship between job satisfaction and the love aspect among teacher emotions ($\beta=0.228$).

In the third model, sadness as a teacher emotion was added to the previous models as predicted by teachers' job satisfaction. The results of this model show that the variance in predicting teacher emotions increased from 5% to 7% ($R=0.27$, $R2=0.07$). Based on these results, a significant regression equation was found ($F=168.479$; $p<0.01$) which shows that the established model is statistically significant. Also, considering the beta coefficient value, t value and significance level of the independent variable, job satisfaction significantly predicts sadness ($t=12.980$, $p<0.01$). There is a positive relationship between job satisfaction and sadness, and this was supported by correlation analysis ($\beta=0.274$).

In model 4, job satisfaction predicting anger as a teacher emotion was tested. Based on the regression analysis, the established model is statistically significant ($F=190.742$; $p<0.01$). As the beta coefficient value, t value and significance level of the independent variable show that teachers' job satisfaction is statistically significant in predicting anger as a teacher emotion ($t=13.811$, $p<0.01$), which was also shown in the correlation analysis, suggests that a positive relationship between job satisfaction and anger exists ($\beta=0.290$). Added to the previous models, Model 4 yielded an R2 of 0.08, accounting for the total variance.

In the 5th and final model, how much job satisfaction predicted fear as a teacher emotion was examined. When the regression analysis results are investigated, it is seen that Model 5 is statistically significant ($F=353.771$; $p<0.01$). It is also evident that job satisfaction predicts fear as a teacher emotion in a positive way ($\beta=0.381$). $t=18.809$, $p<0.01$). In fact, nearly 14% of the total variance of teacher emotions was explained by teachers' job satisfaction ($R2=0.14$) when fear as an emotion was added to the previous models.

Qualitative Findings of the Teacher Opinion Form

In order to explain and gain an insight into teachers' job satisfaction in predicting teacher emotions, participant teachers were asked in the opinion form used as a data collection tool for the qualitative part what factors increased their satisfaction with their job and which emotions they felt under certain circumstances. The data collection form was in Turkish so that the respondents would express their emotions and satisfaction related cases as much and clearly as possible. Their responses were analyzed, and recurring themes and categories were identified, as Table 4 shows below.

Table 4. Factors affecting teachers' job satisfaction and associated emotions

Theme	**Categories**	**%**	**n**	**Associated Emotions-Positive**	**Associated Emotions-Negative**

	Student learning/growth	91.7	133	-happiness -satisfaction -joy -love -motivation -excitement	-disappointment -frustration - sadness -anger -fear
Factors increasing and decreasing teachers' job satisfaction	Teachers' feeling of efficacy	75.8	110	-happiness -love -joy -surprise	-disappointment -sadness -anger -fear
	Working conditions	63.4	92	-love -joy	-sadness -fear -anger
	Concerns regarding administration, families and society	55.8	81	-happiness -love	-anger -sadness -fear -disappointment

As Table 4 shows, the factors affecting teachers' job satisfaction were grouped under four major categories based on their responses in the opinion form. It is worth emphasizing here that these factors are associated with both positive and negative emotions, as reported by the participants as seen in Table 4.

Regarding the factors that job satisfaction was linked with, the most commonly mentioned aspects by the participants (91.7%, n=133) were students' learning and growth. Teachers' job satisfaction was heavily influenced by their students' attitudes, willingness, and endeavors to learn the language. A great majority of the participants (72.4%, n=105) stated they especially loved the teaching profession upon students' interacting with them and their peers in English in the classroom. Yet it was also reported that students' negative attitudes towards learning the language, as well as their negative relationships with the teacher, caused dissatisfaction with their job. To exemplify, "when my students are reluctant or resistant to learn English, I feel unmotivated to teach. In such cases, I feel helpless and this deteriorates our relations with the students." (T3). Some teachers (29%, n=43) also claimed that classrooms where disruptive students outnumbered the supportive ones made them feel dissatisfied and reluctant to teach in such classes. On the theme of student learning/growth, positive emotions included happiness, satisfaction, joy, love, motivation and excitement while the negative ones were disappointment, frustration, sadness, anger and fear. Regarding this, teachers explained that they could feel these emotions quite often in an interchangeable way within one day at school, which is among the significant findings of this study showing that teachers' emotions vary considerably from positive to negative within a day at school. To illustrate, T13, T43 and T80 stated that when a class with high achievers makes them happy and motivated for teaching, combined with love, a class with disruptive students caused anger and fear. T13 said that "I am satisfied with my job and love it… Although I feel sadness in a class with mostly unsuccessful students, when an unsuccessful student accomplishes a task successfully, this suddenly makes me very happy. The same is also true for high achieving classes." This shows that teachers experience both positive and negative emotions frequently depending on the students in different classes and their emotions are mostly transitory.

Based on the analysis of teachers' responses, it is seen that teachers' feeling successful and self-confident in their job contributes to their satisfaction, which was gathered under the theme of teachers' feeling of efficacy (75.8%, n=110). They reported both positive and negative aspects increasing and decreasing their satisfaction. To illustrate, one of the teachers (T5) stated, "My attachment to my job increases whenever I see my contributions to my students' life; for example, if they pass the university exam to become English teachers, I feel successful." Another teacher (T32) similarly added that "if my teaching turns into something useful for my students, my satisfaction increases." On the other hand, factors such as students' failing in exams and not reaching the intended gains were reported to make teachers feel ineffective or inadequate as an aspect decreasing teachers' job satisfaction. In this regard, T10 and T24 reported that they felt satisfied when they could teach something to their students, but students' failures in the courses or their seemingly slow pace of progress made them feel ineffective in their job. When their emotions on this aspect are considered, happiness, love, joy and surprise as positive emotions, and disappointment, sadness, anger, and fear as negative emotions were mentioned by the participants. To exemplify, similar to T5 above, T93 explained in detail that "exams are very important for my students. I feel anxious and fearful that they may fail in the university exam. Thus, I try harder for them and seek new ways to teach better, which also makes me quite happy in my teaching. Their

passing the exams makes me feel satisfied". Thus, it is seen that teachers' job satisfaction is related with their own appraisals of the teacher-self, accompanied with various emotions.

Other than these aspects, teachers' working conditions involving issues such as income, class hours, quality of teaching programs, assessment system, educational policy in Turkey and the physical infrastructure of the school and classrooms were each reported by the teachers as factors affecting their job satisfaction bidirectionally. Containing a number of diverse issues within the theme of working conditions (63.4%, n=92), the data analysis revealed that the teachers' satisfaction with their job was also determined by some unconnected factors which affected the teaching and learning process either directly or indirectly, unlike the previous themes. For example, school infrastructure and teachers' income may not be directly related to each other but separately they increased or decreased their job satisfaction. Specific examples can be provided based on teachers' responses; "My satisfaction with my job decreases when I work in crowded classes, since classroom management is very challenging in such classes. This year I requested to work in rural schools because there are fewer students in rural settings." (T36). Similarly, another teacher stated that "education policies in Turkey change frequently and we as teachers are expected to be flexible enough to adapt to these changes. The idea that we will face new policies in education affects me negatively and makes me feel hopeless." (T11). The emotions for this theme were reported as joy and love for positive emotions, and sadness, anger, and fear for negative ones. Again, in this theme, the temporary feature of teacher emotions was emphasized as a finding. One of the teachers (T102) stated that "I am happy with my job, but I teach several hours a week teaching all levels from 9th to 12th grades and this stresses me out, arousing both anger with the administration and sadness for my situation."

The final theme drawn from the qualitative data for job satisfaction was "concerns regarding administration, families and society". Teachers highlighted in particular that school administration played a central role in the job satisfaction of teachers. Quite a lot of teachers (55.8%, n=81) emphasized that they were not treated equally by their school administrators and this caused reluctance to be fully involved in teaching activities and school tasks. T7 stated that "I enjoy being in the classroom and teaching my students, and I do not want to go out of the class because I feel discriminated in a negative way." Likewise, T31 stressed that "I enjoy being with my students in the classroom, but the school administrations' negative behaviors make me feel nervous. I learned to cope with this emotion, so this does not affect me in terms of job satisfaction." At the same time, teachers also emphasized that the expectations of the students' families from teachers and their attitudes towards teachers affected teachers considerably, nurturing satisfaction or dissatisfaction. Regarding this, "…although I love my profession and have good relations with my students, families have unrealistic expectations and they put pressure on me due to the exam-based education" (T34). Similarly, T25 stated that "the exam system in Turkey keeps all the teachers alert and families expect a lot from us, and this makes me angry." On the other hand, T6 explained that "when I am respected by my students and their families, I always feel good". As the last aspect of this theme, receiving support and acceptance by the community was reported to be a factor influencing teachers' job satisfaction and T15 wrote that "generally, in rural places we are supported by the local people and they value us a lot, which increases my satisfaction, but this is quite the opposite in cities." Teachers reported happiness and love as the positive emotions and anger, sadness, fear and disappointment as the negative emotions in association with the theme of concerns regarding administration, families and society.

All in all, the findings show that teachers' job satisfaction is positively correlated with both positive and strikingly negative emotions. The regression analysis showed that job satisfaction predicts teacher emotions but to a limited extent, only 14% of the total variance. The rest of the variance calls for explanations that require further research. The qualitative data showed that a number of themes were identified with teachers' job satisfaction. Thus, based on the findings as reported by participants, job satisfaction is not associated only with positive emotions because while teachers were satisfied with their jobs, a number of negative emotions were still experienced.

Discussion

Teacher emotions have attracted the attentions of researchers (Atmaca et al., 2020; Chen, 2019b; De Costa et al., 2018) since they are related to various aspects in terms of teacher performance, student success, teachers' personal well-being and communication in the school environment, and so on. Similarly, teachers' job satisfaction, as with teacher emotions, provides increased teacher performance and attachment, more student success, teacher well-being, better organizational outcomes, and other positive outcomes. However, studies generally address a linear understanding for teacher emotions predicting the teachers' job satisfaction. Surprisingly, no studies focused on whether teachers' job satisfaction predicted various teacher emotions. Thus,

this study set out to understand how English language teachers' emotions are predicted by job satisfaction and the findings of the study revealed significant and novel findings which contribute to the literature.

One of the general findings of this study is that teachers' job satisfaction and teacher emotions are related constructs. Atmaca et al. (2020) also found in their study that teacher emotions and job satisfaction were correlated constructs, supporting the findings of this study. The findings of the present study show that job satisfaction is positively correlated, not only with positive emotions, but surprisingly, with negative emotions too. The existing literature has focused on teacher emotions predicting job satisfaction and several studies indicated that positive teacher emotions would have a positive correlation with their job satisfaction (Buonomo et al., 2020; Chen, 2019b; Hagenauer et al., 2015; Ignat & Clipa, 2012; King & Chen, 2019; Nalipay et al., 2019; Rodrigo-Ruiz, 2016). In this respect, it was found that teacher emotions predicted teacher job satisfaction in various aspects (Atmaca et al., 2020). Atmaca and her colleagues (2020) found that positive teacher emotions were linked to higher job satisfaction. In particular, it was found that the love and joy aspects of teacher emotions predicted teachers' job satisfaction in a positive way. Additionally, negative emotions of anger and sadness were not significantly correlated with job satisfaction. In another recent study which focused on teacher emotions and job satisfaction, Buonomo et al. (2020) also indicated that teachers were more satisfied with their jobs when they minimized their negative emotions and adopted positive emotions. Notably, Atmaca et al. (2000) found that fear as a negative teacher emotion predicted job satisfaction in a positive way, which supports the current findings. It can be concluded here that job satisfaction has a relationship with negative emotions, too. However, this needs clarification with further studies. The qualitative findings of this study provide a significant insight into this controversial issue. It was found that job satisfaction is a more constant construct, unlike emotions. Teachers' reports showed that although they were satisfied with their job, they experienced various emotions within the teaching profession. This may be attributed to the dynamic and episodic features of emotions. Based on the finding that job satisfaction predicts both positive and negative emotions, it can be claimed that job satisfaction has a more stable nature, and due to the labile nature of emotions, job satisfaction may predict various emotion types.

When the results of regression analyses are considered, this study revealed that teachers' job satisfaction predicted teacher emotions significantly, explaining various aspects of emotion types. In particular, teacher job satisfaction predicted positive emotions, namely, both the joy and love aspects of teaching. Regarding this, job satisfaction explained 1% of joy and 4% of the love dimension of teacher emotions. The joy aspect is linked with support and positive interactions with students, families, colleagues and the administration. Thus, although statistically significant, job satisfaction contributes comparatively little to the joy aspect of teaching. This can be explained by the fact that the focus of the joy factor among teacher emotions is dependent mostly on teachers' relations with their students (Chen, 2019a). Thus, job satisfaction explains a small proportion of teachers' positive relations with their students or colleagues, which indicates that job satisfaction has little to do with joy aspect. As Rodrigo-Ruiz (2016) states, the joy aspect of teacher emotions is most prevalent in teaching. It is seen that job satisfaction predicts this aspect, but to a very limited degree, indicating that job satisfaction does not necessarily mean teachers have a completely positive relationship with students, families and colleagues. Also, this may be attributed to another factor; the atmosphere in one class may be different in another class, thus a teacher may experience joy in certain classes but not in others.

In terms of job satisfaction predicting the love aspect of teacher emotions, job satisfaction explained 5% of joy and love as teacher emotions. The love aspect consists of issues regarding social acceptance in terms of receiving respect and recognition as well as positive attributions stemming from the nature of teaching and contributing to student growth. Teachers' love of teaching involving these issues is explained by their satisfaction with teaching as a profession. In studies aimed at investigating teacher emotions predicting job satisfaction, it was found that the love aspect predicted teachers' job satisfaction since the prestigious status of the teaching profession contributed to teacher motivation (Atmaca et al., 2020). As pointed out by Atmaca et al. (2020), since teachers in Turkey are extrinsically motivated due to their social status, permanent work contract and off days as well as holiday periods, this contributes to their job satisfaction. As Chen (2019) explained, the love aspect of teacher emotions is related to passion for teaching, and the love aspect of teacher emotions is reflected by their satisfaction with the teaching profession. Thus, this study validates that while positive emotions predict teacher job satisfaction, as supported by other studies (Buonomo et al., 2020; Chen, 2019b; Hagenauer et al., 2015; Ignat & Clipa, 2012; King & Chen, 2019; Nalipay et al., 2019; Rodrigo-Ruiz, 2016), the job satisfaction of teachers also predicts positive teacher emotions, namely, the joy and love dimensions.
One of the most remarkable findings of this current study is that teachers' job satisfaction is a predictor of negative teacher emotions of sadness, anger and fear. These negative emotions were concerned with policy changes, unequal treatment, competition among colleagues and social pressure on teachers (Chen, 2016). In addition, qualitative data revealed that students' failures and disinterest in English also created negative

emotions such as sadness, or the teachers' feelings of inadequacy in teaching caused anxiety. Thus, negative emotions are more influenced by sources stemming from student learning failures, teaching anxiety, workload, system-related restrictions, and more importantly, the pressure and expectations of parents. Based on the findings of the present study, job satisfaction predicts sadness by 7%, anger by 8% and fear by 14%.

Regarding sadness, students' underperformance, or not taking responsibility for their learning and tasks as well as activities, is one cause. In fact, Chen (2019) explained that there are three major predictors of teacher emotions: knowledge transmission, student-teacher interaction, and student focus. The sadness aspect is linked totally to knowledge transmission-related issues; thus, when teachers have difficulties in transmitting knowledge to their students, they feel sad, which is also predicted by job satisfaction. This may also be due to teachers' seeking ways to compensate this gap and trying to find new ways of transmitting knowledge to students, which turns out to be a contributor to job satisfaction. As Rodrigo-Ruiz (2016) stated, sadness on the part of teachers has a positive effect on students while being accompanied by anger.

As the findings of this study show, teachers' job satisfaction also predicts another negative teacher emotion, the anger factor, which is related to negative student attitudes and relations with teachers, unfair treatment of the teachers based on pay and appraisal in addition to a public bias towards teachers (Chen, 2019). It seems that job satisfaction predicts the anger factor, accompanied by sadness, both of which are explained by similar percentages in terms of job satisfaction. In fact, the anger dimension of teacher emotions is related mostly to knowledge transmission and student focus. This indicates that in order to maximize teaching efficiency due to student failure, negative attitudes and public bias, teachers feel anger, and this urges them to struggle more for their profession to balance these negative aspects. Contrary to this finding, most studies link anger and other negative teacher emotions with teacher burnout (Fried et al., 2015). On the other hand, Hagenauer et al. (2015) state that it is the quality of the teachers' relationship with their students, namely, closeness, that changes teacher emotions from joy to anger. In some classrooms, teachers may experience joy while they may be angry due to students' attitudes in another classroom. Trying to balance this situation by increasing their devotion to students and student outcomes, teachers' sadness turns into anger, which is reflected in their job satisfaction.

Finally, the most surprising finding of this study is that job satisfaction predicts the fear dimension of teacher emotions. In fact, this finding is valuable and novel in the field of educational research because although fear is regarded as a negative emotion, it seems to have a bidirectional effect acting both as an independent and dependent variable for job satisfaction. In spite of having a negative dimension linked to teacher burnout, fear also has positive consequences in terms of stimulating motivation and invigorating organizational changes and interpersonal relations (Thomas, 2014). This is explained by the projection motivation theory, indicating that individuals in organizations have to cope with sources of fear and change this emotion into a base operating system for the better. However, for fear to be used as a weapon in the workplace, individuals need to have coping strategies which aid chance and motivation (Thomas, 2014). The qualitative data of this study also revealed that teachers applied coping strategies to minimize negative emotions. This may also be attributed to emotion regulation applied by teachers in their profession. It is known that teachers make use of several emotion regulation strategies (e.g., hedonic regulation) to control their negative emotions for increasing teaching effectiveness (Taxer & Gross, 2018). Thus, teachers' emotion regulation strategies may be studied for a deeper understanding of this predictive effect. A similar finding regarding fear is found by the study of Atmaca et al. (2020), which focused on teacher emotions predicting job satisfaction, which tackles the opposite side of the focus of this study. In their study, the fear factor predicted teacher job satisfaction in a significant way; explained by the notion that students' dissatisfaction, family pressure and a higher level of expectations from teachers accompanied by a heavy workload become emotionally demanding for teachers. Indeed, frequent educational reforms and exam-based educational policies in Turkey (Erarslan, 2018) may contribute to teachers' negative emotions, mostly the fear factor, as this study shows. Thus, this study shows that English teachers in Turkey feel stressed and under pressure because of various factors, as the fear dimension exhibits, but this results in a positive aspect regarding job satisfaction. It can be concluded that the fear dimension of teacher emotions may be contributing to their profession, as predicted by their level of job satisfaction.

All in all, investigating job satisfaction as an independent variable in predicting various teacher emotions, this study has a number of remarkable findings. The correlations upon which the regression models are based are statistically significant, but generally weak. Based on the findings, it is possible to conclude in general that job satisfaction is not only correlated with positive teacher emotions, but also with the negative emotions of sadness, anger and fear. Contrary to general expectations, both positive and negative teacher emotions are predicted by teachers' job satisfaction. This may be due to the spiral nature of teachers' emotions (Lavy & Eshet, 2018) stemming from workplace psychology, which may have a ripple effect in terms of teacher emotions. Also, the teaching profession itself and schools as the workspace of teachers can cause various effects on them. Generally, it is thought that schools as educational organizations are shaped by individual attributions of the teachers, yet this study reveals that teachers may also be affected in terms of their emotions by work-related conditions. It is natural that teachers' emotions are affected by students, their parents, attitudes towards teachers and teaching profession, and policy changes in the same vein. Atmaca et al. (2020) also state that the same conditions may be

motivating or demotivating for teachers, and therefore affect teacher emotions. Hence, job satisfaction may also be related with negative teacher emotions. As Šedová et al., (2017) also put forward, negative teacher emotions are observed to trigger teacher performance, and learning could be supported by negative emotions since they stimulate teachers for the better in terms of the efficiency and effectiveness of their profession. At the same time, it can be concluded that teachers' emotions are temporary as experienced at opposed poles within short periods of time in a teaching day. It may be stressed that permanent or long-term positive emotions may predict job satisfaction or negative ones may predict burnout; yet as this study shows, job satisfaction predicts teacher emotions but to a limited extent (14%) due to episodic features of emotions.

Limitations of the Study

This study has a number of limitations. One is the TEI survey factors; the study is limited to five emotions although qualitative date yielded other emotion types. Also, the aim of this study was to reach the highest number of participants who were actively working as English teachers in state schools in Turkey. For this reason, the study is limited to participants working in state schools because it is possible that teachers' job satisfaction and emotions are different from those in private schools, due to working conditions. The study findings are limited to the data collected using quantitative and qualitative means. These limitations may be dealt with in future research studies.

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How Gifted Primary School Students Make Sense of the Definition, Purpose and Process of Observation

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How Gifted Primary School Students Make Sense of the Definition, Purpose and Process of Observation

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Abstract

This study examines how gifted primary school students define observation, whether they know the purposes of observation and how they manage to perform it. A qualitative study was designed to thoroughly examine the observation process of 16 gifted students and determine the factors affecting the process. The focus group meetings were analyzed with the students' pictures and the field notes obtained during their observations. The results indicated that when examining the students' behaviors in the observations instead of what they observed, they draw what they already know. Most of the students used the word "to examine" when defining "observation." Additionally, the students' drawings before the observation were relatively simple and did not have enough details about living beings. Besides, the second-grade students describe observation from a broader perspective, and their observation examples from their past experiences are short-term and object-based. The students also showed differences regarding their grade level in their opinions about which sense organs should be included in the observation process.

Key words: Observation, gifted students, primary science education, scientific process skills

Introduction

Observation is regarded as a process of determining an object's characteristics or event precisely, in a planned, systematic and generally empirical way by creating literary data. Observation is a primarily cognitive activity involving all the senses (Tomkins & Tunnicliffe, 2001). Apart from scientific observation, living beings make observations to understand their environment and regulate their relationships with other living things (Millar, 1994; Rogoff, Paradise, Mejia Arauz, Correa-Chavez & Angelill, 2003).

The indispensable factor for practical scientific observation is consciousness, one of the crucial differences between looking and observing (Tan & Temiz, 2003). Observation is considered a skill that students superficially acquire since teachers generally cannot raise awareness of observation skills (Haslam & Gunstone, 1996). In other words, students mainly cannot become competent in observation skills (Swinehart, 1987; Chinn & Malhotra, 2001). In the drawings students make or in the notes they keep during the observation process, they depict/write what they know, not what they observe, and they do not give the necessary importance to the observation process (Park & Logsdon, 2015). Teachers may also consider activities to improve observation skills as a waste of time (Tomkins & Tunnicliffe, 2001). It is known that teachers do not observe their students and classroom interactions sufficiently and, mostly, do not take advantage of observing students enough (Jablon, 2010). However, teachers need to consider the possible positive effects of practical observation skills on students and their potential to develop their instruction (Grimm, Kaufman & Doty, 2014).

Useful observations are not conducted to determine properties such as color, length, shape, and size (Griffiths & Thompson, 1993). The purpose of valid observation is to explain observed objects or events in a holistic, detailed and accurate way (Bensusen, 2020). It may not be possible to obtain data by experimenting in some disciplines. More advanced data can be obtained through scientific and detailed observations in astronomy or evolutionary biology (Smith & Reiser, 2005). Thus, observation may turn into a critical data collection tool to generate scientific data.

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Thanks to efficient observations focusing on a scientific problem in different fields, even accidents can turn into essential products that result in significant profits (Ewing, 1936). However, it is very important to know what you are observing and to concentrate on the process. Perhaps, Claude Bernard's quote may be enlightening in this context:

"The observer who does not know what he is looking for will never understand what he finds out."

There are some rare incidents, but using your senses logically to understand the phenomenon is crucial. It is undeniable that valuable products can result from scientific processes, even by chance, with effective observation skills. Observation data is a substantial step in forming scientific data since more advanced data is obtained if accompanied by experiments, mathematics or another scientific method (Chalmers, 2013).

One of the general objectives of the several science education curricula prepared by the Ministry of National Education (MoNE) in Turkey is to improve students' scientific process skills (MoNE, 2005; MoNE, 2013; MoNE, 2018; Tabak & Çalık, 2020). Observation is one of the scientific process skills, and students must practice their skills and, thus, develop these skills (Park & Logsdon, 2015). Besides, observation is within the scope of Turkey's education program as science education programs of many countries worldwide. For example, in the 1996 report prepared by the National Research Council (NRC) in the United States, it is explicitly recommended that teachers should ask questions to get to know the environment better around their students and to motivate them to find logical answers to these questions by using observation (NRC, 1996). In the report prepared by the American Association for the Advancement of Science (AAAS) in 1994, it was emphasized that students actively observe, record, enrich their observations through different tools, eliminate bias in observations, and increase the validity of the data gathered from observations by making repeated observations (AAAS, 1994).

Observation is an essential skill for children to obtain data about their environment (Monhardt & Monhardt, 2006). The observation process can also be conducted by observing more than one object or event simultaneously. During the observation process, an object, event or living being can be observed. It is also vital that the object, event or living being can attract students' interests (Elmas, Akın & Geban, 2013). For example, it was found that students mostly prefer to make observations about the natural environment and the sky (Koyunlu Ünlü, 2018). Worsham (2007) asked his students to observe their dogs in his study.

In observation, more than one object can be observed at the same time. For example, a student who observes different types of fruit can take a mandarin orange, which they are familiar with, as a reference object, and write or draw the results of their observation by comparing other fruits they have observed (Checkovich & Sterling, 2001, Oğuz-Ünver & Yürümezoğlu, 2009). A reference object can help children make a more detailed observation as it enables them to focus more on similarities and differences. Also, using a reference object can eliminate the problem of misknowledge that may always cause problems in observation, overshadowing the observation's objectivity since a student observing the observed object and the reference object will focus more on the related differences and similarities (Park & Logsdon, 2015).

The observation process and its results might be shared with other students in groups, and the process is pursued as a group work so that students can acquire some skills such as peer learning (Bodner & Elmas, 2020; Martínez, Bannan-Ritland, Peters & Baek, 2011). Students can explain the aspects of the observed object or event and why they focus on it in group discussions. It is also possible that students who observe the same object and event may draw different conclusions from the same observation. In such a case, re-observations may be requested several times. It should be noted that inferences and results may change, but observation data generally do not (Checkovich & Sterling, 2001). Students who are asked to make inferences from their observation data should be provided sufficient time and the opportunity to examine and interpret the observation data. Students that have examined and interpreted the data thoroughly may have new questions, and they may form connections between their schema and data. Thus, they can gain new knowledge and experiences, notice differences and patterns, and comprehend relationships between these concepts in detail (Oğuz-Ünver & Yürümezoğlu, 2009). Students might present evidence of the results they accomplished for valuable feedback. Evaluating and discussing students' different results from their observations will also support learning the difference between observing and making an inference. Another benefit is that they can form new research problems by utilizing new data and experiences gathered from observations (Swinehart, 1979).

Observation is often confused with inference. Inference can be defined as a skill to make statements about past events' results (MoNE, 2005). Observation and inference are closely related skills. Inferences can be made

through data based on observation. In other words, observation is a prerequisite for making inferences (Aksoy, 2019; Gürsel-Arslan & Temiz, 2004). For instance, it can be associated with observation skills when a student states that the leaves are yellow in Autumn and smell differently from the Spring. On the other hand, explaining the reason for these changes (e.g., the arrival of Autumn or cooling season) can be attributed to inference skills.

Unlike common perception, observation is not a basic means but a comprehensive process through which detailed data is obtained. Therefore, observation is far more than seeing. Furthermore, the observation process may be affected by the observer's past experiences, prejudices, psychological state, level of knowledge about the subject and similar factors beyond collecting information through the senses (Driver, 1983; Haslam & Gunstone, 1998; Haury, 2002). Thus, the detailed data obtained in the observation may better understand the observed object and event. Conducting this comprehensive observation process using an observation guide will make the process more systematic. Therefore, a guide can support students in making practical observations (Checkovich & Sterling, 2001; Swinehart, 1979). Such a guide provides students with the opportunity to make effective observations from an early age. Students can use this guide until they can acquire effective observation skills as a behavior. Besides, students can be directed to discussion based on the data they have obtained during their observations. Thus, students can produce strong arguments, which can also encourage students to have more informative discussions.

Superficial observation is a skill that students quickly acquire. Teachers' task is to support their students to improve to observe more comprehensively (Tan & Temiz, 2003). To develop students' observation skills, teachers should know how their students perform their observations and analyze students' problems while observing. Class activities can offer meaningful opportunities to examine how students make their observations.

It is essential to develop students' observation skills. Thus, this study aimed to investigate how gifted students define observation, whether they know the purposes of observation and how they manage the observation process. Research problems of the current study are stated as follows:

1. How do primary school gifted students define observation?
2. For what purposes do primary school gifted students observe?
3. How do primary school gifted students manage the observation process?

Method

Research Design

This study is qualitative and aims to thoroughly examine a group of students' observation process and determine the factors affecting it. It is a case study as it is conducted with a particular group of students who are expected to fulfill the tasks within the study's scope (Patton, 2014). This study examines students' experiences and inferences on a three-step process due to observing an earthworm and a leaf.

Participants

Participants were 16 gifted students studying in different primary schools in Afyonkarahisar province, Turkey. Gifted students have significantly higher competence than their peers in self-expression, motivation, and having a different perspective (Tomlinson, 2014). The high ability of gifted students to express themselves and explain their observations in detail in the focus group meetings was essential in selecting research participants. In addition, students were selected from different age groups in order to examine students' observation abilities according to grade levels. The general characteristics of the participants are provided in Table 1. In the results section, pseudonyms were assigned to the participants.

Table 1. Centre the caption above the table

Characteristics of Participants		Number
Gender	Female	8
	Male	8
Grade Level	2nd Grade	5
	3rd Grade	5
	4th Grade	6

The Physical Environment of the Study and the Implementation Process

The study was carried out in an institution serving gifted students in the province of Afyonkarahisar in the 2017-2018 academic years. Students attend a particular education program after formal education, including extracurricular activities, according to their characteristics. A wide range of educational materials such as robotic training sets, 3D printers and construction sets are used in this institution. Therefore, the students are familiar with such activities. Thus, students are expected to exhibit natural reactions towards the activities, supporting their observation skills in its nature.

The pilot study was conducted with 10 (Five students as two groups) students with similar characteristics to the main study participants. There is only one entity, the leaf, as an observation object. Based on the pilot study, the interview form was revised, and four new questions were added. Entities to be observed were also revised in order to relate the activity to real-life (a living being that can move was added; soil worm).

Students are currently studying in three different groups based on their grade levels in the institution where the study was conducted. This institution is providing only extracurricular support, and it is not working as a formal school. The extracurricular activity was implemented for students on different days in the same week. Since the groups did not interact with each other, students did not know or foresighted the activity. Besides, to enable the students to express their ideas more efficiently, the researcher, who the students had previously recognized, was more actively involved in all stages of the study.

Prior to the activity, a focus group meeting was held to examine how the students perceived observation and how they performed it. After the interview was completed, a short break was taken to get the students' feedback and prepare the activity tools, and then the activity started. In the first step of the activity, students were given identical stationery materials, including crayons. They were asked to draw a worm and a leaf on the same paper separately based on their previous observations (past life experience). In the second step, sufficient time was given to the students to observe a leaf whose details are exact and a living worm in Figure 1. After observing, students were asked to draw the leaf and worm on the paper. In the third step, they were expected to observe the same beings through a magnifying glass. Students were expected to draw for the last time after using a tool, and they completed the activity.

Figure 1. Entities observed in the activity

During the activities, the students were not guided on observation time and other factors. The students were allowed to observe the worm by handling it if they were willing to. Thus, the students had the opportunity to observe the movements of the worm. Meanwhile, the researchers took detailed field notes about the students' observation processes.

Figure 2. The activity processes

Data Collection Tools and Data Analysis

In the study, the focus group meeting was analyzed with the students' pictures and the field notes obtained during the students' three-step observation process. Source triangulation was achieved by using more than one source in collecting data, which increases the dependability (reliability) and credibility (internal validity) of the study (Patton, 2014).

At the end of the study, a data set consisting of three focus group interview records, 48 different drawings and field notes for 2nd, 3rd and 4th-grade levels were obtained. The focus group interview constitutes the primary data of this study, while students' drawings and field notes are supportive.

The focus group interview was conducted using a semi-structured interview form consisting of ten questions (Appendix 1). Also, the probe questions in the interview form were included to obtain more detailed information. During the interviews (with the consent of the students and parents) voice recordings were taken. All recordings were transcribed verbatim. Transcripts were examined thematically with content analysis.

In the content analysis, sentences were determined as a unit of analysis, and the data were coded by two researchers independently, and code lists were prepared. Then, consensus and disagreement were determined by comparing the two code lists. After a series of meetings, as a result of the calculation, the coding's reliability (agreement between researchers) was determined as 88% (Miles & Huberman, 1994). A sample of codes and themes were presented in Table 2.

Table 2. A section of the code list of the focus group study

Themes	Definition of observation (What is "observation"?)	Purposes of observations (What are the benefits of observation?)	Observation process (How is observation done?)
Codes	Look	to discover	by examining
	Examine	to learn by oneself	by looking
	Dream	to remember	by using a tool

Findings

The results were systematically stated in detail based on the research questions under the Definition of Observation, Function of Observation and Observation Process. While the statements of the students supported the findings, pseudonyms were assigned.

Results for the theme "Definition of Observation"

In the focus group discussion, the second-grade students mostly answered "What is observation?" using word groups. For example, Ece (second-grade) defined it as "I am thinking of seeing, examining, and visualizing in

the brain." Fatih (second-grade), on the other hand, defined it as "I am thinking of dreaming, examining and visualizing in my mind. "When it comes to third and fourth-grade students, they answered this question more clearly within one sentence. For example, Sinem (third-grade) defined observation as "Observation is to observe an entity.", and Asuman (fourth-grade) defined it as "Observation is to examine something in detail."

A significant number of students (12 out of 16) used the word "examine" when defining observation. On the other hand, three students summarized the observation as "envisioning" and two students as "looking." When the students were asked to explain these answers, for example, Mustafa (fourth-grade) explained, "Observation is to scrutinize the details of the entity.", and Zehra explained (fourth-grade), "Observation is to examine something by looking and researching for a long time." These explanations exhibit that some students are not successful enough to distinguish observation in daily life and scientific purpose, and they regard observation as looking and seeing. It can be said that they describe observation only as observing an object during their lessons, not as an essential step of a scientific process.

The field notes taken during the activity determined that the students observed the entities for a long time. It was determined that especially second and third-grade students observed the entities more than once at intervals. This result revealed that the students need a specific period so as to make a valid observation, and adequate time to ensure that the students can reach the observation objectives should be given to them. For the details to be comprehended, a mental activation is necessary. For this reason, the concept of time is a more critical matter within the context of seeing the detail and taking control of the process.

In the focus group interview, when the students' responses to the question "Give an example to an observation that you made before" were examined, it was seen that most of the second-grade students mentioned the word "examination" at this point. For instance, Bahar's (second-grade) response was: "…when I saw the worms in the soil, and I examined them for such a long time that I zoned out and did not even realize that my mother walked away."

In addition, it was determined that the observation experiences of the second-grade students were mainly short-term and object-focused, whereas those of the fourth-grade students were mostly process-driven. For example, Aysu (third-grade) explained her observation about tomatoes yielding from seeds, and Tarik (third-grade) explained his observation regarding the process of ants leaving their nests and finding food and carrying the food to their nests. The second and third-grade students exemplified their observation experiences mostly from natural events, while the fourth-grade students mostly exemplified their observation experiences from their school experiences. For instance, Batu (fourth-grade) explained his observation regarding the experiment they made at school about the changes in the structure of foods, whereas Akin (fourth-grade) explained the experiment by comparing the stone and sand they brought to the classroom.

At this point, it can be inferred that students mostly tend to observe the animals. It is seen that students mostly prefer to observe a living being rather than an object. Also, in general, they are more eager to observe a process rather than a standing object.

Please embed tables and figures in appropriate areas within the document and center them horizontally. Tables and figures should not exceed the given page margins. Provide captions (maximum length: 6 to 8 words) for each table or figure. Centre the caption above the table and below the figure. Please reference the table or figure in the text (Table1). Please do not use vertical lines in tables. For figures, GIF and JPEG (JPG) are the preferred formats.

Results of the Theme "The Purposes of Observation"

The student's response to the question "What is the purpose of making an observation?" is mainly related to obtaining data. Students also stated different purposes of observation. For instance, Sinem (third-grade) answered this question by saying, "In observation, the purpose is to follow the changes in something, and emphasized the process. Beyza (second-grade) answered the question by saying: "While making an observation, the purpose is to look closely at something and to recognize it." and Arda said: "The purpose is to explore new things." These answers indicated that students emphasized the role of observation in exploring things and tracking changes. However, students stuck to a definite group of purposes instead of a broader range of purposes of observation.

It was observed that students examined the living beings attentively by looking at them closely. When the drawings are examined, it can be determined that the drawings that they made after their observation with a

magnifying glass are more elaborate than the ones that they made before. For example, while they colored the living beings using only one color before the observation, they expressed color changes in the same living beings by toning and shading after the observation. Besides, they also emphasized the texture and some of the defects of living things, such as stains. Furthermore, it was observed that most of the second and third-grade students drew the worm with a smiling face before the observation, and their drawings were closer to reality after the observation with senses. The drawings of Sinem, a third-grade student, are provided as an example in Figure 3.

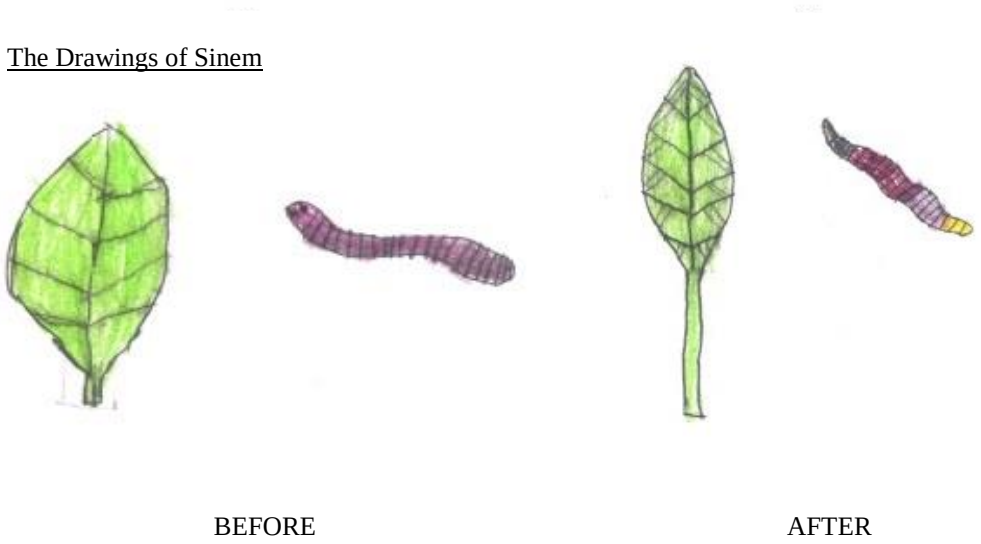

Figure 3. Examples to the drawings before observation and after the observation with the senses

In the focus group interview, students were asked, "Which creatures other than human beings make an observation? Explain with examples", to which they responded by exemplifying some survival activities of the animals such as hunting. Additionally, Akin, Arda, Batu and Asuman, who are fifth-grade students, also indicated that animals observe by using their sense of smell to recognize one another. For instance, Arda said: "…Seals kiss their newborn babies and leave a scent on them. Later on, they recognize them by that smell.".

Observation Process

When the students in the focus group interview were asked, "How is an observation made?" it is seen that twelve of them said "by looking carefully," three of them said, "by examining with a telescope or a microscope." One of them said, "by breaking into pieces."

The students were asked: "Is it necessary to prepare for observation?". It is seen that all of the second-grade students said it was "not necessary." In contrast, the other students said it was "necessary." Pre-observation preparations were explained by the students as "providing the tools, preparing the devices and selecting the place to make the observation".

To the question "Which sense organ/s do we use while making an observation?" four of the second-grade students responded as "eyes" while one of them responded as "eyes and ears." The third and fourth-grade students responded as "Observation is made with five sense organs." The field notes taken during the activity determined that most of the students, including the second-grade students, observed the living beings by touching them.

Students were asked: "What are the benefits of using more than one sense organ while making an observation?". Whereas the second-grade students could not answer at first, three students later responded as "We recognize the things that we cannot see clearly by touching them." and added, "That's how visually impaired people make observation…". The third and fourth graders stated that observing with more than one sense organ provides the opportunity to determine the details that cannot be detected in the observation made with one. For example, Mustafa explained this situation by saying: "We can recognize a small detail simply by touching, which we missed while looking."

When the students were asked: “Have you ever observed by using a tool so far?” four of the second-grade students said: “No,” while one student said: “Yes, I used a microscope.”. All the students in the third and fourth graders have used a microscope or a magnifying glass before. Students stated that they could better interpret the living beings in their observations by using tools. For instance, Arda expressed this situation by saying: “…when I observed the paper, I did not see any problem, but when I looked at it with a magnifying glass, I saw transparent spots (defects) on it.”. The field notes determined that the third and fourth graders mostly used the magnifying glass correctly. Also, as seen in Figure 4 - the drawing of Mustafa, a fourth-grade student - the students' drawings after observation with a magnifying glass were more detailed.

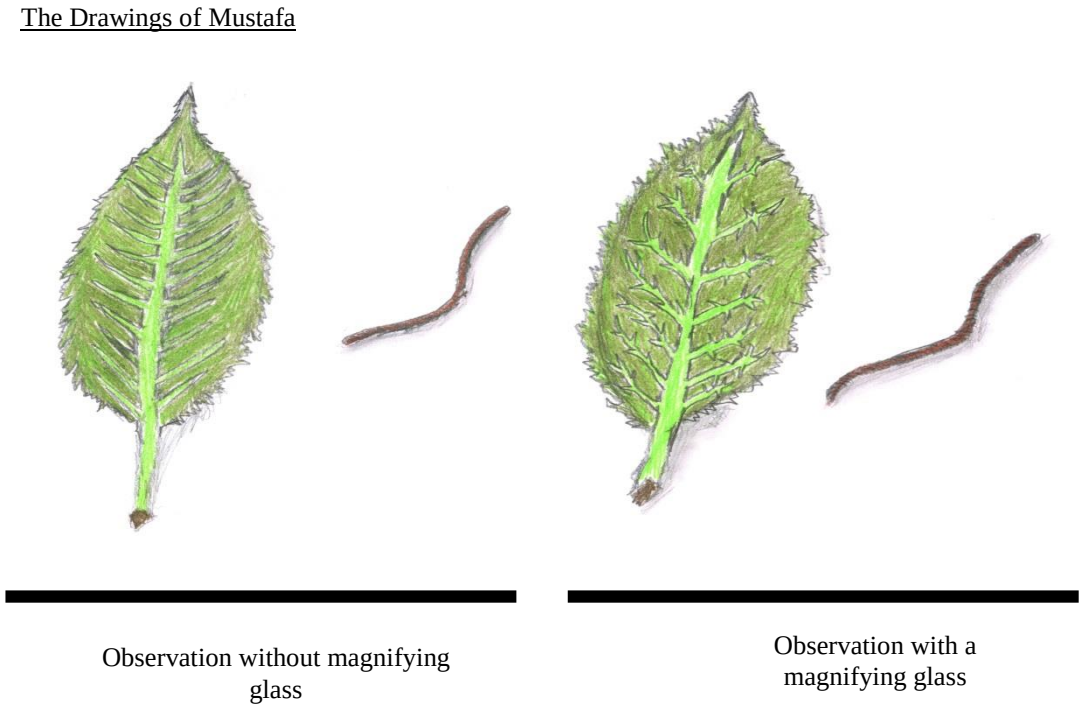

Figure 4. Drawings of observation using only senses and drawings of observation using a magnifying glass

When the students were asked: “Where is an observation made?” their answer mainly was: “In observatories, laboratories and schools.” On the other hand, Batu said: “It can be done wherever there are observation tools.” Most of the fourth-grade students believe that observation is made in a particular place. However, at the end of the focus group discussions, when asked: “If there is anything you would like to add, please specify.” Akin said: “I think observation has an important place in our lives. Even if we do not realize, we observe at any moment of the day”. On the contrary, Tarik, a third-grade student, said: “The most important sense organ in observation is the eye. Even the name “observation” comes from the word “eye” itself. In Turkish, the word observation is derived from the word eye, so that is why Tarik made such a comment.

Discussion and Conclusions

Even though the observation process is an integral part of scientific research, it may be insufficient to achieve the learning goals since it is based on the senses (Park & Kim, 1998). There are three qualities that observation should have in particular so as to have scientific quality. These three qualities of the observer are sufficient knowledge on the subject of observation, understanding the theories in the relevant field, and having appropriate attention habits (Eberbach & Crowley, 2009). When we examine the general situation of the students in the observations, it is seen that they draw what they know rather than what they observe. The prior knowledge of the students sometimes may not be parallel to reality or be sufficient. Therefore, the inclusion of high-level cognitive skills such as questioning, inferencing, or hypothesizing that accompany the students' observation will support providing more and definitive benefits (Maxwell, 1972).

In the focus group discussions conducted within this study's scope, it was presented that most of the students used the word "to examine" when defining observation. Consistent with that, it was determined that students

observed the living beings used as observation objects by examining them closely several times. Altunbay (2017) stated that one of the two most common words in the literature is "examination." Brown and Concannon (2016) proposed using a technique named PSOE, predicting, sharing, observing and explaining. Observation easily matches other skills to improve instructional quality (Sumrall, Sumrall & Robinson, 2018).

On the other hand, most of the students stated only one of the purposes of observation. Nevertheless, when the body of literature is examined, observation emerges as a multifaceted process frequently used in school, daily life, and scientific studies, which may have multiple purposes (Remmen & Frøyland, 2020). In the classroom, observing the students effectively is one of the critical observation areas for teachers. Teachers can create a developmental environment that is more suitable for the student's needs with the help of the inferences they obtain results from these observations (Jablon, 2010). Therefore, it can be said that both the students and the teachers should comprehend that observation is a very functional tool.

All of the participants go to schools in the city center, a very densely populated area. Therefore, students rarely see soil worms where they live. That is why all of the students probably observed the worm carefully. As a result, they could express the details about the movements and the worm's structure verbally or by drawing a picture. This result is consistent with the literature. In their study, in which they carried out living brine shrimp observation, Tomkins and Tunnicliffe (2001) determined that students mostly observed behavioral and structural characteristics, making living beings a part of the observation process significant advantage in attracting students' attention. Likewise, Dilek, Taşdemir, Konca and Baltacı (2020) indicated in their study that students quickly concentrate on the living beings or events they rarely encounter and have the enthusiasm to find out the details of such things.

Tan and Temiz (2003) express that losing concentration quickly while making observations may cause students to miss vital information. In this context, using different tools while making observations will keep the students' interest vivid in observation. Still, it will also be beneficial for them to learn how to use various tools and make an observation. A similar study was conducted by Worsham (2007) about pets – even though they are ubiquitous. Worsham designed a lesson for middle school students, including the observation of their dogs. That lesson was designed as five-course hours and included data analysis, presentation and cooperation, and observation skills. With such a lesson plan, it was determined that students' motivation towards observation increased. Students' observation of a living being can motivate them positively towards the lesson and the act of making an observation (Yurumezoglu & Oztas Cin, 2019; Oztas Cin & Yurumezoglu, 2020). A research inquiry process designed in a different study did not create the expected effect even though it included observing the birds (Trumbull, Bonney & Grudens-Schuck, 2005). It should be kept in mind that observation is a tool that should always be planned carefully and depended on the observer's skills.

It was determined that the students' drawings before the observation were relatively simple and did not emphasize the details sufficiently. While their drawings after the observation were more detailed, it was seen that the drawings which were closest to reality were the ones that were made after the observation with a magnifying glass. Therefore, the deeper the students' observation, the more elaborate their drawings got as well. For this reason, using a tool that enhances the capacity of sense organs while making observations may facilitate it. This result also revealed that students could express their observations by drawing or sketching (Bensusen, 2020). However, a significant portion of the students cannot show the expected proficiency in verbally expressing their observations. For this reason, enabling the students to express their observations in different forms, such as drawings, paintings, sketches and graphics, may be beneficial in increasing both permanence and awareness (Dotger & Walsh, 2015).

It was determined that the second-grade students describe observation from a broader perspective, and the observation examples they give from their past experiences are short-term and object-based. On the contrary, examples of the third and fourth-grade students are in the form of more extended process observations. Consistent with this result, the second graders - unlike the third and fourth graders - stated that preparation is unnecessary for observation. This situation may indicate that second-grade students tend to make a short-term observation, and sometimes in the form of improvisation. Altunbay (2017) indicates that the second keyword in the definition of "observation" in the literature is "monitoring." Therefore, observation corresponds to a systematic process that requires monitoring. Therefore, directing students to make systematic and long-term process observations in the first years of primary school can enable them to collect more in-depth data in their observations. Dilek et al. (2020) also stated that preschool students use their observation skills to gather information in a comprehensive framework, such as the behavior of their group and other group members, the design and development process of products, and the behavior of teachers. By this means, she emphasized that observation is the primary data collection tool of every activity stage (Dilek et al., 2020).

According to their grade level, the students also differed in their opinions about which sense organs observation is related. While the second-grade students said that observation could be made only with eyes, the third and the fourth graders indicated that observation could be made using all the sense organs. Similarly, in the literature (Griffiths & Thompson, 1993), it is stated that students make a mistake to think that observation only consists of what they see. Observation made with one sense organ may limit the data students obtain. This is because observation becomes meaningful, provided that all the senses are used for exploration (Tan & Temiz, 2003). Therefore, students should be directed towards using more than one sense organ while making an observation.

Observation has an important place in children's lives, starting from the moment they are born (Marin, 2013). As a result, children grow up as observers of their environment (Tan & Temiz, 2003). In some cases, observation skills may not develop as much as necessary, which should be reinforced immediately. Lestari, Dinata, Deta ve Pratiwi (2020) also found that students do not have the expected competence in observing different variables that affect an event or a living being and gathering information about them needs better training about observation skills. On the other hand, it is not a skill developed in a short-term intervention in schools (Tan & Temiz, 2003). For this reason, a guide may be prepared for the students to facilitate practical observation at school or in daily life (Manery, 2003; Koyunlu Ünlü, 2018).

Although observation is a fundamental element of scientific and social life, it is not a skill that is emphasized enough from primary education to the university level. Our students and teachers must recognize the opportunities that observation skills offer beyond looking. At this point, it can be said that especially many comedians analyze social events with in-depth observations and that they owe most of their success to their effective use of this skill. A similar situation is valid for the law of gravity, which Newton found due to his observations. Another example that can be given from the history of science is the case of Archimedes finding the buoyancy of water in the famous story. All these and similar examples emphasize the importance of effective observation in our lives.

Recommendations

Within this study's scope, how gifted primary school students make sense of the definition, purpose, and observation process are emphasized. It was seen that the students could not describe "observation" at the desired level but that they could explain it on a cognitive level. Program developers and teachers need to understand the definition and objectives of a basic skill like observation through activities. It is expected that students who do many observation activities will be better educated about the definition and purposes of observation. It is also vital that the textbooks include different observational activities accompanied by an observation guide structured in a specific context (Martínez, Bannan-Ritland, Peters & Baek, 2011; Elmas, 2020). Designing these activities at both ends, especially in making free observations in nature, will positively affect developing students' awareness and stimulating their interest in observation. Students' taking notes and drawing while making free observation will also affect the observation process positively.

Diversification of observation processes is another important suggestion. It should be kept in mind that there may be several different objects, situations, or living beings that may be observed. While a non-moving object is observed in some observations, you may be asked to observe a pet living with you in others. Sometimes, a process observation can be assigned as homework to diversify observation. This may be in the form of observing the germination of a seed in cotton or the molding of stale bread left by a window. The point to focus on is to repeat the observation skills frequently on different objects and processes, increase students' awareness, and improve their skills.

It should be ensured that students use different instruments and all the sense organs whenever appropriate while making an observation. It is quite crucial that the observation activities are designed so that students cannot use only their senses of hearing or sight, but also their senses of touch, smell and taste, and so that students can express their observations verbally.

Limitations

This study is qualitative. A limited number of participants were in the sample, and the purpose is not a mere generalization. This study includes data analysis on the use of senses and observation tools, which are considered helpful to support observation skill development. The sample has also consisted of gifted students

that have higher cognitive capabilities than their age group. This study's results are thought to be useful in that they include suggestions that may be helpful in the classroom environment.

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Appendix 1. Focus group interview questions

Questions

1. What is observation?
    a. What is the first words that come to mind to define observation?
    b. What is your definition of observation?
2. What is the purpose of making an observation?
    a. Why do we make an observation?
3. Have you made any observations before?
    a. If yes:
        a1. Can you give an example of an observation that you made before?
        a2. What have you observed in the different observations you have made so far?
    b. If no: I can give you time to think a little; maybe you will remember an example.
4. Where is an observation made?
    a. Can you explain with an example?
    b. Can observations be made in different indoor or outdoor settings?
5. How is an observation made?
    a. What are the stages of making an observation?
    b. With which process is the observation started and completed?
6. Is it necessary to prepare for observation?
    a. For the answer you need:
        a1. Which preparations are needed to make?
        a2. Why are these preparations made?
        a3. What are the benefits of being prepared?
    b. For the answer that is not necessary: Give an example of an observation that you did or can do without preparation.
7. Which sense organ/s do we use while making an observation?
    a. Please explain with an example.
    b. Which sense organ/s do you use to observe your surroundings?
8. Is there any benefit to using more than one sense organ while observing?
    a. If yes: What are the benefits of using more than one sense organ while making an observation?
    b. If no: Would it be an advantage for the observer if we only see but smell the object or living thing we observe?
9. Have you ever observed using a tool so far?
    a. For the answer I did:
        a1. Which tool (s) did you use?
        a2. How did this tool affect your observation?
10. Could there be other living things that observe other than humans?
    a. If yes: Which living things other than human beings make observations? Explain with examples.
    b. If not: For example, could wild animals be observing to catch their prey?