

Published by International Association of Educators

epasr

Educational Policy Analysis and Strategic Research

ISSN: 1949 - 4289

Volume 15 Issue 1

March, 2020



epasr.penpublishing.net

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PUBLISHING

EPASAD

Educational Policy Analysis and Strategic Research

Volume 15 Issue 1 March, 2020



A Journal Sponsored by International Association of Educators (INASED)

EDUCATIONAL POLICY ANALYSIS AND STRATEGIC RESEARCH

Indexing/Abstracting:

- 1- ERIC: <http://www.eric.ed.gov/>
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- 3- Directory of Open Access Journals: (DOAJ): <http://www.doaj.org/home>
- 4- Cabell's Directory of Publishing: <http://www.cabells.com>
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Investigation of the Use of Electronic Portfolios in the Determination of Student Achievement in Higher Education Using the Many-Facet Rasch Measurement Model

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Abstract

This study aimed to determine the rater behavior in the evaluation process of student electronic portfolios used to measure student achievement in higher education, and thus to evaluate the usability of the electronic portfolio system. Considering that rater behavior adversely affects both validity and reliability in determining the performance of individuals, it is important to identify the effect of this factor and evaluate the related results in line with this effect. The data of the study were collected from the students enrolled in an English language teaching program at Gazi University Gazi Education Faculty within the scope of the measurement and assessment course in the fall semester of 2017-2018. An analytic rubric developed by the researchers was used in the evaluation of the student electronic portfolios. The study included two participants groups consisting of three raters and 61 students (11 male, 50 female). In the analysis of the data, the many-facet Rasch measurement model was used as an analysis method since it was appropriate for the nature of the current data set. When the findings of the study were examined, it was found that one or more rater behaviors interfered with the performance of the individual in the use of non-objective measurement tools, and consequently negatively affected the validity and reliability of the measurements. In conclusion, it can be stated that the individual's performance related to electronic portfolios in higher education is generally affected by the rater behavior in the evaluation process independent of the measurement tool. In addition, it has been confirmed that electronic portfolios can be used to determine individual performance in higher education.

Keywords: Electronic portfolios, rater behavior, higher education, many-facet Rasch, validity.

DOI: 10.29329/epasr.2020.236.1

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Introduction

In today's world, beyond acquiring knowledge, it has become necessary to develop high-level mental skills, such as decision-making, critical thinking, and problem-solving (Barak, Ben-Chaim, & Zoller, 2007). Gaining or developing these skills has become the focal point of curricula (Boddy, Watson & Aubusson, 2003; Riedler & Eryaman, 2016; Watts, Jofili & Bezerra, 1997). High-level mental skills take a long time to acquire and vary from individual to individual. They are process-oriented and measured by complementary measurement tools (portfolio, electronic portfolio [e-portfolio], performance tasks, etc.). Kutlu, Doğan and Karakaya (2014) emphasized that high-level mental skills referred to the whole of the cognitive, affective and psychomotor characteristics of an individual in the process of exhibiting her/his abilities. It was also suggested that the use of multiple-choice tests was not appropriate for the measurement of high-level cognitive skills, and that such test formats were more suitable for measuring knowledge and lower-level cognitive skills (Ebel, 1965; Kutlu et al., 2014). Thus, it is necessary to use novel test/assessment tools to measure high-level cognitive skills.

One of the novel measurement tools that help students develop their high-level cognitive skills and effectively reflects the development of students is an e-portfolio (Egan, 2012; Jenson, 2011). Unlike traditional measurement tools, e-portfolios are both process- and outcome-oriented, and they have a wide range of use in education, from primary to higher levels (Barker, 2005). Jenson (2011) stated that when e-portfolios were used in education, they helped students develop their high-level cognitive skills. However, despite the advantages of using e-portfolios in education, there are also certain disadvantages. When the literature is examined, it is seen that e-portfolios take a long time to prepare, require technological competence, present difficulty in standardization of scoring, and have low objectivity in assessment compared to the traditional measurement tools (Bahar, Nartgün, Durmuş & Bıçak, 2006; Chang, Tseng, Chou & Chen, 2011; Hung, 2012).

One of the objectives of performance assessment is to determine the competency of an individual in relation to the measured performance through accurate and reliable scoring (Johnson, Penny & Gordon, 2008). In other words, if an individual receives the same or similar scores upon completing different performance tasks or being scored by different raters, the objectivity of the assessment is considered to be high. The scores assigned in the evaluation of individual performance are attributed to reliability while the inferences made using these scores are associated with validity (Johnson, Penny & Gordon, 2008). Therefore, achieving a high level of objectivity in the performance assessment process would also increase both reliability and validity. In the literature, to ensure the objectivity of performance assessment, rubrics (holistic or analytic) (Haladyna, 1997; Kutlu et al., 2014; Oosterhof, 2003), multiple raters (Gronlund, 1977; Kubiszyn & Borich, 2013), and rater training (Bernardin & Buckley, 1981; Haladyna, 1997; Lumley & McNamara, 1995) have been recommended.

The current study used both a rubric and more than one rater for a more objective measurement during the assessment process of the student e-portfolios.

Although the use of contemporary methods helps improve objectivity in the assessment of individual performance, it cannot achieve complete objectivity as in traditional measurement tools. In the performance assessment process, one or more rater behaviors often interfere with scoring (Haladyna, 1997). Since rater behaviors that interfere with individual performance are attributed to the variance that is unrelated to the structure of the measure, they pose a direct threat to the validity (Jonsson & Svingby, 2007; Messick, 1996). Therefore, determining the rater behaviors that have a negative effect on objectivity in performance assessment is important for the validity of the decisions undertaken. The current study aimed to determine the possible rater behaviors in the assessment of students in higher education and to evaluate the usability of e-portfolios.

Method

Participants

The study included two participant groups: raters and students. The student group consisted of 61 individuals (male = 11, female = 50) that were enrolled in the English language teaching program at Gazi University Gazi Education Faculty and took the measurement and assessment course in the fall semester of the 2017-2018 academic year. The raters were three academicians enrolled in a doctoral program in the same faculty.

Measurement Tool

In this study, an analytic rubric developed by the researchers was used to evaluate the e-portfolios of students in higher education. When determining the criteria that constituted the rubric, the characteristics that should be possessed by an e-portfolio were taken into consideration. The identified criteria were presented to three experts, and as a result of their feedback, the final version of the criteria list was added to the measurement tool and prepared for implementation. After the expert feedback, the criteria of the relevant measurement tool were determined as follows: design/layout, originality, diversity of student work, time, self-reflection, amount of student work, and performance tasks. When evaluating the student e-portfolios, each criterion was scored using four-point grading (from 1, extremely poor to 4, very good). Field experts examining the relevant measurement tool stated that the weighting of the criteria should be considered differently. Similarly, in performance assessment studies, it is stated that the criteria or items should be weighted differently (Kondo-Brown, 2002) depending on the nature of the structure to be measured. However, there are also researchers that chose to perform equal weighting (Farrokhi, Esfandiari & Schaefer, 2012).

After the analytic rubric was prepared and applied, the process of collecting evidence was initiated to determine the validity and reliability of the related measurements. Factor analysis was used to obtain evidence of the validity of the measurements and McDonald's (1999) ω coefficient for

reliability. Before conducting an exploratory factor analysis (EFA), the assumptions of the relevant analysis should be tested. Therefore, first, it was checked and determined that the minimum number of samples was sufficient (at least five persons per variable), there were no missing or extreme values in the data set, there was a linear relationship between the criteria of the measuring instrument, and all the variables were normally distributed. After all the assumptions were met, the data set was examined in terms of factorability, and it was found to have a factorable structure (Kaiser-Meyer-Olkin value: .836 and Barlett sphericity test: statistically significant at $\chi^2(\text{fd}) = 233.337(21)$, $p = 0.000$). According to the results of the EFA, the measurement tool was found to represent a unidimensional structure (explained variance: 53.73%, factor loads: 0.652, 0.682, 0.824, 0.517, 0.762, 0.848, and 0.791 for Criterion 1 to 7, respectively). After collecting the validity evidence of the measurements obtained using the developed tool, McDonald's ω was used to evaluate the reliability of the measurements. Analyses using Mplus (version 7) revealed that McDonald's ω coefficient was .891 (95% confidence interval: .840 - .920). According to this result, it can be stated that the measurements obtained from the developed rubric for the scoring of the student e-portfolios were reliable, and there was also evidence of the validity of the inferences based on these measurements.

Data Collection

The data of the study were collected from the selected students by gathering their work throughout the measurement and assessment course using an e-portfolio system. After the students uploaded their work related to the topics covered by the curriculum into the e-portfolio system every week, the lecturer examined the students' work and gave individual feedback. The content and quantity of work that each student was expected to include in their e-portfolios throughout the semester were determined. It was explained to the students that the diversity of work they undertook was also important (e.g., video, written materials or visual materials). Then, the performance/ability of each student to prepare the e-portfolio file was scored using the developed rubric. The scores of each rater were transferred to an electronic spreadsheet program (Microsoft Excel) to obtain the data set.

Data Analysis

In the present study, a fully crossed design was used, in which all raters scored all student e-portfolio files. Data analysis was performed using the many-facet Rasch measurement model in FACETS (version 3.70.1) package program (Linacre, 2012). In this study, there were three facets: raters (R), criteria (C) and students (S). When analyzing the data, the recommendations provided by Myford and Wolfe (2003, 2004) were taken into consideration; thus, first group-level and then individual-level statistics were obtained. When the literature was examined, it is found that there are many rater errors/behaviors affecting the performance assessment process (Royal & Hecker, 2016). For example, Royal and Hecker (2016) provided a list of 30 different rater behaviors and noted that some of these behaviors were more common than others. The most frequent rater behaviors in the literature were rater strictness/leniency, halo effect, central tendency, differential strictness and

differential leniency (Farrokhi, Esfandiari & Vaez Dalili, 2011; Myford & Wolfe, 2003, 2004). In the current study, the above-mentioned four behaviors were selected as the rater behaviors to be examined, and statistical indicators were obtained at both group and individual levels.

Results

Since the many-facet Rasch measurement model belongs to the Rasch family, it must meet the assumptions of the Rasch models (Eckes, 2015, s.124; Farrokhi, Esfandiari & Schaefer, 2012; Farrokhi, Esfandiari & Vaez Dalili, 2011), namely unidimensionality, local independence, minimum interval measurement, presence of ranking, and model-data fit. In order to determine whether the developed rubric was unidimensional, EFA was conducted. When the EFA results were examined, it was found that the measurement tool had a single-factor structure, the variance explained was 53.73%, and the factor loads of the criteria ranged from 0.517 to 0.848. The G^2 statistic developed by Chen and Thissen (1997) was used to test the local independence of the criteria in the scoring scale. According to this statistic, the estimated LD χ^2 values between each pair of criteria should be below 10 and the marginal fit χ^2 values should be close to zero as an indicator of local independence (Chen & Thissen 1997). The results of the local independence test for each pair of criteria are given in Table 1.

Table 1. Marginal Fit (χ^2) and LD χ^2 Values for the Partial Credit Model

Criteria	Marginal X^2	1	2	3	4	5	6
1	0.1						
2	0.1	2.1					
3	0.3	-0.6	1.2				
4	0.1	-0.1	-1.3	0.3			
5	0.4	-0.3	-0.4	2.1	1.0		
6	0.8	0.6	2.2	0.6	0.6	0.6	
7	0.3	0.8	-0.0	1.6	-0.5	1.6	1.2

The LD χ^2 values of the criteria boundaries were below 10 and the marginal fit chi-square values were generally close to 0 (Table 1), suggesting that the assumption of local independence was generally provided. It was also determined that the developed rubric had minimum equal-interval and ranked grading (from 1 to 4), the related assumptions were considered to be met. Finally, the standardized residual values were examined and tested for the model-data fit. For a good model-data fit, it is suggested that the number of standardized residual values outside the ± 2 range should not exceed 5% of the total number of observations (Linacre, 2017). In the current study, the total number of observations was $61 \times 7 \times 3 = 1281$, and the number of observations outside the range of ± 2 was 50 (3.90%). After ensuring that all the assumptions of the many-facet Rasch measurement model were satisfied, data analysis was initiated.

Strictness and Leniency Behavior

The first rater behavior that was examined in this study was strictness and leniency. For this purpose, the measurement report related to the rater facet was utilized, and it is presented in Table 2.

Table 2. Measurement Report Obtained for the Rater Facet of the Rasch Model

Rater	Logit measure	Standard error of measurement	Infit	Outfit	t-value
R2	-.32	.08	1.05	1.15	4.00
R1	-.01	.08	1.04	1.06	0.13
R3	+.33	.08	0.88	0.89	4.13
Mean	.00	.08	0.99	1.04	
Standard deviation	.33	.00	0.09	0.14	

Model, Sample: RMSE = .08 Standard deviation = .32
 Separation ratio = 3.88 Separation index = 5.50 Reliability of the separation index = .94
 Model, Fixed (all same) chi-square = 32 sd = 2 p = .00
 Model, Random (normal) chi-square = 1.9 sd = 1 p = .17
 Observed inter-rater agreement: 65.7%
 Expected inter-rater agreement: 46.3%
 Kappa statistic of inter-rater reliability: .36

$t_{\text{critical}}(0.05, 2) = 4.303$; RMSE = Root Mean Square Standard Error

In this study, the strictest rater was R3 (logit = 0.33), and the rater showing the highest leniency was R2 (logit = -.32) (Table 2). The infit and outfit values of the raters appeared to be acceptable (range .5 to 1.5), with the value of each rater being close to the expected value (1). The high values of separation ratio, separation index and separation index reliability indicate that the raters differed in their scoring of the students' performance. Similarly, the fixed-effects chi-square value was significant, suggesting that the raters exhibited different behaviors when scoring. The other evidence of the different scoring behaviors of the raters was the kappa statistic calculated using the inter-rater agreement values. It is reported that a kappa value below .40 indicates poor agreement (McHugh, 2012; Sim & Wright, 2005). After determining the raters' differences in scoring through the statistical indicators at the group level, it is necessary to identify the rater or raters that cause this difference (Çetin & İlhan, 2017; İlhan, s.133, 2015; Myford & Wolfe, 2004). For this purpose, the t-statistic was calculated for each rater. When the calculated t values and the table $t(t_{\text{critical}})$ values were compared, the t values were not significant. This result means that although the raters had different behaviors in evaluating the student e-portfolios, this did not have a significant effect on the overall assessment of the student performance.

Halo Effect

Another rater behavior that is highly likely to occur in performance assessment is the halo effect. In order to determine this effect, the measurement report of the criterion (or item) facet is examined as a statistical indicator at the group level (Çetin & İlhan, 2017). In this study, during this analysis, it was observed that the separation ratio was 5.13, the separation index was 7.74, the reliability of separation index was .97, and the fixed-effects chi-square value was statistically significant ($\chi^2 = 171.9$, sd = 6, $p < .01$). According to these results, it can be stated that the difficulty levels of the criteria differed, and there was no halo effect on the scoring. In order to determine whether the raters displayed halo behavior, the infit and outfit values of the raters, which are statistical

indicators at the individual level, were examined. The measurement report of the criteria revealed that the differences in the logit values between the difficulty levels of the criteria was greater (.46 – (-1.53) = 1.99). If the fit value of a rater significantly differs from 1, that rater is considered to display halo behavior (Myford & Wolfe, 2004). In the current study, there was no rater with a fit value that significantly differed from 1; i.e., there was no halo effect on the scoring of any of the raters (Table 2). Finally, to confirm that the raters do not exhibit the halo behavior, the many-facet Rasch analysis should be repeated by equalizing the difficulties of the criteria of the measurement tool. After this process, if there is a rater that has a perfect fit value (equal to 1), it is accepted that this rater shows halo behavior (Linacre, 2012). In the current study, when the many-facet Rasch analysis was repeated with criteria having equal difficulties, it was determined that none of the raters had a perfect fit value.

Central Tendency

Another rater behavior that is likely to occur in the performance assessment process is the central tendency effect. In order to determine this behavior, the measurement report and category statistics related to the student and criterion facet were analyzed as group-level statistical indicators, and the results are presented in Table 3.

Table 3. Category statistics

Category	Frequency	Percentage	Cumulative percentage	Outfit
1	88	7	7	1.4
2	407	32	39	1.1
3	540	42	81	0.9
4	246	19	100	0.9

The raters mostly used categories 2 and 3 in their scoring, which may be an indicator of their central tendency or the students' moderate-level competence (Table 3). Since the category statistics are not sufficient to determine the central tendency behavior of the raters, the measurement results related to the student facet should also be examined. The results of the measurement report on the student facet are shown in Table 4. As it is not appropriate/possible to present the values for all students, only three students with the highest logit values and three students with the lowest logit values are given here as examples.

Table 4. Measurement Report Obtained for the Student Facet (The Data from Six Students are Presented as Examples)

Student	Logit measure	Standard error of measurement	Infit	Outfit
S10	-3.07	.43	0.78	0.83
S49	-3.07	.43	0.85	0.84
S52	-2.90	.41	1.25	1.23
S39	3.42	.45	1.24	1.10
S3	3.63	.47	1.25	1.03
S12	3.63	.47	0.80	0.69
Mean	.68	.37	1.00	1.04
Standard deviation	1.55	.03	0.40	0.54

Model, Sample: RMSE = .37 Standard deviation = 1.50
 Separation ratio =4.05 Separation index = 5.74 Reliability of separation index = .94
 Model, Fixed (all same) chi-square = 878.5 sd = 60 p = .00
 Model, Random (normal) chi-square = 56.5 sd = 59 p = .57

The values of separation ratio, separation index and reliability of separation index were high, indicating that the students could be distinguished in a valid and reliable way according to their different competence levels and that there was no central tendency effect (Table 4). As the group-level statistical indicators for the determination of central tendency behavior, the infit and outfit values of the criterion facet were also examined. The measurement report of the criterion facet is given in Table 5.

Table 5. Measurement Report Obtained for the Criterion Facet

Criteria	Logit measure	Standard error of measurement	Infit	Outfit
C4	-1.53	.13	1.74	1.90
C6	-0.15	.12	0.75	0.74
C7	0.25	.12	0.78	0.80
C2	0.28	.12	1.06	1.07
C5	0.33	.12	0.87	0.89
C3	0.36	.12	0.72	0.72
C1	0.46	.12	1.13	1.14
Mean	.00	.12	1.01	1.04
Standard deviation	.70	.00	0.36	0.41

Model, Sample: RMSE = .12 Standard deviation = .64
 Separation ratio = 5.55 Separation index = 7.74 Reliability of separation index = .97
 Model, Fixed (all same) chi-square = 171.9 sd = 6 p = .00
 Model, Random (normal) chi-square = 5.8 sd = 5 p = .33

Both infit and outfit values of the criteria ranged from 0.72 to 1.90 (Table 5). According to the results, C4 did not have acceptable fit values (0.50 to 1.50). When the category statistics were examined, it was determined that the raters clustered in the first category of the relevant criterion. After determining the central tendency behavior at the group level, the category statistics were also examined for each rater to identify the rater or raters that exhibited this behavior at the individual level, and it was determined that R2 displayed such behavior. According to the results, none of the raters exhibited the central tendency behavior in the scoring of any other criteria (except C4). In this context, it can be stated that the categories of the developed rubric provided a valid and reliable measurement. Another indicator for the validity and reliability of the rubric categories in

differentiating student performance is category probability curves, which are presented in Figure 1 for the data obtained from the current study.

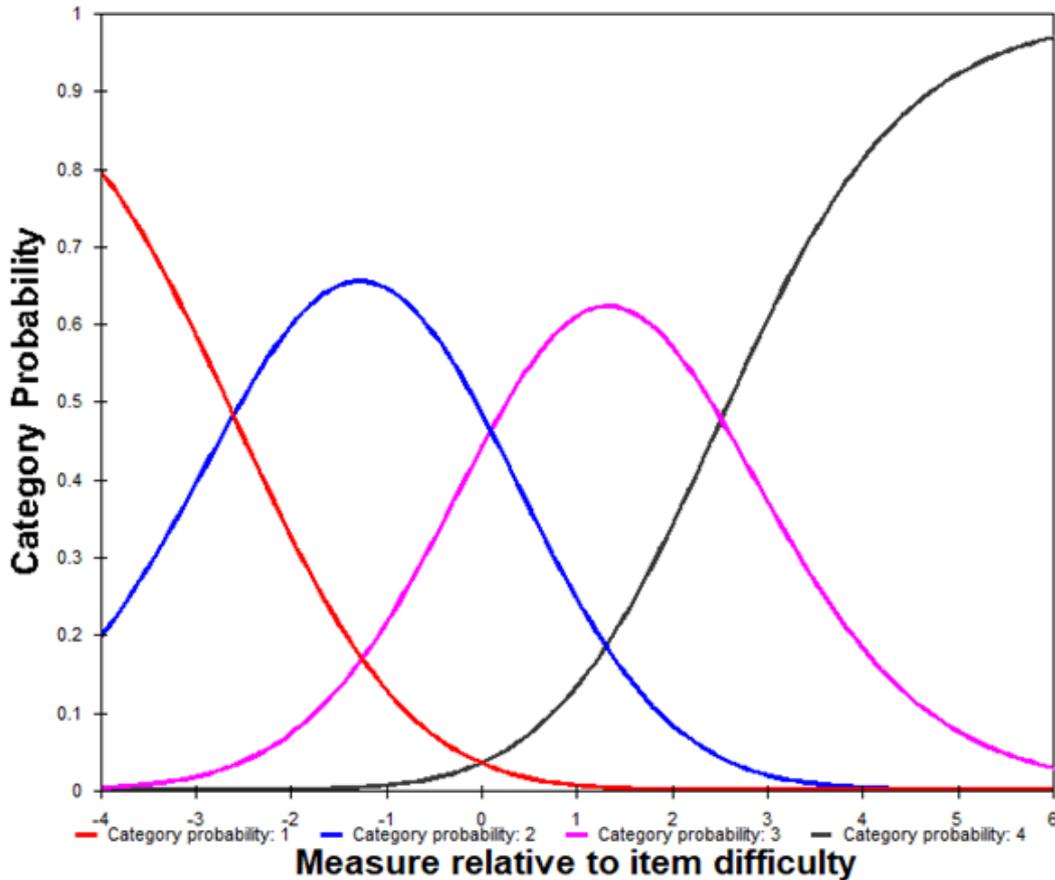


Figure 1. Category probability curves of the developed rubric.

The students with low competence levels were more likely to be in lower categories and they were less likely to be in upper categories (Figure 1). Similarly, it was more probable for the students with high ability levels to be in upper categories, and there was less probability for their presence in lower categories. These results indicate that the categories of the developed rubric were functional in distinguishing student performance.

Differential Strictness and Leniency

Differential strictness and leniency behavior refers to a rater's tendency to give higher scores to some students (for example, successful students) or lower grades to others (such as those with low grades or who misbehave) when assessing/scoring the student performance (Linacre, 2017; Myford & Wolfe, 2004). In this study, whether the raters evaluated all the students and all the criteria in a similar manner was investigated by analyzing the statistical indicators at the group and individual levels. First, the rater-student interactions were examined to determine how the raters behaved toward all students. When examining the bias report, a t-value is given for each rater x student interaction. According to Linacre (2017), the t-values outside the ± 2 range indicate a statistically significant interaction/bias.

When the results obtained from the current study were examined, it was found that there were seven interactions outside the ± 2 range, which are presented in Table 6.

Table 6. Statistically Significant Interactions Between the Raters and Students

Rater	Student	Observed Score	Expected Score	Bias (logit)	Standard Error	t-value
R2	S55	15.00	20.19	-1.94	.63	-3.10
R2	S58	16.00	20.52	-1.67	.62	-2.71
R2	S60	20.00	24.07	-1.62	.61	-2.66
R3	S36	12.00	15.46	-1.40	.66	-2.14
R2	S33	21.00	17.52	1.28	.62	2.09
R2	S25	23.00	19.20	1.45	.64	2.26
R2	S32	26.00	22.47	1.70	.81	2.08

Fixed chi-square = 158.4 sd = 183 p = 0.91

The non-significance of the chi-square value given in Table 6 suggests that the raters did not show any bias behavior in the scoring process. However, when the statistical indicators at the individual level were examined, it was found that some interactions were significant; in other words, the raters behaved in a biased manner during the assessment of the student performance. For example, it was observed that R2 gave some students higher scores and other students lower scores than expected. As a result, of the three raters, one (R2) displayed bias for and against students. In this case, the validity and reliability of R2 in the assessment of student performance was considered to be lower compared to the other two raters.

In order to determine how the raters behaved according to the criteria in the process of assessing the student performance, the rater-criterion interactions were examined. The results revealed a statistically significant interaction between all the investigated cases (seven criteria x three raters = 21 interactions). It was observed that R3 displayed a more strict behavior in relation to the C4 criterion (observed score = 183, expected score = 193, t-value = -2.15). Based on the overall results, it was determined that the raters did not show any bias when assessing the student performance according to the given criteria.

Discussion, Conclusion and Recommendations

The use of e-portfolios in higher education helps students discover new things (Campbell & Schmidt, 2005), select and use effective materials in their future professions (Shaidullina et al., 2014), and make plans regarding their future (Tubaishat, 2015). It is stated that in higher education, e-portfolios are useful for monitoring students' development process (Ada, Tanberkan-Suna, Elkonca & Karakaya, 2016). However, despite the benefits of using e-portfolios in higher education, they also have certain limitations. One of these limitations is that objectivity is more difficult to assess in the process of determining the state of the student e-portfolios compared to traditional measurement tools (such as multiple-choice tests). When evaluating the e-portfolio files of the students, one of the reasons why objectivity cannot be fully ensured is that the assessment undertaken varies from rater to rater. Thus, taking into account the effect of the raters in the process of determining the student

performance will contribute to the validity and reliability of the measurements and inferences based on these measurements. Therefore, in this study, the effects of rater behaviors in the assessment of the student e-portfolios were examined in order to contribute to the validity and reliability of the inferences made in relation to the student performance.

In this study, the most frequent rater behaviors (strictness/leniency, central tendency, halo effect, and differential rater strictness/leniency) were examined (Farrokhi, Esfandiari & Vaez Dalili, 2011; Myford & Wolfe, 2003, 2004). When the findings of the study were analyzed, it was found that in the assessment of the student e-portfolios, the raters showed strictness/leniency, centered tendency and bias behaviors; however, the halo effect was not observed. This result suggests that one or more of the rater effects/behaviors in performance evaluation interfered with the scoring of the student e-portfolios. In the current study, despite the use of both multiple raters (Gronlund, 1977, s.85; Kubiszyn & Borich, 2013, s.170) and an analytic rubric (Dunbar, Brooks & Miller, 2006; Ebel & Frisbie, 1991, s. 194; Kutlu vd., 2014, s.51; Oosterhof, 2003, s.81) to improve objectivity in performance assessment, several rater behaviors emerged during the evaluation of the student e-portfolios. Haladyna (1997, p. 137) emphasized the difficulty of maintaining consistency between raters even when rubrics were used.

In order to determine whether the rater strictness/leniency behavior had a significant effect on the assessment of the student performance, the t-values of each rater were calculated and analyzed at the statistical significance level of 0.05. According to this analysis, the t-value of none of the raters was statistically significant. This finding indicates that although the raters scored differently in terms of strictness/leniency, they did not have a significant effect on the overall assessment of the student performance.

Concerning the random strictness/leniency behavior, all raters exhibited a similar approach to the criteria in the developed analytic rubric. In other words, the rater x criterion interactions (21 in total) were not statistically significant at both group and individual levels. However, it was determined that the raters did not display the similar strictness/leniency behavior toward all students in the process of evaluating their e-portfolios, and exhibited differential strictness and leniency behavior in favor of or against some students. Rater behaviors threaten the validity of direct measurements because they are attributed to the variance unrelated to the structure of the measurement tool (Abu Kassim, 2011; Brennan, Gao & Colton, 1995; Congdon & McQueen, 2000; Farrokhi vd., 2011). Therefore, determining the rater behaviors interfering with the performance assessment will contribute to the validity of the measurements and inferences based on these measurements. Accordingly, in the current study, identifying the rater behaviors that interfered with scoring during the evaluation process of the student e-portfolios contributed to the validity of the measurements and the decisions made based on these measurements. Considering that R2 exhibited more of the investigated rater behaviors (all

behaviors except halo) than the other two raters, it may be helpful not to include her/his scoring in the assessment of the student portfolios to increase the validity of the measurements.

According to the results of the present study, it is recommended that rater behaviors should be examined in order to ensure the validity of measurements and inferences based on these measurements during the assessment of individual performance. To increase the validity of the measurements, it is suggested that at the group level, the significant behaviors of the raters should be excluded from individual assessment, and at the individual level, if there are a sufficient number of raters, the rater displaying the significant behaviors should not be included in scoring. Considering that rater training has an effect on rater behaviors and contributes to the reliability and validity of the measurements, it should be offered to raters participating in scoring for increased validity and reliability in the performance-based assessment process. Lastly, continuous monitoring of the rater behaviors that occur in the process of evaluating the e-portfolio files of the students in higher education and providing training to minimize these behaviors can contribute to the reliability and validity of the measurements and the inferences based on these measurements.

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The Effect of Prediction, Observation, Explanation Supported Project-Based Environmental Education on the Levels of Attitude and Behavior Toward the Environment*

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Abstract

This study aims to determine the effect of prediction, observation, explanation supported project based environmental education (POESPBE) on the attitudes and behaviors levels of eighth grade students compared to teacher-centered environmental education. The study used a quasi-experimental research design including pre-test, post-test and control group. The application step of the study was carried out by the researchers in a ten-week period in 2018-2019 academic year. The study group included 62 students, 34 of whom were in the experimental group and 28 of whom were in the control group. The experimental group was applied the POESPBE and the control group was applied teacher-centered environmental education. Attitude Scale toward Environment and Behavior Scale toward Environment were administrated as pre-test, post-test and follow-up test to evaluate the attitude and behavior levels of the students in the experimental and control groups toward the environment. Data were analyzed using the Independent Samples t-test and Repeated Measures ANOVA. The study found that the POESPBE provided a significant development on students' attitude and behavior; however, teacher-centered environmental education could not provide a significant development on the students. Based on this result, it can be claimed that the methods like the POESPBE, which can change individuals' attitudes and behaviors toward the environment in positive way, should be used in environmental education.

Keywords: Environmental education, prediction-observation-explanation supported project based environmental education, prediction-observation-explanation, project based learning

DOI: 10.29329/epasr.2020.236.2

* This study was produced from the master thesis prepared by the first author. A part of this study was presented as an oral presentation at the EJSER 5th International Symposium on Social Sciences on 27-29 April 2019.

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Introduction

Environmental problems caused by human impacts damage human life and life resources. In this sense, the solution of the environmental problems that needs to be addressed as a whole can be achieved not only by repairing the degraded environment, but also by developing awareness for protecting it (Yağlıkara, 2006). Nowadays, one of the most significant functions of education is to teach persons to know the natural environment they live in and to use natural resources efficiently and in a balanced manner. The rapid depletion of natural resources and the destruction of natural habitats and a healthy and livable environment by humans unconsciously are regarded as an important problem by educators (Demir & Yalçın, 2014). The primary way to achieve cognitive, affective and behavioral change in order to eliminate environmental damage caused by human is to provide environmental education (Özdemir, 2007). It is because insensitivity and lack of education are at the center of most environmental problems (Kızılaslan & Kızılaslan, 2005).

Environmental Education and its Importance

For a sustainable environment, environment education is much prominent for person to be aware of the environment as from their childhood, to exhibit it as a behavior, to understand how their activities can affect environment and to be sensitive about environmental problems (Hsu, 2004; Mahidin & Maulan, 2010). Providing a permanent solution to the environmental problems, educating more environmentally sensitive students, and understanding the importance of protecting nature and leaving it to future generations instead of consuming all the sources offered by nature can only be achieved through environmental education (Baş, 2010; Ramadoss & Poyya Moli, 2011). The aim of environmental education is to provide that persons have information to resolve these issues, help prevent environmental problems and gain positive behavior toward the environment, rather than being unaware of the environmental problems. In other words, environmental education aims to reduce environmental problems by improving environmental awareness among students (Aktaş, 2014; Eryaman et. all, 2010; Gülay & Önder, 2011; Hsu, 2004; Mahidin & Maulan, 2010; Özdemir, 2007). Due to these characteristics, environmental education is different from environmental science or other kinds of education that include ecology. Environmental education offers ecological information on one hand and on the other, it enables the improvement of an attitude toward the environment in individuals and subsequently turns this attitude into a behavior. Environmental education addresses students' cognitive, affective and psychomotor learning domains (Erten, 2004).

By providing environmental education-teaching, it is purposed to train students to love and protect the nature, know and examine the environment they live in, do not remain insensitive to the environmental problems they face, and strive to improve the environment. For this purpose, environment should be perceived as a whole by students, and the importance of taking necessary precautions for every generation to live in a healthy environment should be made to understand. For

the environment to be able to meet the needs of people, preventing excessive consumption of natural resources and allowing environment to renew itself are only achieved by conscious individuals who have received qualified education (Ozdilek, Okur & Eryaman, 2012). Environmental education starts from the preschool; nevertheless, the desired environmental sensitivity cannot actually be achieved (Akçay, 2017; Armağan, 2006; General Directorate of Environmental Impact Assessment Permit and Inspection [GDEIAPI], 2004). However, using natural sources that nature offers correctly and in a planned way in order for the environment to meet the needs of individuals, preventing excessive consumption and environmental pollution, allowing the environment to preserve its ability of self-renewal, arising environmental awareness in humans, and raising persons that are more responsive to environment are the most important aims of environmental education. In this context, inefficiency in environmental education resulting from not using appropriate methods or techniques is the major factor underlying the environmental problems (Gautier, 2014; GDEIAPI, 2004).

Accordingly, it can be argued that individuals should be given environmental education to provide them with a positive attitude and behavior toward the environment, create a sustainable life, and solve the environmental problems. It is thought that student-centered learning approaches such as Prediction, Observation, Explanation (POE) and Project Based Learning (PBL), which can overlap with the environment itself, may procreate resolutions to the issues arising from life, and are based on learning by doing-living should be used in environmental education.

Predict-Observe-Explain (POE) Technique

POE technique is used to determine and eliminate students' mistakes regarding the concepts, reveal their knowledge, and achieve more effective teaching (Atasoy, 2004; Boo & Watson, 2001; Liew, 1995). POE technique tackles information with a constructivist approach, enables students to connect and configure their prior knowledge with what they have just learned and helps them absorb knowledge (Güngör & Özkan, 2017). In the prediction stage, the individuals are asked to make predictions regarding the events in the activities that will be created by the teacher and explain their predictions along with their reasons. This can be performed by offering options to the individuals or by asking open-ended questions (White & Gunstone, 1992). In the observation stage, the individuals are allowed to observe the event related to their predictions. The event should be observable by the learner and should be in the quality of causing contradiction in the learner's mind (Tao & Gunstone, 1997; White & Gunstone, 1992). In the explanation stage, the individuals are asked to compare their predictions with their observations, and an investigation is carried out to explain the differences-similarities between the predictions and observations and to eliminate conflicting situations. The results of the observations are made meaningful by the individuals (Liew & Treagust, 1998).

Project Based Learning (PBL) Method

PBL is a learning method which puts students in the center of the teaching-learning process, involves real-life issues, includes students' problem-solving skills and other meaningful learning, enables them to work by themselves through individual or group works to construct knowledge, solve problems and produce their own products to build knowledge, and whose focal points are concepts-scientific principles (Korkmaz & Kaptan, 2001; Saracaloğlu, Akamca & Yeşildere, 2006; Simkins, Cole, Tavalin & Means, 2002; Vatansver Bayraktar, 2015). While students play an active role in this process, teachers guide them to develop and finalize their projects. Through project works, students can be enabled to establish relationships between the real world and the concepts of science, and find opportunities to work individually or in collaborative learning environments by observing interdisciplinary relationships (McGrath, 2002; Saracaloğlu et al., 2006). Stages of PBL: 1. Determining the project topics-organizing research groups, 2. Creating project plans, 3. Implementing the project, 4. Planning project presentations, 5. Making presentation (sharing and discussing the project and achieving generalizations) 6. Evaluation (Korkmaz & Kaptan, 2001; Korkmaz, 2002). According to Korkmaz and Kaptan (2001), PBL is the leading method among others that can be used to transfer the knowledge and skills that students gained in science lessons into daily life and associate them with real life. In this approach, while students conduct their projects, they seek solutions to real-life problems by using their creativity and, at the same time, they are involved in activities such as accessing information, making analysis-synthesis and questioning. Children have the opportunity to find themselves in the real world thanks to the research they conduct in line with their interests and abilities (Solomon, 2003). In this context, considering that environment teaching-education is a component of science teaching-education, environmental education should be included in life, and negative environmental behaviors and problems should be learned by doing-living, it can be claimed that PBL method, based on learning by doing-living and problem solving, is important for environmental education.

Prediction, Observation, Explanation Supported Project Based Environmental Education (POESPBEE)

POESPBEE may be explained as a learning approach which aims to develop a project for solving a problem about environmental issues using the scientific research method through research-questioning, to reach generalizations through predictions, observations and explanations in the process of sharing and discussing the project. It is a model based on doing-living learning in which individuals are liable for their own learning-comprehension. In the POESPBEE approach, PBL method is supported by POE technique at the beginning, during and after the PBL process. No study on POE supported PBL, except for the one conducted by Güven (2011), was found as a result of the examination of the relevant literature. In the study by Güven (2011), POE technique was used at the beginning of the PBL process only to gain preliminary information; however, how POE supported

PBL method was performed was not explained in detail. In the present study, POE technique was used at the beginning, during and at the end of PBL process, so POE was integrated with PBL. Thus, the POESPBE approach was designed as a more effective learning method. This makes it an authentic and different study. How PBL method was supported by POE technique in environmental education was expressed in detail in the application part of the study.

Rationale and Importance of the Study

Today, attitudes and behaviors toward the environment are very important in solving environmental problems that threaten the whole world and in preventing new environmental problems (Güven, 2014). The fact that students are able to be aware of environmental problems they may encounter in their lives and solve these problems is a necessity for a sustainable environment (Hsu, 2004; Mahidin & Maulan, 2010). At this point, environmental education is an indispensable tool for eliminating the problems that may devastate the world. Raising persons who have environment conscious is aimed through this training (Erten, 2004). The purpose of environment education is not only to provide information about the environment, but also to allow a positive improvement in individuals' attitudes, awareness and behaviors toward the environment, train individuals to ratiocinate, question, try to prevent arising of new problems, and produce solutions when they occur. To attain environmental goals, it is necessary for individuals to gain awareness for environmental problems and display attitudes and behaviors that will prevent these problems. These goals may be reached through environment education given by methods-techniques that put the student at the center (Erten, 2004; Güven, 2011; Karataş, 2013). Traditional teaching methods teach many subjects, but they lack in making children transfer what they have learned to real life. It is clear that children who have received traditional education, which includes environmental issues, lack in environmental awareness. Therefore, it is necessary to get students to adopt lifelong environmental literacy habits on environmental issues through collaborative groups and student-centered learning-teaching approaches inside or outside classroom environments (Akgün, 2001; Güven, 2011; Yılmaz, 2006). Environmental education that the time requires should focus on providing a perspective that will enable the establishment of a sustainable life culture on earth and developing cognition, awareness, skills and talents in parallel with it, rather than setting objectives limited to protection of environment (Özdemir, 2007). In this context, in the process of education about the environment, which is the real life itself, it is clear that it is impossible to achieve environmental goals through traditional education which cannot be connected with real life. This shows the necessity of using student-centered teaching methods such as PBL and POE, based on learning by doing-living, can build up relationship with life, allow individuals to actively participate in the learning-teaching process and enable the application of what has been learned. Using the POESPBE in this study to achieve the objectives of environmental education makes this study significant.

The rationales for using POE technique supported by PBL in environmental education have been given below. There is no environment education class in the curriculum of the Ministry of National Education (MoNE) and environmental education is provided in a limited scope within the science course (MoNE, 2018). This may result in a lack of prior knowledge about the environmental issues in students. The pilot study of this research conducted in 2017 revealed that when only PBL was used in environmental education, the lack of prior knowledge about the environment in students resulted in failure to produce qualified projects, thus not being able to realize PBL process that could further develop the cognitive and affective skills toward the environment among students. It is essential in the PBL process that the subjects be learned during the process in that individuals design a project for the solution of a problem through research-inquiry using a scientific research method and then share it. In this context, PBL method was supported with POE technique at the beginning of the PBL process to make the learning process more effective with qualified projects that can solve problems, to question prior information about the environmental issues, to give preliminary information and to draw notice to the significance of the environment and the environmental problems. In addition, PBL method was supported by POE technique to facilitate the learning by reaching generalizations through predictions, observations and explanations during the sharing stage of projects in the PBL process and to actively involve the students who follow the projects in the learning process.

Studies in the literature suggest that instead of giving environmental education under different courses and with a limited scope, it should be given with its own learning approach and a curriculum with sufficient time in which environmental education subjects-gains can be applied. A specific environmental education is needed for students to train them to have environmental awareness and environmental literacy to solve the environmental problems during their education (Erdoğan, Kostova & Marcinkowski, 2009; Mosothwane, 2002; Özsevgeç & Artun, 2012). Designing an authentic POESPBE approach that includes environmental education issues to meet this necessity makes the present study important.

A review of the secondary school science curriculum indicates that it includes the goals and subjects of environmental education, but students receive narrow-scale education related to these subjects at different grades (MoNE, 2018). In addition, the related curriculum does not provide a learning environment in that individuals may conduct study in the field of environment education, resolve issues regarding the environmental problems, and discuss their solutions (Taycı & Uysal, 2009). This may negatively affect students' attitudes toward the environment (Cutter, 2009; Seçkin, Yalvaş & Çetin, 2010) and, accordingly, their knowledge and behavior. Positive development of attitudes and behaviors can be achieved by active attendance of individuals in the learning-teaching environment through learning by doing-living and being involved in the learning experiences. In both the POE approach and PBL method, which were included in the present study, individuals are given

the occasion to structure what they learn through learning by living and they are made liable for their own learning. In this context, the originally designed POESPBE model, in which PBL method was supported by POE technique, was determined as the subject of this study to gain positive attitudes and behaviors toward the environment which is real life itself.

The Aim of the Study

This study aims to show the effect of the POESPBE approach on the attitudes and behaviors of eighth grade students compared to teacher centered environmental education.

Method

Research Model

The study used a quasi-experimental design because the students in the experimental and control groups were not assigned based on drawing a lot or randomization, in other words, students who had already been grouped were included. Since the environmental issues and problems were covered using the POESPBE approach and teacher-centered teaching method, and the changes in the environmental attitudes and behaviors of students were compared, the pre-test and post-test and control group design were used in the study (Büyüköztürk, Akgün, Kılıç Çakmak, Karadeniz & Demirel, 2016).

The Study Group

The study was conducted with eighth grade students studying in the 2018-2019 academic year. It included a total of 62 students; 34 students in the experimental group and 28 students in the control group.

Characteristics of the Participants

All the students in the study group received education in the same state secondary school in the district center of a medium-sized city in Turkey in the 2018-2019 academic year. The participants resided in the center of the district. The control group consisted of 15 female and 13 male students, and the experimental group consisted of 17 female and 17 male students.

Sampling Procedures

For the study, eighth grade students whom the researcher could easily reach, apply the experimental process, and make guidance, and who were enrolled in the school where the researchers worked were included in the study group. Therefore, it can be claimed that the appropriate sampling method was used (Büyüköztürk et al., 2016).

Data Collection Tools

Behavior Scale toward Environment (BSTE)

The students' environmental behavior scores were evaluated using the Behavior Scale toward Environmental Problems (BSTE) that is composed of 20 items. In the scale, developed by Yavetz and Pe'er (2006) and adopted into Turkish by Timur and Yılmaz (2013), one item is negative and the other 19 are positive. In this likert scale, the items are scored according to the following responses: "Always=5," "Usually=4," "Sometimes=3," "Rarely=2," and "Never=1." The Cronbach's alpha value of the scale was found to be 0.85. The item that includes a negative expression is reverse scored. The highest score is 100 and the lowest is 20. Before passing the application stage of the study, the BSTE was applied to 127 students who were excluded from the sample of the study. The Cronbach's alpha reliability coefficient of the BSTE was calculated to be 0.84.

Attitude Scale toward Environment (ASTE)

Students' attitude scores toward the environment were evaluated using the Attitude Scale toward Environment (ASTE) that consists of 25 items. In the ASTE, developed by Atasoy and Ertürk (2008), four items have positive and 21 have negative expressions. The Cronbach's alpha value of this 5-point Likert type scale is 0.85. The items are scored according to the following responses: "Completely agree=5," "Agree=4," "Partly agree=3," "Disagree=2," and "Completely disagree=1" The items including negative expressions are reverse scored. The lowest score in the scale is 25 and the highest is 125. Prior to conducting the study, the ASTE was applied to 127 students who were not included in the study sample and the Cronbach's alpha reliability coefficient was calculated to be 0.89. The reliability coefficients of the BSTE and ASTE were greater than 0.70, which indicated that they were reliable (Büyüköztürk, 2016).

Data Analysis

The data were analyzed using the SPSS 22. Kolmogorov Smirnov and Shapiro Wilk analyzes were used to check whether the data were distributed normally, and the results were given in Table 1 below.

Table 1. Normal Distribution of Data Analysis Results

Group	Variable	Test	Skewness	Kurtosis	Shapiro-Wilk (p)	Kolmogorov Smirnov (p)
Control	Attitude	Pre	-0.67	-0.60	0.142	0.053
		Post	-0.56	-0.75	0.200	0.076
		Follow-up	-0.23	-0.83	0.200	0.590
	Behavior	Pre	0.22	-0.20	0.200	0.973
		Post	-0.16	-0.17	0.200	0.968
		Follow-up	0.27	-0.88	0.200	0.519
Experiment	Attitude	Pre	0.05	-0.03	0.200	0.618
		Post	-0.35	-0.34	0.200	0.325
		Follow-up	-0.15	-0.78	0.200	0.668
	Behavior	Pre	0.55	0.12	0.200	0.261

Post	-0.20	-0.54	0.200	0.799
Follow-up	-0.29	-0.55	0.200	0.650

The experimental and control groups' Kolmogorov Smirnov and Shapiro Wilk results regarding attitude and behavior pre-test, post-test and follow-up tests were greater than 0.05, and the skewness-kurtosis coefficients were between -1.5 and +1.5. Accordingly, the pre-test, post-test and follow-up test data of the control and experimental groups about the attitude and behavior toward the environment were normally distributed. In addition, analyses of the equality of the variances conducted using the Levene's test showed that the variances were equal. Based on these results, parametric tests were used for the analysis of the data that showed a normal distribution. The Independent Samples t-Test was used to determine whether there was a significant difference between the pre-test, post-test and follow-up test scores of the control and experimental groups, which were measured using the Repeated Measures ANOVA. All analyzes were evaluated at 0.05 significance level. Eta Squared (η^2) value was used to calculate the effect size in the analyses in which the difference was significant. The effect size was evaluated according to η^2 as $0.01 < \eta^2 < 0.06 =$ small, $0.06 \leq \eta^2 < 0.14 =$ medium, and $0.14 \leq \eta^2 =$ large (Cohen, 1988).

Application Step of the Study

The study was conducted with eight grade students in a public school during 2018-2019 academic year, and it was completed in 40 lesson hours in 10 weeks. The pre-test, post-test and follow-up tests were not included in this period. The applications were carried out by the researchers for both groups to prevent the errors that could have resulted if different teachers were assigned. Thus, an error that might arise from the researcher was aimed to be controlled (Çepni, 2014). Before the experimental procedure, the BSTE and ASTE were implemented for the experimental and control groups.

Application in the Control Group

Teacher-centered teaching methods were used for the control group in environmental education. These methods included narration, demonstration, question and answer. The subjects of environmental education given in Table 2 were taught in the control group.

Application in the Experiment Group

The topics regarding the environment were taught to the experimental group using the POESPBE, and the application process was given in Table 2.

Table 2. Application Process of the POESPBE Approach in the Experimental Group

Lessons Provided in Two Parts		
Week	The First Part of the Lesson (2 lessons per week): Drawing attention, interest to the environmental issues and providing preliminary knowledge through POE	The Second Part of the Lesson (2 lessons per week): Implementation of stages of PBL Method
1	Environmental concepts Environmental pollution and the Change in the environment from past to present Air pollution	Giving information about the project and PBL method Giving information about the stages of the project, determining the groups
2	Water pollution Soil pollution	Determination of project topics Determination of problem sentence Planning the study process
3	Nuclear pollution Electromagnetic pollution	Conducting research, preparing projects
4	Noise pollution Light pollution	Conducting research, preparing projects
5	Renewable energy sources Recycling The environment for a sustainable life Greenhouse effect and global warming	Conducting research, preparing projects
Lessons Given in One Part (four lessons per week)		
6, 7, 8, 9, 10	Sharing and discussing the projects in the classroom, making generalizations and evaluation with the support of POE technique	

Application in the Experimental Group in the First Five Weeks

Lessons in the first five weeks were designed as two parts and lasted 20 lessons (four lessons per week). In the first part of the lesson, POE technique regarding the environmental concepts, topics and problems was used to prepare higher quality projects on the environmental issues and to apply PBL method more effectively. Thus, students' attention and interest were drawn to the importance of the environment and the environmental problems for a sustainable life and they were provided with preliminary knowledge about these topics. For example, while POE technique was used for water pollution, visuals about water pollution excerpted from interesting video-animations were shown to the students. Subsequently, they were asked to make predictions about how the event in the visuals had an impact on the environment, whether this event was an environmental problem, about its causes, consequences and how this event would affect human life. During the observation stage, they were asked to watch the video including visuals about how water pollution occurs, its causes, results and effects on the environment and life. At the explanation stage, the students were asked to explain whether the predictions were consistent with the observations. During the application of POE, a POE activity document was prepared for each environmental issue and the students were asked to fill it out. Therefore, the students' attention and interest were drawn to the environmental issues and preliminary information was provided using POE technique.

In the second part of the lesson, stages of PBL method were addressed. In the first week, project, scientific research, and stages of preparation of scientific research-project were explained to

the students with examples, and project groups were formed. The students in the groups were asked to find a name and slogan for their groups to warm them to one another. They were also asked to conduct research to determine the topic of the project related to the environmental issues and problems.

In the second week, the project topics were identified, a problem sentence was determined for the environmental problems, and the research process for the solution of the problem was planned. In the POE technique used in the abovementioned process, predictions were taken for the solution of the problem. In addition, necessary research and investigations were made to solve the problem, and relevant information was collected.

In the third week, project proposals for the solution of the problem were developed and projects were started to be prepared based on the collected information.

Preparation of projects continued in the fourth and fifth weeks. In this process, the students were given a “PBL Method Form.” Furthermore, some out-of-school time was allocated for the project preparation process and project groups were interviewed and guided.

The POE technique was also used during the PBL process. The group that prepared the project made predictions for the solution of the environmental problem during the prediction stage. In the observation stage, the students in this group observed the results of the project and recorded their observations. In the explanation stage, they explained whether their predictions and observations were consistent.

Applications for the Experimental Group in the Sixth, Seventh, Eighth, Ninth and Tenth Weeks

The lessons in the sixth, seventh, eighth, ninth and tenth weeks were designed as one part and lasted 20 lessons (four lessons per week). In the lessons designed as one part, the missed projects were completed outside the lessons and the completed projects were shared, discussed and generalized in the classroom by being supported by POE technique. A “Project Presentations POE Activity Paper,” completed by the students, who followed the project presentations as participants, was used for each project. Before the projects were presented -at the prediction stage of POE technique- the students’ predictions about which the environmental problem that the project shown was intended to solve, how this solution could prevent the environmental problem, and how it could be beneficial to the environment and sustainable life were obtained. During the observation stage, the project was presented, projects were examined and observations were recorded through touching and seeing by the students who observed them. At the explanation stage, the students were asked to explain whether the predictions and the observations were consistent. Afterwards, the students completed “Project Presentations POE Activity Paper” for each project. After the project was shared in the classroom, the students discussed the environmental issue-problem in the project and made generalizations about them. Thus, the stages of the POESPBE approach were completed. In this process, the teacher guides

the students, monitors the process, designs the learning environment, manages the sharing and discussing stages of the project and applies the stages of the POESPBE approach. On the other hand, the students investigate, question, perform the stages of a scientific study, produce projects and take responsibility for their own learning.

At the end of the experimental process, the ASTE and BSTE were administered as post-test. 12 weeks after this procedure, the ASTE and BSTE were administered to the control and experimental group as a follow-up test.

Findings

The Findings of the Attitude Scale toward Environment (ASTE)

Table 3. Independent samples t-test results for the ASTE

Test	Group	N	\bar{X}	S	Df	t	p
Pre	Control	28	85.61	15.95	60	0.46	0.647
	Experiment	34	83.85	14.05			
Post	Control	28	87.29	16.68	60	-4.05	0.001
	Experiment	34	102.59	13.05			
Follow-up	Control	28	86.36	17.41	60	-5.25	0.001
	Experiment	34	101.03	12.25			

According to Table 3, there was no significant difference between the control and experimental group students' ASTE scores at the beginning of the study ($t_{(60)}=0.46$; $p>.05$). However, there was a significant difference between the groups' post-test scores ($t_{(60)}= -4.05$; $p<.05$) and follow-up test scores ($t_{(60)}= -5.25$; $p<.05$) in favor of the experimental group. The $\eta^2=0.22$ value, determined for the significant difference between the experimental and control groups' post-test scores on the ASTE and the $\eta^2=0.31$ value, determined for the difference between their follow-up test scores, were higher than 0.14, which indicated that the effect size was large (Cohen, 1988).

Table 4. The descriptive analysis of the control group's ASTE scores

Test No	Test	N	\bar{X}	S
1	Pre	28	85.61	15.95
2	Post	28	87.29	16.68
3	Follow-up	28	86.36	17.41

Table 5. The control group's repeated measures ANOVA results for the ASTE scores

Source of Variance	Sum of Square	df	Mean Square	F	p
Between Subjects	20310.417	27	752.238	0.474	0.625
Measurement	39.595	2	19.798		
Error	2254.405	54	41.748		
Total	22604.42	83			

Table 5 showed that there was no significant difference between the control group students' ASTE pre-test, post-test and follow-up test scores ($F_{(2,54)}=0.474$; $p>.05$).

Table 6. The descriptive analysis of the experimental group's ASTE scores

Test No	Test	N	\bar{X}	S
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1	Pre	34	83.85	14.05
2	Post	34	102.59	13.05
3	Follow-up	34	101.03	12.25

Table 7. The experimental group's repeated measures ANOVA results for the ASTE scores

Source of Variance	Sum of Square	df	Mean Square	F	p	Significant Difference
Between Subjects	12377.490	33	375.075			
Measurement	7349.353	2	3674.676	51.427	0.001	1-2, 1-3
Error	4715.980	66	71.454			
Total	24442.823	101				

Table 7 showed that there was a significant difference between the experimental group's ASTE pre-test, post-test and follow-up test scores ($F_{(2-66)}=51.427$; $p<.05$). The difference between the post-test and pre-test was in favor of post-test, and the difference between the follow-up test and pre-test was in favor of follow-up test. The POESPBE approach can be claimed to have a significant effect on development of attitude toward environment as the value of $\eta^2=0.61$ was greater than 0.14 (Cohen, 1988).

The Findings of the Behavior Scale toward Environment (BSTE)

Table 8. Independent samples t-test results for the BSTE

Test	Group	N	\bar{X}	S	Df	t	p
Pre	Control	28	60.21	15.45	60	0.76	0.450
	Experiment	34	57.47	12.97			
Post	Control	28	62.75	14.67	60	-5.62	.001
	Experiment	34	81.06	10.93			
Follow-up	Control	28	62.18	16.10	60	-5.25	0.001
	Experiment	34	80.65	11.53			

Table 8 showed that there was no significant difference between the BSTE pre-test scores of the students in the experimental and control groups ($t_{(60)}=0.76$; $p>.05$). However, there was a significant difference between the post-test scores ($t_{(60)}=-5.62$; $p<.05$) and follow-up test scores ($t_{(60)}=-5.25$; $p<.05$) in favor of the experimental group. The $\eta^2=0.35$ value, determined for the significant difference between the experimental and control groups' post-test scores for their behavior toward environment, and the $\eta^2=0.32$ value, determined for the difference between the follow-up test scores, were higher than 0.14, which indicated that the effect size was large (Cohen, 1988).

Table 9. The descriptive analysis of the control group's BSTE scores

Test No	Test	N	\bar{X}	S
1	Pre	28	60.21	15.45
2	Post	28	62.75	14.67
3	Follow-up	28	62.18	16.10

Table 10. The control group's repeated measures ANOVA results for the BSTE scores

Source of Variance	Sum of Square	df	Mean Square	F	p
Between Subjects	16824.476	27	623.129		
Measurement	99.071	2	49.536	1.099	0.340
Error	2433.595	54	45.067		
Total	19357.142	83			

Table 10 showed that there was no significant difference between the control group's BSTE pre-test, post-test and follow-up test scores ($F_{(2,54)}= 1.099$; $p>.05$).

Table 11. The experimental group's measures of central tendency and expansion for the BSTE

Test No	Test	N	\bar{X}	S
1	Pre	34	57.47	12.97
2	Post	34	81.06	10.93
3	Follow-up	34	80.65	11.53

Table 12. The experimental group's repeated measures ANOVA results for the BSTE scores

Source of Variance	Sum of Square	df	Mean Square	F	p	Significant Difference
Between Subjects	9039.647	33	273.929			
Measurement	12395.529	2	6197.765	84.402	0.001	1-2, 1-3
Error	4846.471	66	73.431			
Total	26281.647	101				

Table 12 showed that there was a significant difference between the experimental group's BSTE pre-test, post-test and follow-up test scores ($F_{(2,66)}=84.402$; $p<.05$). The difference between pre-test and post-test was in favor of post-test, and the difference between the pre-test and post-test was in favor of the follow-up test. The $\eta^2=0.71$ value was higher than 0.14, which indicated that the POESPBEE approach had a significant effect on the improvement of behavior toward environment (Cohen, 1988).

Discussion

The experimental and control groups' levels of attitude toward environment were similar at the beginning of the study; however, the experimental group's level of attitude toward environment was significantly higher than that of the control group at the end and three months after the study. In addition, the effect size value was large in both the post-test and the follow-up test. These results showed that the POESPBEE approach was more effective than teacher-centered environmental education in improving the attitudes toward environment. The differences between the attitude toward environment pre-test, post-test, and follow-up test scores were insignificant in the control group. This can be interpreted that teacher-centered environmental education has no significant contribution to the improvement of the attitudes toward the environment. This result can be explained by the fact that students are inactive in teacher-centered teaching and this teaching model is not interesting and attractive.

The ASTE scores of the students in the experimental group significantly increased at the end of the study process, and this increase was maintained three months after the study. The POESPBEE approach also has a large effect on the improvement of the attitudes toward the environment. These results can be interpreted as a positive contribution of the POESPBEE approach to the improvement of the attitude toward the environment. In the POESPBEE approach, students' interest and attention were drawn to the environmental issues through the prediction, observation and explanation stages, they

conducted a scientific project, they realized that the environmental problems threatened a sustainable life and that they became aware of the results of the environmental problems, all of which can be argued to pave the way to an improvement in their attitudes toward the environment. In addition, projects on socio-scientific subjects, such as environmental pollution, recycling, greenhouse effect and global warming, were carried out in the POESPBE approach, and the results were discussed and shared in the classroom. It is possible to claim that the fact that students came up with new ideas for the solution of environmental problems, designed projects, made predictions, observations and explanations, and shared their ideas in this process contributed to a positive change in their attitudes toward the environment. In short, the project was carried out by performing the applications in line with the objectives, which might have resulted in the fact that the students were ensured to like the subjects of environmental education and as a result, their attitudes toward the environment were improved (Benli, Ay & Kahramanoğlu, 2011; Farmer, Knapp & Benton, 2007; Güven, 2011; Güven, 2014; Knapp & Barrie, 2001). No study, except for the one which Güven (2011) conducted and in which POE and PBL were used together, was found as a result of the literature review, and neither was a study on the effect of POE technique on attitude and behavior toward the environment. Therefore, the results of the study examining the effect of PBL on the attitudes and behaviors toward the environment were also included in the discussion section of this study. Güven (2011) concluded that the PBL method supported by POE technique improved prospective science teachers' attitudes toward the environment. POE technique was used only at the beginning of the PBL process in the study carried out by Güven (2011); however, in the present study, the entire PBL process was integrated with POE technique, using it at the beginning, during and at the end of the process. Moreover, being sensitive to the environment for the prospective science teachers, who were included in the sample in Güven's (2011) study, is the teachers' competence specified by the MoNE (MoNE, 2017). Therefore, the improvement in the attitudes of prospective teachers toward the environment at the end of environmental education is a situation that is expected to emerge naturally. However, in the present study, eighth grade students, whose environmental sensitivity was not determined as a professional competence, were included in the sample. These two factors make the present study original and different. Also, the studies conducted by Awad (2017), Bayram and Seloni (2014), Benli, Ay and Kahramanoğlu (2011), Benzer (2010), Benzer and Şahin (2012), Borhan and İsmail (2011), Erol (2016), Kaşarcı (2013), Yucasu (2015) found that PBL method made a significant contribution to the improvement of the attitude toward the environment, which supports the result of the present study. Evans, Koul and Rennie (2007); Matlack and McEwan (2008) emphasized that projects played an important role in raising environmental awareness. In the abovementioned studies, how PBL improves the environmental attitudes is explained by the fact that students conduct a study on the subjects that attract their interest and attention and create a product, called a project. In these studies, explanations about the effect of PBL on attitude overlap with the learning activities involved in the POESPBE process. The positive change in the attitudes of the individuals will also change the environmental

behaviors positively. In this context, to prevent environmental problems and eliminate the behaviors that cause these problems, the attitudes toward the environment should positively improve and these positive attitudes should turn into behaviors. For this purpose, it can be claimed that the methods like the POESPBEE, which can change individuals' attitudes toward the environment in positive way, should be used in environmental education.

There was no significant difference between the experimental and control groups' BSTE scores at the beginning of the application; however, the experimental group's scores were significantly higher than those of the control group at the end and three months after the application. In addition, the effect size value was high in both the post-test and the follow-up test. According to this finding, the POESPBEE approach is more effective than the teacher-centered environmental education in the increase of environmental behavior scores. There was no significant improvement in the behavior of the control groups, whom teacher-centered environmental education was applied, toward the environment. This could have resulted from the fact that the negative effects of the negative behaviors toward the environment could not be seen as the students were inactive during the learning process and learning by doing-living was not realized. There was a significant increase in the experimental group's BSTE scores at the end of the study, and this increase was maintained three months after the study. In addition, the POESPBEE approach has a large effect on behavior. These findings show that the POESPBEE approach has a positive effect on the improvement of the environmental behavior. This result can be explained by the fact that through the learning by doing-living in the POESPBEE process, individuals were enabled to see that negative behaviors toward the environment caused environmental problems, that the environmental problems posed a threat to human health and the future of the world, and that behaviors were the most important factors on a sustainable life. The literature includes studies which have found similar results suggesting that PBL method positively affects students' behaviors. For example, studies conducted by Bayram and Seloni (2014), Benzer (2010), Benzer and Şahin (2012), Borhan and İsmail (2011), Erol (2016), Kırbağ Zengin and Yucasu (2017), Yucasu, (2015) found that PBL method significantly contributed to the improvement of the environmental behavior. Rooij (2009) found that students' communication and intra-group collaborative behaviors improved positively through a well-planned and disciplined project method. Güven (2011) concluded that the PBL method supported by the POE technique improved prospective science teachers' behaviors toward the environment. The improvement of the behaviors was explained by learning by doing-living through carrying out projects in the abovementioned studies. In these studies, explanations about the effect of PBL on behavior overlap with the learning activities involved in the POESPBEE process. The positive behaviors that individuals display toward the environment are very important in terms of solving the environmental problems that threaten a sustainable life and preventing new problems from arising. Therefore, individuals' negative behaviors toward the environment should be changed (Güven, 2011; 2014). In this context, instead of traditional teaching in

environmental education, the learning-teaching approaches, in which individuals will be able to experience the effects of environmental behaviors on the environment by doing-living, should be used for them to show positive behaviors toward the environment.

Conclusion and Suggestions

In brief, the POESPBEE approach was effective in the development of attitude and behavior toward the environment while teacher-centered environmental education was not effective. Considering the results and the activities carried out in the POESPBEE approach, the methods in which students can make predictions, observations and explanations for the purpose of drawing interest and attention to environmental issues, questioning and providing preliminary information, as in POE technique, can be used in environmental education. In addition, as in PBL method, it can also be suggested that the methods, in which ideas for the solution of the environmental problems can be proposed, studies can be done, projects can be designed, shared and discussed during the research process, and which indicate that environmental problems threaten a sustainable life and enable to be aware of the results of the environmental problems, be applied.

Based on the results of this study, it is clear that improving the attitudes toward the environment and turning them into environmentally friendly behaviors is not possible through traditional education to which environment, the real life itself, cannot be connected during education process. Therefore, instead of teacher-centered methods in environmental education, student-centered learning-teaching approaches, which are based on learning by questioning-doing-living, enable an active attendance in the learning environment, and can establish a relationship with life, should be preferred.

In this study, there were two eighth grade classes in the school where the application was carried out; therefore, while the effect of the teacher-centered teaching and the POESPBEE approach on the attitude and behavior toward the environment was being investigated, the effects of the POE technique and the PBL method could not be examined individually. This is the limitation of the research. For this reason, it may be suggested that studies which compare the effects of the teacher-centered teaching, the POESPBEE approach, POE technique and PBL method be carried out.

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School Happiness: A Grounded Theory

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Abstract

In this study, it was aimed to develop a school happiness theory based on the opinions of the teachers, school administrators, parents, and students. This study was designed in a qualitative grounded theory model. The study groups were 18 teachers, 14 school administrators, 13 parents, and 20 students. Snowball sampling method was used to determine the study groups. Twelve main qualifications were identified related to the school happiness. These main qualifications were physical equipment, school environment, learning environment, communication and collaboration, education policy, social activities, school management, teacher qualifications, school distinct, student centeredness, learning activities, and student qualifications. The results indicated that the priority level of the main qualifications varies from one participant group to another. The teachers give priority school environment, school management, and physical equipment. On the other hand school administrators give more priority to the school environment, physical equipment, and education policy for school happiness. The parents give more priority to the physical equipment, school environment, cooperation and communication for school happiness. In addition, the students give more priority to the learning environment, school environment, and physical equipment. According to these results, it can be suggested that school society should be in cooperation and communication for effective school environment, physical equipment should be coordinated for talent education, learning environment should be organized considering multi-faceted development of the students to increase school happiness.

Keywords: Happiness, School happiness, Priority, Qualification, Grounded theory

DOI: 10.29329/epasr.2020.236.3

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Introduction

Happiness was defined by researchers in different ways. Happiness is defined by Huebner (1991) as the life satisfaction; by Seligman, Parks and Steen (2004), as the meaning of attaching to life. Lyubomirsky, Sheldon and Schkade (2005), define happiness as the positive feelings about life. Happiness can also be defined as the feelings of an individual such as joy, gladness, hope, physical and spiritual well-being (Köknel, 1992). Veenhoven (2008), defines happiness as the evaluation of life, as a whole. Similarly, Selim (2008) defines happiness as the satisfaction level of individuals. Diener (1984), describes happiness as the satisfaction generally taken from life, and the more positive emotions than the negative ones. Likewise, Seligman (2011), identifies the happiness as a multidimensional structure that includes meaning of life, positive feelings, responsibility, positive relationships and success. While the happiness of adults depends on many variables such as health, family life, social relations, security, freedom, moral values, income level, working conditions; the children's happiness can be related to the variables such as the meeting level of their basic needs, love, trust, communication, recognition, school success, health and play (Ahn, Garcia & Jimeno, 2004; Clair, 2012; Thoilliez, 2011). Since happy people perceive the world as safer and feel more self-confident, the happiness of individuals is highly functional for their life skills as well as the work performance (Boehm & Lyubomirsky, 2008; Fredrickson, 2013). In addition, happy people make decisions easily, cooperate more easily, and are more tolerant in their relations (Lyubomirsky & King, 2005; Pan & Zhou, 2013; Schnittker, 2008).

School happiness is expressed as the emotional well-being, which is result of harmony between the personal needs and the expectations of the stakeholders (e.g. students, teachers, school administrators and the other personnel) from school depending on the certain environmental factors (Engels, Aelterman, Petegem, & Schepens, 2004). According to Talebzadeh and Samkan (2011), the school happiness of students is associated with the certain factors such as physical factors, individual features, social-emotional factors, and instructional factors. It is clear that a happy school environment is crucial for revealing the students' talents and providing effective learning (Boehm & Lyubomirsky, 2008). Similarly, Bird and Markle (2012) argue that a happy school environment not only contributes to student's academic success but also improve other life skills, such as healthy communication, lifelong success, and self-fulfillment. The cognitive, emotional, personal and social development occurring during this time period make it the most convenient time for change by creating a strong basis for well-being throughout life (McKabe, Bray, Kehle, Theodore, & Gelbar, 2011). On the other hand, the decrease in school happiness can be able to lead to lower school success, loneliness, depression or drug addiction by weakening of friendship relationships (Yucel & Vogt-Yuan, 2016). Findings from research reveal that social psychological factors are more effective than physical factors for school happiness. In a study conducted by Yıldırım (2014), the findings show that the cooperation among staff, fair assessment and supportive feedback, positive school climate, student-oriented

teaching practices, classroom climate and personal development increase teachers' well-being in school. In addition, Aelterman, Engels, Van Petegem and Verhaeghe (2007) revealed that teachers' well-being is associated with the teacher-parent relations, supports from colleagues, self-efficacy, workload, positive attitudes towards innovations, and supportive attitude of principal.

Teachers play a crucial role in learning process. Happy teachers provide a non-threatening environment in learning process of students as the facilitator, planner, instructor, mediator, and explainer. According to Wolk (2008), by focusing on the following important principles it is possible to create more happiness feelings for students in school: encouraging to enjoy from learning, giving different options to the students, letting students to create any things, presenting of students' works, taking time to tinker, creating an attractive school space, spending enough time outside of school, reading good books, offering more gym and arts lessons, assessment of transform, and having some fun together. In a study UNESCO-led in Asia-Pacific countries, different qualifications were determined in terms of school happiness (Salmon, 2016). These qualifications are associated with the 'people', 'process', and 'space'. In this study, the qualifications related to the 'people' are friendship and relationship in the school community, positive teacher attitudes and attributes, respect for diversity and differences, positive and collaborative values and practices, teacher working conditions and well-being, and teacher skills and competencies. The qualifications related to the 'process' are reasonable and fair workload, teamwork and collaborative spirit, fun and engaging teaching and learning approaches, learner freedom in creativity and engagement, sense of achievement and accomplishment, extracurricular activities and school events, learning in a team spirit between students and teachers, useful, relevant and engaging learning content, mental well-being, and stress management. The qualifications related to the 'places' are warm and friendly learning environment, secure environment free from bullying, open and green learning and playing places, school vision and leadership, positive discipline, good health sanitation and nutrition, and democratic school management.

In recent years the number of studies related to the school happiness increases, in Turkey. These studies generally focus on subjective well-being of the students (e.g. Asıcı & İkiz, 2018; Certel, Bahadır, Saracaloğlu, & Varol, 2015; Gündoğdu & Yavuzer, 2012; Öztürk & Çetinkaya, 2015; Türkdoğan & Duru, 2012; Türkmen, 2012; Uçan & Kıran-Esen, 2015; Yalız-Solmaz, 2014). In some studies the researchers focus on the relationship between school well-being and different variables. Büyükşahin-Çevik and Yıldız (2016) focus on the relationship between hopelessness and happiness; Demir-Çelebi and Sezgin (2015) subjective well-being and moral maturity; Doğan, Sapmaz and Akıncı-Çötök (2013) self-criticism and happiness; Özdemir and Koruklu (2011) values and happiness; Öztürk, Meral and Yılmaz (2017) happiness and religiosity and Terzi (2017) job satisfaction and happiness. Sarıçam (2014) examined the effect of intolerance of uncertainty on students' happiness. Some of these studies the researches focus on the relationship between the subjective well-being, happiness and school success (e.g. Chaplin, 2009; Holder and Klassen, 2010; López-Pérez, Sánchez,

& Gummerum, 2015; Mahon & Yarcheski, 2002; McCabe, Bray, Kehle, Theodore, & Gelbar, 2011; Park & Peterson, 2006; Schnittker, 2008; Talebzadeh & Samkan, 2011; Uusitalo-Malmivaara, 2012; Uusitalo-Malmivaara & Lehto, 2013; Van Hal, et al., 2014; Weaver & Habibov, 2010). In these studies, the researchers focus directly on children's school happiness (e.g. Demiriz & Ulutaş, 2016; Salmon, 2016; Telef, 2014; Ünüvar, Çalışandemir, Tagay, & Amini, 2015; Wolk, 2008). In addition, in some studies the researchers focus on teachers' school happiness (e.g. Acton & Glasgow, 2015; Aelterman, Engels, Van Petegem, & Verhaeghe, 2007; Collie, Shapka, Perry, & Martin, 2015; Spilt, Koomen, & Thijs, 2011; Yıldırım, 2014). Limited studies were conducted on school administrators' happiness (e.g. Duran & Yıldırım, 2017; Ekinci, Sakız, & Bindak, 2017; Mehdinezhad, 2011) and parents' satisfaction (Clair, 2012; Gibbons & Silva, 2008). When the literature is examined, a theoretical context on school happiness based on the opinions of the school stakeholders found to be nonexistent. Therefore, in this study, it was aimed to reveal school happiness theory depending on the opinions of the stakeholders (teachers, school administrators, parents, and students). For this purpose, the following questions were sought:

1. What are the main components for school happiness?
2. What are the qualifications for school happiness frequently voiced by the participants?

Method

This study was designed in a qualitative grounded theory model. The qualitative method is used to obtain in-depth and comprehensive information on a topic (Denzin & Lincoln, 2005; Marshall and Rossman, 2006; Patton, 2014; Singh, 2007). The key philosophical assumption related to all types of qualitative research is that the reality is constructed by individuals via interaction with their social environments (Merriam, 1998). The purpose of grounded theory model is to go beyond description, to provide an integrated theoretical explanation of a process or action, to create or explore a theory (Corbin & Straus, 1990). In the theory building study, the researcher should determine whether the problem is suitable for the theory building research. Grounded theory is a pattern used when there is no theory to explain or understand a process (Creswell, 2015).

Study Group

The study group consists of 18 teachers, 14 school administrators, 13 parents, and 20 students. The snowball sampling method was used to determine the study group. The snowball sampling is a convenience sampling method which is one of the purposeful sampling. In this method, sampling continues until data saturation (Burns & Grove, 2005). Snowball sampling can be utilized by seeking information from various sample groups to identify primary research reports that are frequently referred to by various stakeholders interested in the phenomenon (Suri, 2011). The chain of recommended informants would typically diverge initially as many possible sources are recommended, then converge as a few key names get mentioned over and over (Patton, 2014).

Therefore, school happiness was examined by applying the views of participants having different demographic qualifications, as possible. Twelve of teachers were females and eight were males. Six of them were working in primary school, five were working in secondary school, five were working in academic high school, and four were working in vocational high school. Twelve of school administrators were males and eight were females. Six of them were working in primary school, six were in secondary school, four of them were working general high school, and four were in vocational high school. The average age was 52. The average age was 38.6. Nine of the parents were female and eleven male. The average age was 41.3. Eleven of students were female and nine were male. The average age of them was 17.3. Twelve of them were attending academic high school, eight of them were vocational high school.

Data Collection Tool

Data was collected by using semi-structured interview form developed by researchers. The semi-structured interview form composes two parts. In the first part, there were the questions determining the demographic features of the participants. In the second part there were the open-ended questions to determine the participants' opinions about school happiness. In the first stage, it was asked teachers to write the qualifications that they think as necessity for school happiness. In the second stage, participants differed and different questions were asked them to reveal the main qualifications for school happiness. These stages continued with other participants.

Data Collection

Data were collected through face-to-face interviews with the participants, gradually. First of all, it was asked from the participants that they should imagine a happy school. Then, it was asked them to write qualifications that they perceive as the necessity for school happiness. Every interview lasted about in 20-25 minutes. These procedure were conducted each participant group. These process were fulfilled in eight months.

Data Analysis

Data were analyzed by using descriptive analysis and content analysis techniques. In this process, the forms were separated according to the participant qualifications (e.g. school administrators, teachers, students, and parents) before analysis and coded as P1, P2, P3, P4 ... P20, respectively. Then, all data were inserted in excel table, and the opinions written in the same words were evaluated in the same category. Consequently, the sub-themes were created by considering the opinions which reflect the same content.

Validity and Reliability

Data were interpreted considering associated situation, the internal consistency of the sub-themes were supported based on the measures of internal homogeneity and external heterogeneity to ensure the internal validity. The sub-themes were determined depending on the theoretical structure, and all findings were presented without comment to ensure internal reliability (Creswell, 2015). Additionally, it was applied to the expert opinion in order to verify whether the opinions represent sub-themes. The lists containing each participant group opinions and the sub-themes were given two different faculty members in educational sciences field. It was asked from the experts that they should compare the opinions of the participants with the sub-themes in the lists, and then the matches were compared. It was applied the formula 'Reliability= Consensus/ (Consensus + Dissidence) × 100' to determine the reliability of the coding (Miles & Huberman, 1994, p. 64). For the teachers' opinions, the agreement between two coders was calculated as 91%, for school administrators 93%, for parents 94%, and for students 96%, In addition, in order to increase the validity of the research, triangulation was applied. Triangulation can be examined under different titles as data sources, method and researcher variation. The triangulation of data sources is to involve participants with different characteristics. Confirming the data obtained with different methods (interview, focus group interview and document analysis) increases the validity and reliability of the results (Yıldırım & Şimşek, 2013).

Procedure

This grounded theory study was planned and conducted in four stages respectively, (1) Coding for theory creation (2) Concept development, (3) Comparison of concepts, and (4) Creation of theoretical model (Strauss & Corbin, 1998).

Results

Data was analyzed by using qualitative content analysis. As a result of content analysis, 89 sub-themes were determined. Then, 12 main categories were determined related to the sub-themes. The main categories were created based on the opinions of the participant groups. Seven categories were created depending on the opinions of all participants. However, the views of different groups were influential in the creation of other five categories.

In Figure 1, the main categories according to the participants' views were given.

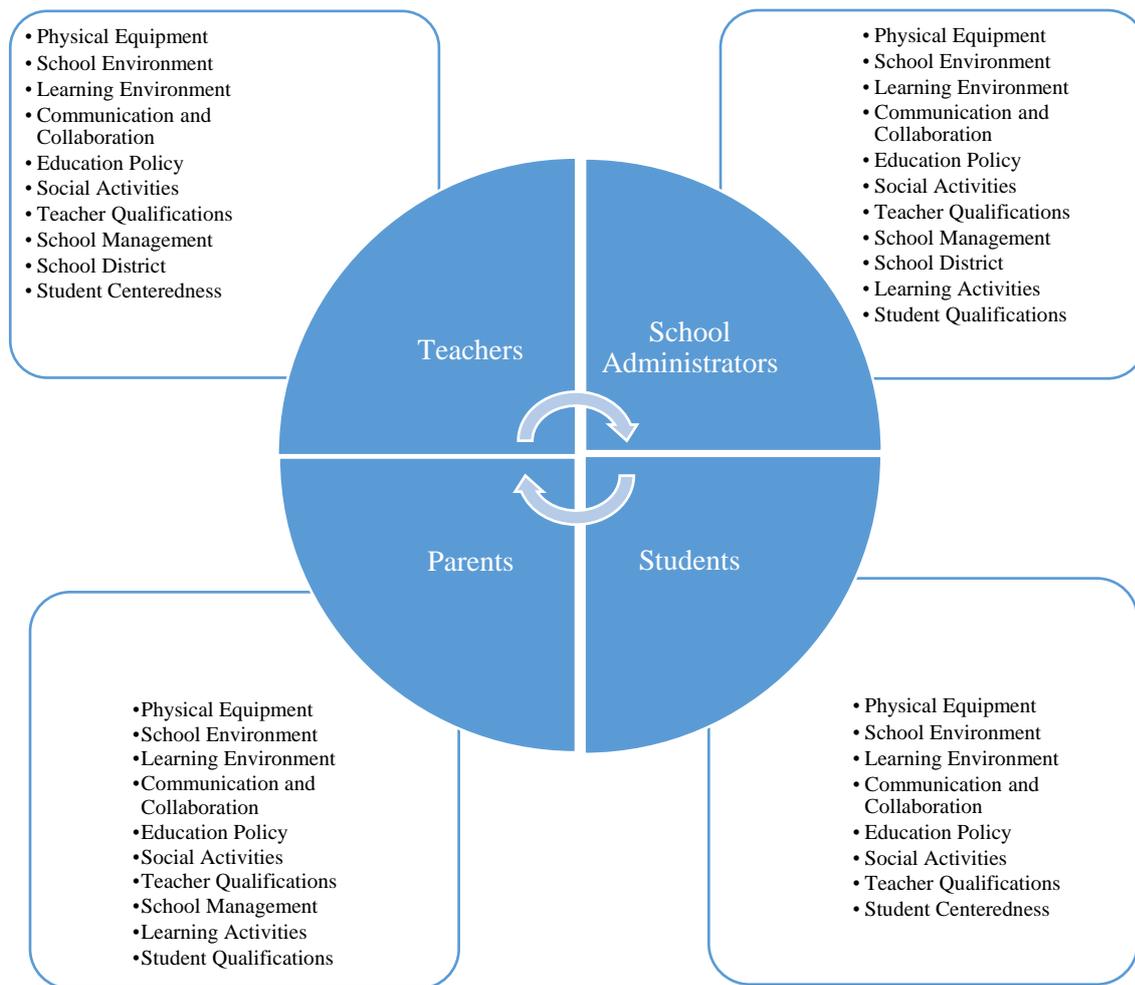


Figure 1. The main categories according to the participants' views.

In Figure 1, it is seen that physical equipment, school environment, learning environment, communication and collaboration, education policy, social activities, and teacher qualifications were defined as the main categories for school happiness according to the opinions of all participant groups. School management was defined as a main category for school happiness according to the opinions of the school administrators, teachers and parents. In addition, student centeredness was defined as another main category according to the opinions of teachers and students. Moreover, school environment was defined as a main category for school happiness based on the opinions of the teachers and administrators. Besides, student qualifications were defined as the main category based on the opinion of the school administrators, and learning activities were defined as the main category based on the opinions of the parents. In addition, school district was defined as the main category based on the opinions of the school administrators and teachers' opinions.

In this section, the most frequent opinions of participants related to the main qualifications for school happiness were presented. The common opinions of each participant group (teachers,

administrators, parents, and students) were determined and then the most frequent opinions were shown in the Table 1. The opinions with a frequency less than three were excluded.

Table 1. The frequencies of main categories and the sub-themes

Physical Equipment (f=123)	(2) School Environment (f=98)
Physical equipment must be sufficient [f=34]	School environment must be safe [f=29]
School must be hygienic [f=25]	Cooperation and solidarity must be prior [f=17]
Classroom size must be ideal [f=13]	School environment must be tolerant [f=13]
Playgrounds must be enough [f=12]	Working environment must be peaceful [f=7]
Appropriate places for social activities [f=9]	School look out for all students' happiness [f=6]
Technological equipment must be sufficient [f=8]	Teachers are happy in school [f=6]
Eating environment must be healthy [f=7]	School must be attractive for students [f=6]
Course tools must be adequate [f=6]	School must provide adequate guidance service [f=6]
Physical environment must be supportive [f=5]	School society must be in mutual respect [f=4]
Educational staff must be sufficient [f=4]	Organizational commitment must be high [f=4]
(3) Learning Environment (f=72)	(4) Communication and Collaboration (f=71)
Multi-faceted development [f=13]	School-parent cooperation should be strong [f=24]
Learning should be related to life [f=9]	Open communication in school [f=10]
Learning environment is emancipatory [f=8]	Teacher-parent cooperation [f=7]
Learning should be in cooperative manner [f=8]	Cooperation is strong among school community [f=7]
Assessment should be fair [f=7]	Collaboration should be strong among teachers [f=5]
Students should prepare for life [f=7]	Communication is respect-based in school [f=5]
Learning environment should be fun [f=6]	Communication is polite among teachers [f=4]
School environment is democratic [f=5]	Cooperation among teachers is friendly [f=3]
Readiness should be considered [f=5]	Teacher-student communication is gentle [f=3]
Students s should be interested in learning [f=4]	Teacher-management collaboration is high [f=3]
(5) Education Policy (f=57)	(6) Social Activities (f=56)
Talent education should be essential [f=14]	Social activities should be sufficient [f=20]
Education non-based on competition [f=10]	Sports activities should be sufficient [f=13]
Democratic and laic education [f=8]	Enough cultural activities [f=9]
Education should be planned student-centered [f=7]	Enough art activities [f=5]
Education should encourage positive behaviour [f=6]	Enough hobby activities for students [f=5]
Training should take place everywhere [f=6]	Students should exhibit their talents [f=4]
Education policies should be long-term [f=3]	
Education should not be based on recitation [f=3]	
(7) School Management (f=49)	(8) Teacher Qualifications (f=46)
School management should be fair [f=12]	Teachers should have professional competence [f=14]
Participatory decision making is essential [f=10]	Teachers should love their profession [f=9]
School administrators are school leaders [f=8]	Teachers should renew themselves [f=7]
School administrators should be objective [f=6]	Teachers must be in close interest to pupils [f=7]
School administrators are compatible with staff [f=4]	Teachers should be role-model [f=5]
Merit is essential in school management [f=3]	Teachers should be expert in their field [f=4]
School administrators are solution-focused [f=3]	
Administrators should appreciate teaching staff [f=3]	
(9) School District (f=27)	(10) Student Centeredness (f=17)
Parents should be interested in their children [f=7]	Students should be prior in school [f=4]
Suitable social environment [f=6]	Activities considering students' interests [f=4]
Suitable physical environment [f=4]	Priority should be given to students' needs [f=3]
School surroundings should be supportive [f=4]	Activities identified by students' participation [f=3]
Parents should support school [f=3]	Program should be prepared student-centered [f=3]
Well-educated parents [f=3]	
(11) Learning Activities (f=16)	(12) Student Qualifications (f=15)
Activities should be compatible with talent [f=4]	Students should have goals [f=3]
Learning activities should be enjoyable [f=3]	Students should be success-oriented [f=3]
Activities should make students happy [f=3]	Students should obey to the school rules [f=3]
Activities should be compatible with development [f=3]	Students should love school [f=3]

Activities should improve imagination [f=3]

Students without problems in family [f=3]

In Table 1, it is seen that the most frequent opinions in physical equipment main theme, the most frequent opinions are ‘sufficient physical equipment’ [f=34], ‘hygienic school’ [f=25], and ‘ideal classroom size’ [f=13]. In school environment main theme are ‘a safe school environment’ [f=29], ‘cooperation and solidarity’ [f=17], and ‘tolerant school environment’ [f=13]. In learning environment main theme, the most frequent opinions are ‘multi-faceted development’ [f=13], ‘emancipatory learning environment’ [f=8], and ‘cooperative learning’ [f=8]. In communication and collaboration main theme, the most frequent opinions are ‘school-parent cooperation’ [f=24], ‘open communication’ [f=10], and ‘teacher-parent cooperation’ [f=7]. In education policy main theme, the most frequent opinions are ‘talent education’ [f=14], ‘education non-based on competition’ [f=10], ‘student-centered education’ [f=7]. In social activities main theme, the most frequent opinions are ‘sufficient social activities’ [f=20], ‘enough sports activities’ [f=13], and ‘enough art activities’ [f=5]. In school management main theme, the most frequent opinions are ‘fair management’ [f=12], ‘participatory decision making’ [f=10], and ‘objectivity’ [f=6]. In teacher qualifications main theme, the most frequent opinions are ‘professional competence’ [f=14], ‘teachers who love their profession’ [f=9], and ‘self-renewing teachers’ [f=7]. In school district main theme, the most frequent opinions are ‘parents who interested in children’ [f=7], ‘social environment’ [f=6], and ‘physical environment’ [f=4]. In student centeredness main theme, the most frequent opinions are ‘giving priority to students in school’ [f=4], ‘students feel valued’ [f=4], and ‘prioritizing the needs of students’ [f=3]. In learning activities main theme, the most frequent opinions are ‘activities compatible with talent’ [f=5], ‘enjoyable learning activities’ [f=3], and ‘activities that make students happy’ [f=3]. In student qualifications main theme, the most frequent opinions are ‘students have goals’ [f=4], ‘success-oriented students’ [f=3], and ‘students compliance with school rules’ [f=3]. In Figure 2, the main components of the school happiness are shown.

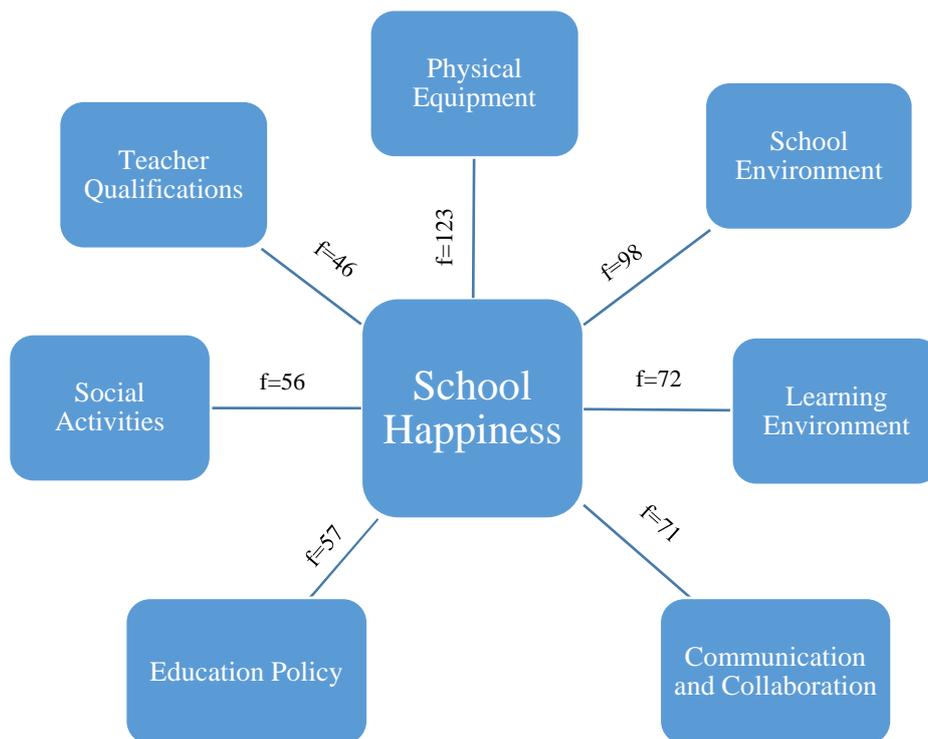


Figure 2. The main components of school happiness.

Discussion and Conclusion

In this study which aims to develop a school happiness theory twelve main qualifications were identified depending on the opinions of the teachers, school administrators, parents, and students. Based on the participants' views these main qualifications were physical equipment, school environment, learning environment, communication and collaboration, education policy, social activities, school management, teacher qualifications, school environment, student centeredness, learning activities, and student qualifications. The results also show that the common main qualifications are physical equipment, school environment, learning environment, communication and collaboration, education policy, social activities, and teacher qualifications. The physical equipment, school environment, and learning environment were the main categories that accepted by all participants as the most necessary qualifications for school happiness. It is clear that the physical equipment, school environment, and learning environment are seen as the key factors that affect the quality of life of the school community as well as the quality of education. Similar findings are seen in previous studies. In a study conducted by Engels, Aeltermann, Van Petegem and Schepens (2004), the findings show that the atmosphere at school, contacts with teachers, involvement in class and at school, school regulations and infrastructure are among the best predictors of school happiness. Similarly, in a study by Singh (2014), the findings of teachers' behavior, school equipment, and social activities increase school happiness. In another study by Talebzadeh and Samkan (2011) the school happiness was associated with the physical factors, individual factors, social/emotional factors, and instructional factors.

The priority level order of main categories were school environment, physical equipment, communication and collaboration, learning environment, education policy, school management, teacher qualifications, social activities, school environment, learning activities, student centeredness, and student qualifications. Moreover, the results indicated that the priority level of the main qualifications varies from one participant group to another. School administrators give more priority to the school environment, physical equipment, and education policy for school happiness. In addition, the parents evaluate the physical equipment, school environment, cooperation and communication as more priority for school happiness. On the other hand, the students perceive the learning environment, school environment, and physical equipment as more prior. In addition, the parents evaluate the physical equipment, school environment, cooperation and communication as more preferred in terms of school happiness. Similar results are seen in previous studies. In a study by Ekinci, Sakız and Bindak (2017), the results show that the social, individual and physical environment of school are the main factors which affect school administrators' life quality. In the studies by Aelterman, Engels, Van Petegem and Verhaeghe (2007) and Collie, Shapka, Perry and Martin (2015) the main factors affecting teachers' well-being are school environment, support from school principal, and workload. In another study by Sarı, Ötünç and Erceylan (2007), the results show that the school management, social activities, communication, and teacher qualifications are the main factors which affect students' well-being in schools. In a study on school image by Bakioğlu and Bahçeci (2010) it was found that the parents give more priority to physical conditions and education quality of school as well as students' academic achievement.

The safe school environment, cooperation and solidarity among staff, tolerant school environment, sufficient physical equipment, hygienic school environment, non-crowded classrooms, and open communication were seen as the basic qualifications for school happiness. In addition, in learning environment and education policy main themes the participants prioritized the education qualifications which aim to multi-faceted development of students, based on cooperative learning in emancipatory learning environment, student-centered, and non-based on competition. In school management main theme, the participants prioritize the opinions that the school management should be fair and objective, participatory decisions making should be applied in decision making process. In teacher qualifications main theme the prioritized opinions are teachers should have professional competence, they should love their professions as well as renewing themselves. Moreover, the participants also underline the opinions such as sufficient social activities, sportive activities, and art activities. On the other hand, school administrators and teachers give priority to the parents' interest to the children, appropriate environment socially and physically for school happiness. The parents prioritize the opinions such as the activities compatible with students' talent, enjoyable learning activities, and the activities which make students happy. The teachers and students also prioritize the opinions including students are prior in school, students feel valued, and priority is given to students'

needs. The school administrators prioritize the opinions such as students who have goals, success-oriented students, and the students who obey to school-rules. In previous studies similar opinions are identified by researcher. In a study by Büyükşahin-Çevik and Yıldız (2016) it is found a statistically significant positive relationship between the self-esteem and happiness of the students. In other study by Uusitalo-Malmivaara (2011) the results show a strong relationship between global and school-related happiness and social relationships. Furthermore, the most popular happiness increasing factors were success in school, more free time and success in a hobby. In another study by Bird and Markle (2012), the school happiness was associated with the critical factors include personal goal setting, structured mentoring or life coaching, increasing gratitude, problem solving, and interpersonal skills. In addition, Asıcı and Ekiz (2018) found that supportive teacher behaviors, secure learning setting and positive peer interaction, academic efficacy and emotional efficacy significantly increase school happiness, but the success-orientedness and social efficacy have no significant effect. Similarly, Oishi, Diener and Lucas (2007) found that the people who experience higher level of happiness are more successful in terms of close relationships and volunteer work, but that those who experience slightly lower level of happiness are more successful in terms of education, political participation and income level.

The results show that the physical equipment, school environment, learning environment, communication and collaboration, education policy, social activities, school management and teacher qualifications were perceived as the common components of school happiness. In addition, the prioritization level of required qualifications for school happiness varies from one participant group to another. While the school administrators and teachers give more priority to school environment, but the students give more priority to learning environment. On the other hand, the parents give more priority to physical equipment. Moreover, the most prior opinions in each main theme were a safe school environment, sufficient physical equipment, school-parent cooperation, multi-faceted development of students, talent education, fair school management, teachers' professional competence, and sufficient social activities. It is clear that the participants emphasized on to safe and equipped school, and school-parent cooperation. Furthermore, talent education, fair school management, teachers' professional competence and sufficient social activities were seen as the key qualifications for school happiness.

Suggestions

According to the participants opinions it is appear that school administrators should more endeavour to create a safe and tolerant school environment for more happiness in schools. It can be suggested that the cooperation and solidarity should increase among the school community members to encourage a happy school environment. The sufficient and hygienic school environment are seen main qualifications for school happiness. Therefore, school administrators can give more priority to school-parent cooperation and create an open communication culture among the members of school

community to increase school happiness of them. It can be suggested that the policy makers in education, should give more priority to talent education and consider multi-faceted development of the students to ensure school happiness. The elimination and competition based approach in education should be renounced, and the priority should be given to the understanding of cooperative learning supported by rich social activities that will enable students to develop in a multifaceted way. School administrators should display fair management skills and give priority to participatory decision making. Teacher candidates should be trained as teachers who love teaching profession and should have professional competence. This study was planned in a grounded theory design. Further research can be planned in different research design in this topic. In this study, it was aimed to reveal main components of a school happiness theory based on the opinions of the participants. Further studies can be conducted on hygienic school, talent education, safe school, and so on.

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The Role of Moral Attitude, Goal Commitment, and Cheating Tendency in Academic Achievement

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Abstract

This study aims to examine the effects of cheating tendency, academic goal commitment, and moral attitude toward cheating on academic achievements of teacher candidates. 486 teacher candidates were recruited. The moral attitude toward cheating was measured with the Moral Attitude subscale of the Scale for Attitude Towards Cheating. The cheating tendency was measured with the Cheating subscale of the Academic Dishonesty Scale. The academic goal commitment was measured with the KUT scale. Academic achievement was measured with the GPA. The data were analyzed with the independent t-test, Pearson Correlation test, and path analysis. While moral attitude positively and directly affected academic goal commitment, it negatively and directly influenced cheating tendency negatively. Academic goal commitment predicted cheating tendency negatively and GPA positively. The cheating tendency had a negative impact on GPA. Academic goal commitment positively affected GPA via cheating tendency; however, the direct effect of academic goal commitment on GPA was higher than the indirect effect. Moral attitude negatively predicted cheating tendency via academic goal commitment while it affected GPA positively. Moral attitude positively predicted GPA via cheating tendency. Consequently, cheating tendency affected academic achievement negatively. Moral attitude toward cheating and the high level of academic goal commitment reduced cheating tendency and increased academic achievement.

Keywords: Moral, cheating, academic dishonesty

DOI: 10.29329/epasr.2020.236.4

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Introduction

Students can apply to various strategies such as studying daily, creating study groups, reading the course content, and keeping note cards (Dapremont, 2014) to achieve academic success. Some researches stated that students believe that they can be successful and that this belief is a source of motivation for success (Coleman, 2008; Love, 2010). A person's self-belief is one of the factors that make him / her successful, which also coincides with the social cognitive theory of Bandura (1986). However, individuals can adopt a variety of study approaches that have been conceptualized as deep (Marton & Säljö, 1976; Juklová et al., 2015) or strategic (Ramsden, 1988; Entwistle & Waterson, 1958) study approach to succeed in academic tasks such as assignments, exams, and lectures. An individual's approach to learning, and therefore studying, can also affect the processes and perceptions of academic achievement (Yıldız, Şenel ve Can, 2018). Among these approaches, unlike academic students, the approach that is conceptualized as a surface approach and that is related to students' memorization, and fear of loss (Biggs, 1999; Juklová et al., 2015) may encourage students to choose non-moral paths for success.

The students who have a surface approach may be more likely to exhibit a cheating tendency to achieve academic tasks, pass exams, and get good grades. However, this approach of students may lead to failure rather than success. There is a possibility to fail for the students who turn to non-moral paths to achieve academic success. Although some researchers found no significant relationship between academic achievement and academic dishonesty tendencies (Robinson et al., 2004; Chase, 2010; Bourassa, 2011; Genereux & McLeod, 1995; Mustaine & Tewksbury, 2005) and some revealed negative relationships (Zhang, Yin & Zheng, 2017; Cochran, 2017; McCabe & Trevino, 1997; Ömür, Aydın & Argon, 2014), the role of moral attitudes and being committed to academic goals should be examined in detail. Because their personal beliefs can be effective in achieving academic achievement, their commitment to this goal, and their resistance to obstacles can play a key role in academic achievement. Therefore, commitment to academic goals can increase the academic success of the individual, lead to a moral approach by moving away from the tendency to cheat.

Goals are intentions that are specified in detail (Orlich et al., 2010). The goals of the students are described as multivariate profiles that can be defined as the different criteria profile that the learner determines for a learning task (Pieschl, Stahl & Bromme, 2013). Learning goals are determined to focus on development. Individuals make efforts to learn and develop their abilities without considering if they are compared with others or according to some particular standards. On the other hand, performance goals focus on assessing individuals by comparing them with predetermined standards or the capabilities of others (Arends & Kilcher, 2010).

Locke et al. (1981) emphasized that goal commitment referred to a commitment to achieve a goal, while Naylor and Ilgen (1984) stressed that goal commitment is focused on the willingness of a

problem solver to continue the effort and achieve a difficult goal over time. Klein et al. (1999) stated that the main outcome of the goal commitment was to provide the relationship between task difficulty and performance. Klein and Wright (1994) point out the importance of goal commitment by emphasizing that individuals who are committed to their goals are more likely to have higher performance than others when their task is equally challenging.

Since goal commitment is directly associated with academic achievement (Johnson, 2007; Girrardi, 2011; Lord, Bjerregaard & Hartman, 2013), determining the goals of the individuals correctly, and showing their commitment to these goals can remove them from the tendency to cheat. This study aims to examine the effect of moral attitude, goal commitment, and the cheating tendency on academic achievement, to test whether the cheating tendency will bring success, and the role of goal commitment and moral attitude in this path.

Methodology

Research Design

This study was designed to provide evidence of the role of moral attitude, goal commitment, and cheating tendency on academic achievement. A theoretical model was hypothesized to reveal the relationships.

Participants

The study group included the final year students in teaching programs of elementary school (n=48), German language teaching (n=19), preschool (n=39), social sciences, (n=27), psychological counseling and guidance (n=47), elementary mathematics (n=27), Turkish language (n=38), Science (n=47), English language (n=66), physical education and sports (n=128). Of the participants, 61.5% were females (n=299), 38.5% were males (n=187).

Measurements

Attitudes Towards Cheating

The Moral Attitude subscale of Attitudes Towards Cheating, developed by Ay & Çakmak (2015), was used to determine the moral attitudes of the students. The scale has 16 items, while the moral attitude subscale includes seven items that are rated between 1 (strongly disagree) – 5 (strongly agree). They found the internal consistency coefficient as 0.85. For this study, the results of the CFA and alpha coefficient were displayed in table 1.

Table 1. CFA results and Alpha Coefficient for Moral Attitudes Towards Cheating

Subscale		Cronbach's Alpha							
Moral Attitude		.94							
CFA Fit Indexes	χ^2	df	χ^2/df	GFI	AGFI	TLI	CFI	SRMR	RMSEA
	20.46	11	1.86	.98	.97	.99	.99	.009	.04

Cheating Tendency

The cheating subscale of the Academic Dishonesty Tendency Scale, which was developed by Eminoğlu & Nartgün (2009) to measure the academic dishonesty tendencies of individuals, was used in this study to measure university students' cheating tendencies. The scale includes 22 items, while cheating tendency has five items that are rated between 1 (strongly disagree) – 5 (strongly agree). The alpha coefficient for the cheating tendency was 0.71 in the original study. For this study, the results of the CFA and alpha coefficient were displayed in table 2.

Table 2. CFA results and Alpha Coefficient for Cheating Tendency

Subscale		Cronbach's Alpha							
Cheating Tendency		.82							
CFA Fit Indexes	χ^2	df	χ^2/df	GFI	AGFI	TLI	CFI	SRMR	RMSEA
	49.45	16	3.09	.97	.94	.96	.98	.05	.06

Goal Commitment

For the measurement of the commitment to academic goals, KUT target-free, one-dimensional, commitment scale, developed by Klein et al. (2014) was used. Şenel, Yıldız, & Klein (2019) adapted the scale in Turkish. The scale has 4 items that are rated between 1 (not at all) and 5 (extremely). The most important feature of the scale is being a one-dimensional and target-free. After specifying the target, the scale can measure the commitment (how committed are you to [your/the/this] [target]?). The scale designed as “how committed are you to academic goals?” The results of CFA and alpha coefficient were displayed in table 2.

Table 3. CFA results and Alpha Coefficient for Goal Commitment

Subscale		Cronbach's Alpha							
Goal Commitment		.94							
CFA Fit Indexes	χ^2	df	χ^2/df	GFI	AGFI	TLI	CFI	SRMR	RMSEA
	0.8	1	0.87	.99	.99	1.0	1.0	.00	.00

Academic Achievement

The academic achievement levels were determined with GPA. GPA was grouped between 0-2.00, 2.01-2.50, 2.51-3.00, 3.01-3.50 ve 3.51-4.00.

Data Collection

The authors collected the data during the 2017 - 2018 academic year with the participation of teacher candidates. The students were asked whether they wanted to participate in the research voluntarily, and the purpose of the research was explained to the volunteers, and the form was introduced.

Analysis

The demographic variables of the participants were analyzed by percentage and frequency. While the differences between the genders were determined by using the independent t-test, the relationship between the variables was calculated with the Pearson Correlation Coefficient. Primary level confirmatory factor analysis was performed in the AMOS program to determine whether the scales were suitable for path analysis. To calculate the fit indices of the hypothesized model, path analysis was performed in the AMOS program, the maximum likelihood method was used, and the direct and indirect effects of the variables were calculated.

Results

Table 4. Gender differences regarding GPA, Moral Attitude, Cheating Tendency, Goal Commitment

Variables	Female		Male		T	p
	n	X±σ	n	X±σ		
Moral Attitude	299	3.69±1.15	187	3.57±1.30	1.087	.278
Cheating Tendency	299	2.19±.90	187	2.49±.96	-3.513	.000**
Goal Commitment	299	3.93±.87	187	3.66±1.06	2.952	.003**
GPA	299	3.34±.88	187	2.77±.81	7.139	.000**

There were gender differences regarding cheating tendency ($t=-3.513$, $p<0.01$), goal commitment ($t=-2.952$, $p<0.01$), and GPA ($t=7.139$, $p<0.01$). No significant difference was found between genders in cheating tendency ($p>0.05$). Females reported lower cheating tendencies and higher commitment to academic goals and GPA than males.

Table 5. Mean, standard deviation, skewness and kurtosis values, and correlation coefficients

	n	X±σ	Skewness	Kurtosis
GPA	486	3.12±0.90	.06	-.45
Moral Attitude	486	3.64±1.21	-.63	-.67
Cheating Tendency	486	2.30±0.93	.46	-.34
Goal Commitment	486	3.83±0.96	-.77	.31
	1	2	3	4
GPA	1			
Moral Attitude	.178**	1		
Cheating Tendency	-.284**	-.735**	1	
Goal Commitment	.271**	.314**	-.337**	1

Commitment to academic goals positively correlated with GPA ($r=0.271$, $p<0.01$) and moral attitude ($r=0.314$, $p<0.01$) while negatively correlated with cheating tendency ($r=-0.337$, $p<0.01$). Moral attitude positively correlated with GPA ($r=0.178$, $p<0.01$) while negatively correlated with cheating tendency ($r=-0.735$, $p<0.01$).

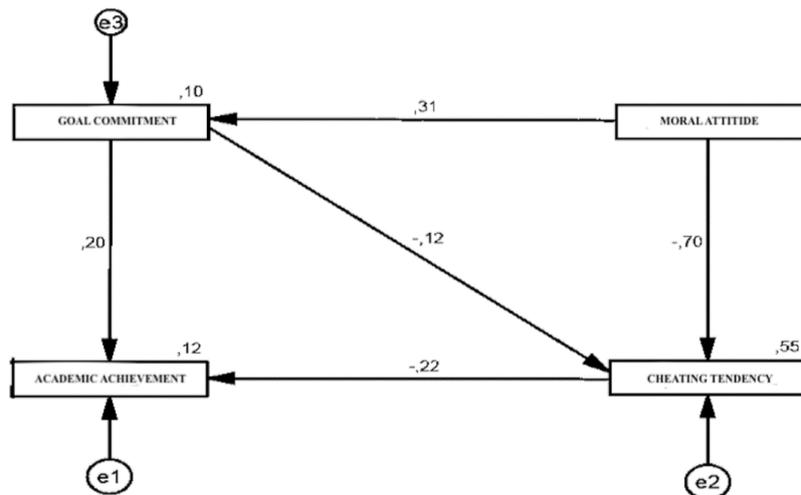


Figure 1. The theoretical model displaying the path between goal commitment, cheating tendency, moral attitude, and GPA

Figure 1 shows the path between goal commitment, cheating tendency, moral attitude, and GPA. There are nine paths, including five direct and four indirect effects hypothesized in the model. Path 1 is the direct prediction of moral attitudes to goal commitment. The path 2 is between goal commitment and GPA, while path 3 is between moral attitude and cheating tendency. Path 4 represents the prediction of goal commitment to cheating tendency. Path 5, which is the last direct effect, is between cheating tendency and GPA. The path 6 is the indirect effect of moral attitude on GPA via goal commitment. In path 7, it is hypothesized that moral attitude indirectly predicts cheating tendency via goal commitment. Path 8 shows the indirect effect of moral attitude on GPA through goal commitment and cheating tendency. Path 9 displays the indirect effect of goal commitment on GPA via cheating tendency. Path 10 is the indirect effect of a moral attitude on GPA via cheating tendency.

Table 6. The estimated parameters, direct and indirect effects

	Mediator/ moderator		Estimate	Standard Error	C.R.	P	Direct Effect	Indirect Effect	
MA (P1)	-	GC	.314	.034	7.28	*	.314	-	
GC (P2)	-	GPA	.198	.042	4,35	*	.198	-	
MA (P3)	-	CT	-.698	.025	- 21,82	*	-.698	-	
GC (P4)	-	CT	-.118	.031	-3,68	*	-.118	-	
CT (P5)	-	GPA	-.217	.044	-4,79	*	-.217	-	
MA (P6)	GC	GPA	-	-	-	*	-	.062	
MA (P7)	GC	CT	-	-	-	*	-	-.037	
MA (P8)	GC - CT	GPA	-	-	-	*	-	.008	
GC (P9)	CT	GPA	-	-	-	*	-	.026	
MA (P10)	CT	GPA	-	-	-	*	-	.151	
Fit Indices									
Model	x²	df	x²/df	GFI	AGFI	TLI	CFI	SRMR	RMSEA
	2.36	1	2.36	.99	.97	.98	.99	.01	.05

The MA directly predicted the GC at the level of 0.31% (path 1). GC affected the GPA directly at approximately 0.19% (path 2). MA had an impact on cheating tendency at the level of -0.69% (path 3). GC directly predicted CT at the level of -0.18% (path 4), while CT affected GPA directly by approximately -0.21% (path 5). MA indirectly affected GPA and CT via GC (path six and path 7), while MA indirectly predicted GPA via both GC and CT (path 8). GC had an indirect impact on GPA via CT (path 9), while MA indirectly predicted GPA via CT (path 10). The fit indices revealed that the hypothesized model had perfect fit ($\chi^2=2.36$, $df=1$, $\chi^2/df=2.36$, $GFI=.99$, $AGFI=.97$, $TLI=.98$, $CFI=.99$, $SRMR=.01$, $RMSEA=.05$).

Discussion and Conclusion

This study aims to examine the effect of moral attitude, goal commitment, and the cheating tendency on academic achievement, to test whether the cheating tendency will bring success, and the role of goal commitment and moral attitude in this path. The results revealed that moral attitude increased goal commitment, which directly and positively predicted GPA. Additionally, the moral attitude towards cheating indirectly and positively predicted GPA. Contrarily, cheating tendency decreased GPA. There was a positive correlation between moral attitude and GPA (Table 5), and cheating tendency decreased this relationship level in the model (Table 6). When the indirect effect of MA on GPA (via cheating tendency) was examined, the positive effect of moral attitudes proceeded. Thus, it can be inferred that a moral attitude reduces the negative impact of cheating tendency on GPA. In the model, it is seen that goal commitment decreases the cheating tendency. Besides, cheating tendency reduced the relationship between goal commitment and GPA. It was found that moral attitude decreases the level of cheating tendency through goal commitment. Moral attitude directly decreased the cheating tendency; however, it is a surprising finding that goal commitment negatively affected the prediction level of moral attitudes on the cheating tendency. Some researchers state that there are no significant associations between GPA and cheating (or academic dishonesty) (Robinson et al., 2004; Chase, 2010; Bourassa, 2011; Mustaine & Tewksbury, 2005; Genereux & McLeod, 1995) while some found significant relations between these variables. For example, Zhang (2017) revealed that the students having lower grades were more prone to cheating, while Cochran (2017) found a negative correlation between GPA and academic dishonesty. McCabe & Trevino (1997) found that GPA had a negative impact on academic dishonesty. Ömür, Aydın & Argon (2014) stated that cheating tendency increased if GPA decreased.

Having a surface learning approach can be the reason for cheating. It is revealed that the surface learning approach can be detrimental for students' moral development (Fleming, 1996; Ponemon, 1990); however, Guo (2011) reported that there was no relationship between plagiarism and surface approach.

Consequently, moral attitude and goal commitment independently increase academic achievement while cheating tendency negatively affected academic success. Increasing the commitment levels of the individuals having a moral attitude toward cheating on academic goals may cause an increment in cheating tendency. The student's goal perception, task difficulty, and being over motivated may lead students to cheat for academic success. It is possible to infer that cheating tendency brings failure. Correspondingly, it can be said that the teacher candidates having a moral attitude, studying for the academic tasks and goals, and being committed to these goals will reach academic success.

Every part of the educational institution has an important role in determining academic goals and adopting a moral attitude. Research shows that if higher education institutions such as faculties, schools, and similar elements include and provide guidance, students are more likely to achieve academic success (Dapremont, 2011; Etowa, Foster, et al., 2005; Gardner, 2005; Higgins, 2005; Wong et al., 2008)

Acknowledgments

This study was presented as an oral proceeding in 2. International Turkish World Congress on Education and Social Sciences held between 7-8 December 2018.

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A Case Study on the Competencies of the Teachers Assigned Abroad by the Ministry of National Education to Teach Turkish to Foreigners

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Abstract

The profession of teaching is defined in Article 43 of the Fundamental Law of National Education no. 1739 as a specialized profession that undertakes education, training and other related administrative duties of the state, and the qualifications of teachers are evaluated under two sections as general qualifications and special field qualifications. Teacher qualifications are competencies that are required to be possessed by all teachers under training to achieve national education goals. The increasing interest in Turkish, escalating immigration rates and other reasons have caused the importance of teaching Turkish as a foreign language to increase. The Ministry of National Education assigns lecturers and teachers every year in order to meet the demand for Turkish educators from abroad. The aim of this study is to determine the field qualifications of teachers who are awaiting assignment after having passed the exam held by the Ministry of National Education to be assigned abroad. The method in this study was designed as case study. The random purposeful (purposive) sampling method and the purposive criterion sampling method were used to determine the study group. The study group consists of 10 teachers and lecturers awaiting assignment after having passed the foreign lecturing exam held by the Ministry of National Education. The data collection phase of the study was carried out using the interview method. The data were transferred to the MAXQDA 12 qualitative data analysis program and the content analysis technique was used in the analysis of the data. Study results showed that most of the teachers in the study group had low awareness toward their assignment and a lack of knowledge on methods-techniques, material and planning, and that most of the participants lacked training in their fields. According to the results obtained in this study, educators to be assigned abroad by the ministry should be required to graduate from the Turkish teaching undergraduate - graduate or postgraduate programs related to teaching Turkish to foreigners.

Keywords: Teaching Turkish as a foreign language, teacher's competencies, teacher education

DOI: 10.29329/epasr.2020.236.5

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Introduction

The profession of teaching is defined in Article 43 of the Fundamental Law of National Education no. 1739 as a specialized profession that undertakes education, training and other related administrative duties of the state (Milli Eğitim Bakanlığı, 1973). According to a statement in the same article, teachers are required to receive special training in their determined field and to possess adequate knowledge and skills in three main areas: general knowledge-general ability, occupational knowledge (pedagogical formation) and field knowledge. Therefore, the profession of teaching is a field of occupation that requires field knowledge, general knowledge and pedagogical knowledge and skill (Çakan, 2004; Şişman, 2009).

"Teacher Qualifications", prepared under three sections as "teaching qualifications", "general knowledge and skills" and "special field knowledge and skills" in compliance with the definition of teaching as clearly stated by the Ministry of National Education in the law no. 1739, went into effect in 2002. According to this, the qualifications of teachers were divided into two sections as general qualifications and special field qualifications. General qualifications encompass 6 fields of qualifications, 31 subfields of qualifications and 233 performance indicators while special field qualifications encompass special knowledge and skills (MEB, 2008).

Teachers play important roles in all stages of education, including the planning, implementation and evaluation of educational activities. Previous studies revealed that student success is directly influenced by the difference created by teachers who possess the aforementioned qualifications (Demirel and Kaya, 2006; Eryaman, 2007; Özer and Gelen, 2015). Therefore, teacher selection directly affects the future of a country. Finland, which receives international acclaim for educational success, accepts only 15% of the applications to teacher training schools. In addition to knowledge tests, communication and social interaction skills are also evaluated in candidate selection through interviews (Şişman, 2009). In addition, teachers are required to have completed a master's degree.

The aforementioned teacher qualifications are required to be possessed by all teachers under training to accomplish national education goals. However, teaching one's native language as a foreign language requires an additional area of specialization. Teachers who teach their native language as a foreign language are required to be able to speak a second or even a third language in addition to their pedagogical qualifications and knowledge of foreign language teaching methods. Foreign language is very important for teachers in terms of efficiency as it is both a tool and a purpose for them (Costa, 2015). Additionally, language proficiency is also important in terms of contributing to the identity development of foreign language teachers as "their teaching experiences are often synchronous with their linguistic development" (Miller and Kubota, 2013). As observed by Chambless (2012), there is a

causal link between the foreign language proficiency of teachers and the level of education in the classroom.

The professional qualifications of teachers are subject to their general knowledge, subject field knowledge and occupational knowledge and skills (Erden, 2005; Eryaman& Riedler, 2010). The "pedagogical education" of teachers who teach their native language as a foreign language is also of importance (Shultz, 2000), and factors such as the emergence of good methods as a result of teacher qualifications, the extent of foreign languages spoken in class and adopted educational approaches directly influence the learning process of all students (Costa, 2015).

Foreign language teaching requires serious preparation. Teachers are required to be capable of conveying knowledge to their students in addition to being knowledgeable about the topics discussed. Additionally, teachers are required to be creative and innovative (Marcelino, 2005).

Questions related to language teaching are generally on what to teach and how. Therefore, teachers are required to be knowledgeable about the essence of the language being taught, or, with a clearer expression, language or linguistics as a whole (Troncoso, 2005). Without this content knowledge, language teachers cannot judge themselves adequately to improve their linguistic proficiency (Kömür, 2010).

The world is in a state of rapid change. Especially with the rapid development of computer and communication technologies in the past 20 years, past knowledge loses validity and gets replaced by new information and methods. The knowledge and skills that were required to be possessed by a second language teacher 20 years ago are insufficient in today's global and rapidly changing world. Although the body of topic knowledge taught under grammar and pedagogy 20 years ago is adequate, second language teachers today are faced with various topic fields (Wilbur, 2007). Therefore, foreign language teachers are required to adapt themselves and possess an accumulation of knowledge and culture in a wide network.

Teachers who teach Turkish as a foreign language should also possess knowledge and skills on attitudes and values in addition to the aforementioned general occupational qualifications. That is because Turkish teachers represent Turkey, Turkish people and Turkish culture in the eyes of foreigners and Turkish learners from around the world (Karababa and Çalışkan, 2013).

The matter of teaching Turkish as a foreign language has gained high importance in recent years. Certificate programs, undergraduate and graduate courses and scientific and academic publications are important indicators of this situation. The most important reason is the increasing demand for learning Turkish. Turkish is taught prevalently as a foreign language both at home and abroad. The number of foreign students in the country has increased, especially in universities (Mutlu and Ayrancı, 2017), and people living in our country for various reasons study Turkish in Turkish education centers. In foreign countries, Turkish courses are offered in various schools established in

recent years, Turcology departments in universities and in various other departments as elective courses. Additionally, Turkish is also taught in the Yunus Emre Institutes and centers of Turkish Language and Culture. Foreign teacher assignments are mainly done by the Ministry of National Education. Teacher selection and assignment was previously done by the Yunus Emre Institute before the institute transferred this task to the Ministry of National Education. Every year, the Ministry holds foreign teacher and lecturer exams for assignment to Turkish schools abroad, Turkish Community Centers and universities upon demand. In addition to certain main qualifications required from lecturer and teacher candidates, Vocational Qualification Exams (written) and Representative Ability Exams (interview) are also held. The candidates who passed the exam are assigned in line with the emerging needs. The requirements for applying for the foreign lecturer exam are listed below:

a) Being a citizen of the Republic of Turkey,

b) 1- Having completed at least 5 (five) years of service as a teacher and/or academician as of the last day of application and being actively in service as an academician under the Higher Education Personnel Law no. 2914, or

2- Having completed at least 5 (five) years of service as a teacher and/or academician as of the last day of application and being actively in service as a teacher in the urban or rural departments of the Ministry of National Education under the State Officer Law no. 657*

c) Having completed military service or being exempt,

d) Having not been sentenced for crimes against the safety of the State, crimes against the constitutional order and the functioning of this order, embezzlement, bribery, theft, fraud, forgery, abuse of trust, fraudulent bankruptcy, bid rigging, using fraud or trickery in the fulfillment of execution, laundering money originating from criminal activity and contraband, even if pardoned or the sentence is expired according to Article 53 of the Turkish Penal Code dated 26/06/2004, numbered 5237.,

e) Having no obstacle to be assigned abroad according to de information and documents obtained as a result of the security clearance to be performed by the relevant authorities,

f) Not having any bodily and mental illness that would prevent the candidate from performing the duty, not being disabled and not being a carrier of any infectious disease,

g) Having not been sentenced for any disciplinary punishment other than warnings and reprimands,

h) Being in compliance with the graduation and foreign language requirements (50 p.) stated in Article (i) of 1. GENERAL PRINCIPLES,

i) Passing the Vocational Qualification and Representative Ability Exams,

j) To be assigned for a second time, those who have previously been assigned abroad by the Inter-Ministerial Joint Culture Commission must have completed their previous foreign duties successfully and have worked for at least 2 (two) years as of the last day of application,

k) Not to be waiting for assignment after having passed the previous exams held by the Inter-Ministerial Joint Culture Commission,

l) Being in possession of the representative ability required by the service. The candidates are required to have a degree from the departments of Turkish Language and Literature/Turkish and Contemporary Turkish Dialects and Literature in the Faculty of Science and Letters, foreign language departments or the departments of philology, linguistics, translation science, comparative literature, teaching and translation as required by the service (MEB, 2017).

As stated above, teaching one's native language as a foreign language is a task that requires an additional area of expertise. Therefore, it is debatable whether only one additional foreign language can be enough to fulfill this task.

The aim of this study is to determine the field expertise competencies of Turkish lecturers to be assigned abroad by the Ministry of National Education, examine the topic based on the conclusions and develop suggestions. In this context, the study was conducted through interviews with teachers awaiting assignment after having passed the exam held by the Ministry of National Education.

Method

Model of the Study

The present study was designed as a case study. Case studies are among the qualitative study designs used in the exploration and examination of emerging situations in the field of education. Case study is an approach that includes the detailed examination and description of limited systems using multiple data collection in order to obtain systematic information on how the said systems operate (Chmiliar, 2010; Merriam, 2013). In a case study, the researcher thoroughly examines one or more conditions limited in time using multiple-source data collection tools such as observations, interviews, audio-visuals, documents and reports (Creswell, 2007). In the present study, in compliance with the case study design, data were collected from the teachers and academicians in the sample group through interviews before being analyzed and described in detail to determine the field qualifications of the teachers awaiting assignment after having passed the exam held by the Ministry of National Education.

Study Group

The random purposeful (purposive) sampling method was used to determine the study group (Creswell, 2007). Purposive sampling is a method where cases thought to contain situations that are richer in terms of information according to the purpose of the study are evaluated. The purposive criterion sampling method was also used (Büyüköztürk et al., 2015). Therefore, three criteria were determined. These are; having passed the foreign lecturer exam held by the Ministry of National Education, voluntariness to participate in the study and availability to participate in telephone interviews. The study group consists of 10 teachers and academicians awaiting assignment after having passed the exam held by the Ministry of National Education. The teachers were informed about the purpose and contents before the study was initiated. Therefore, the study group was determined on a fully voluntary basis. The participating educators were coded as P₁, P₂, P₃...P₁₀. Table 1 shows the age, gender, seniority and education information of the study group.

Table 1. Study Group Characteristics

#	Gender	Age	Working Year	Educational Background	Educational Field
K1	Male	36	12	Doctoral Degree	Turkish Language and Literature/Modern Turkish Literature
K2	Female	29	6	Master's Degree	Turkish Language and Literature /Modern Turkish Language
K3	Male	35	13	Master's Degree	Turkish Language Teaching/Turkish Education
K4	Male	36	11	Doctoral Degree	English Language and Literature /English Education/English Linguistics
K5	Female	44	20	Doctoral Degree	English Language Teaching/English Education/English Education
K6	Female	36	12	Doctoral Degree	Turkish Language and Literature/Modern Turkish Literature
K7	Female	33	9	Master's Degree	Turkish Language and Literature/Folk Literature
K8	Female	33	9	Master's Degree	Turkish Language Teaching/Turkish Education
K9	Female	29	6	Master's Degree	Turkish Language and Literature Teaching/Modern Turkish Literature
K10	Female	32	8	Master's Degree	Turkish Language and Literature/Modern Turkish Literature

Data Collection Tool

The data collection phase of the study was performed using the interview method, which is common in qualitative studies (Silverman, 2013). Therefore, an eleven-question interview form was used, including questions on the awareness of the teachers toward teaching Turkish to foreigners, their educational background and the educational process of teaching Turkish to foreigners. A question pool was established to create the form and the questions were evaluated in accordance with the views of three expert academicians. After the necessary corrections (clarity and purposefulness) were made, expert opinion was referred to again and the interview form was finalized in accordance with these opinions.

Data Collection

Interviews with the participating teachers and academicians were conducted by telephone due to the geographical distance (Creswell, 2015). Pre-interviews were conducted with the participants, in which explanations were made regarding the content, purpose and importance of the study. Their questions were answered and it was explained that their opinions were important and necessary to detect and eliminate the problems in the field. A pilot study was conducted before the interviews and interview times were determined for each participant. The participants were again warned that the conversations would be recorded and their permission was obtained. Afterwards, the questions in the form were directed at the participants and the interviews began with the following phases:

- introduce yourself (with prestigious titles),
- identify the sponsor of the study,
- give the general topic of the study,
- relay the confidentiality of their responses,
- explain how the information will be used, and
- give an estimate of the interview's length. (Burke and Miller, 2001)

After the interviews were concluded, the audio recordings were transferred to the MS Word program as separate files for each participant and prepared for analysis.

Data Analysis

The data obtained through phone interviews were transferred to the MAXQDA 12 qualitative data analysis program and the content analysis method was used in the analysis of the data. The creation of codes and categories in MAXQDA is controlled by the user, who can create codes before, during or after the material is analyzed. The codes are presented in a hierarchical, treelike, structure that allows several levels of codes to be indexed (Oliveira et al., 2015). The main processes in the content analysis are gathering similar data within the framework of certain concepts and themes, arranging them in a manner that is comprehensible for the reader and interpreting them (Yıldırım and Şimşek, 2013). Among the content analysis types, the categorical analysis was used in the study. The data were coded first in the categorical analysis. Codes are symbols used to classify or categorize word groups and concepts related to study questions (Robson, 2001). The codes were categorized around certain themes. The views of the teachers and academicians on the emerging codes were referenced. The analyzed data were presented with visuals obtained through the program and interpreted. It was aimed to increase the clarity of the visuals by differentiating the colors while categories were coded from general to specific. Therefore, the sequence of colorization is as follows: Red > Green > Yellow > Blue > Khaki.

Findings

The data obtained in the study were analyzed in the form of code - category in the MAXQDA qualitative analysis program, and the results were presented with graphics. Figure 1 shows the awareness of the participating teachers towards their duty and field knowledge.

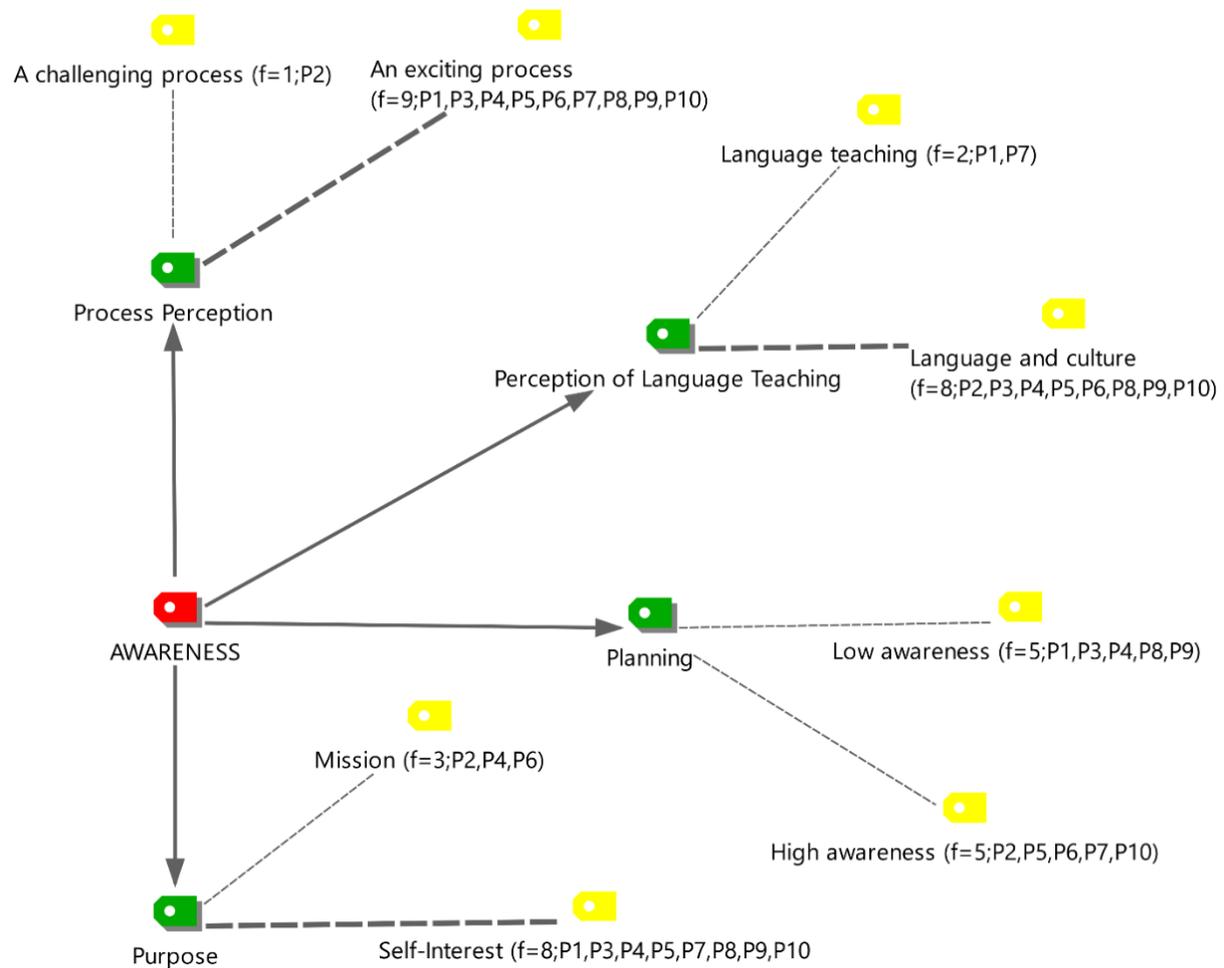


Figure 1. Awareness

Purpose

The participating teachers were first asked the question "What is the primary aim in your desire to go abroad?". 7 of the participants stated their aim as self-improvement and education of themselves or their children. 2 of the participants stated their aim as learning about different cultures and helping the Turks living abroad. 1 teacher responded with both self-development and a sense of duty. Some of the answers given by the teachers are listed below.

Self-Interest: *"My main motivations in going abroad are the good of my children, personal education and gaining experience. (K3)" "It is mostly about living a different experience and learning a foreign language, and I think that it would be beneficial for my personal development as I lived*

abroad before. (K10)" "I applied to work abroad for personal development and an opportunity to become an academician. (K9)"

Mission: *"My primary aim is to promote my own culture, learn about different cultures and get in touch with the Turks living abroad to understand the problems they face. (K6)"*

Planning

In order to reveal their awareness towards their profession and field knowledge, the study group was asked the questions "What kind of planning do you intend to make when you start working?" and "Did you review the curricula related to teaching Turkish as a foreign language?". It was revealed that 5 of the participating teachers were informed about the curricula while 5 of the teachers did not study any Turkish curricula before and had no plans for the process. The findings revealed that the average field knowledge awareness of the participants was low.

Low awareness: *"I have not thought about it, I think that we will be given books in our workplaces. (K3)" "I have not reviewed them in detail, but I have done some research. (K9)"*.

High awareness: *"I haven't thought about this issue as my place of duty is not determined yet, but I have a plan regarding the course content for different proficiency levels. My primary plan is to engage in fun activities with the students. My immediate aim is to improve myself in classroom activities. I do not want to overwhelm the students with grammar knowledge afterwards. (K6)" "I will make my plans based on course hours, I will implement the program I have been using in TÖMER. I will plan the topics I will be teaching at different levels. If they have learned Turkish before, I will hold a number of language proficiency exams. (K10)"*

Perception of Language Teaching

In order to reveal their perception of the close relationship between culture and foreign language teaching, the study group was asked the question "Will you prioritize culture teaching or language teaching?". 8 of the participants emphasized that culture was a part of language and could not be considered as a separate concept while 2 participants stated that they would prioritize language teaching. Based on these results, it can be said that the teachers generally had high levels of perception towards language teaching. Some of the answers given by the teachers are as follows.

Language and culture: *Language is a tool of culture, language cannot exist without culture. I think culture is a very important concept, I will emphasize the promotion of Turkish language and culture without imposing the culture related to the language that we are teaching as there are different cultures in the world. Turkish culture will be included in language education by nature. (K5)" "Culture and language are inseparable, cultural education facilitates language education. (K3)"*

Language teaching: *"Language teaching will be prioritized. (K1)"*

Process Perception

In order to reveal their expectations from the assignment, the participants were asked the question "What are your expectations from the process you will go through?". 8 of the participant stated that the process would be exciting while 2 of them stated that it would be challenging. According to the study data, the participants generally expect positive outcomes from this process.

An exciting process: Gaining experience in Turkish education and teaching language at a basic level, adopting different perspectives, self-improvement, learning about foreign cultures, meeting different people. (K3)" "First of all, I think I will be greatly educated on the Russian language, so this experience will benefit me in the area of foreign language. I want to be a good role model in terms of representing Turkish culture and restoring our reputation abroad. I don't think I will have a problem with this in Russia, but maybe in Europe. My goals are to promote our culture, learn about different cultures, complete the PhD program and improve myself in the field of education as I work at a high school level and aim to get into the academic environment. I think I will be benefited greatly and my vision will expand. (K7)" "A great experience, access to knowledge, doctorate education, learning a foreign language. (K8)"

A challenging process: "First of all, I know that I will be facing challenges but I will focus on my work, I have expectations for myself as well, of course, I want to conduct studies on my field and improve myself. However, my priority will be my students and teaching them in the best way possible. (K2)"

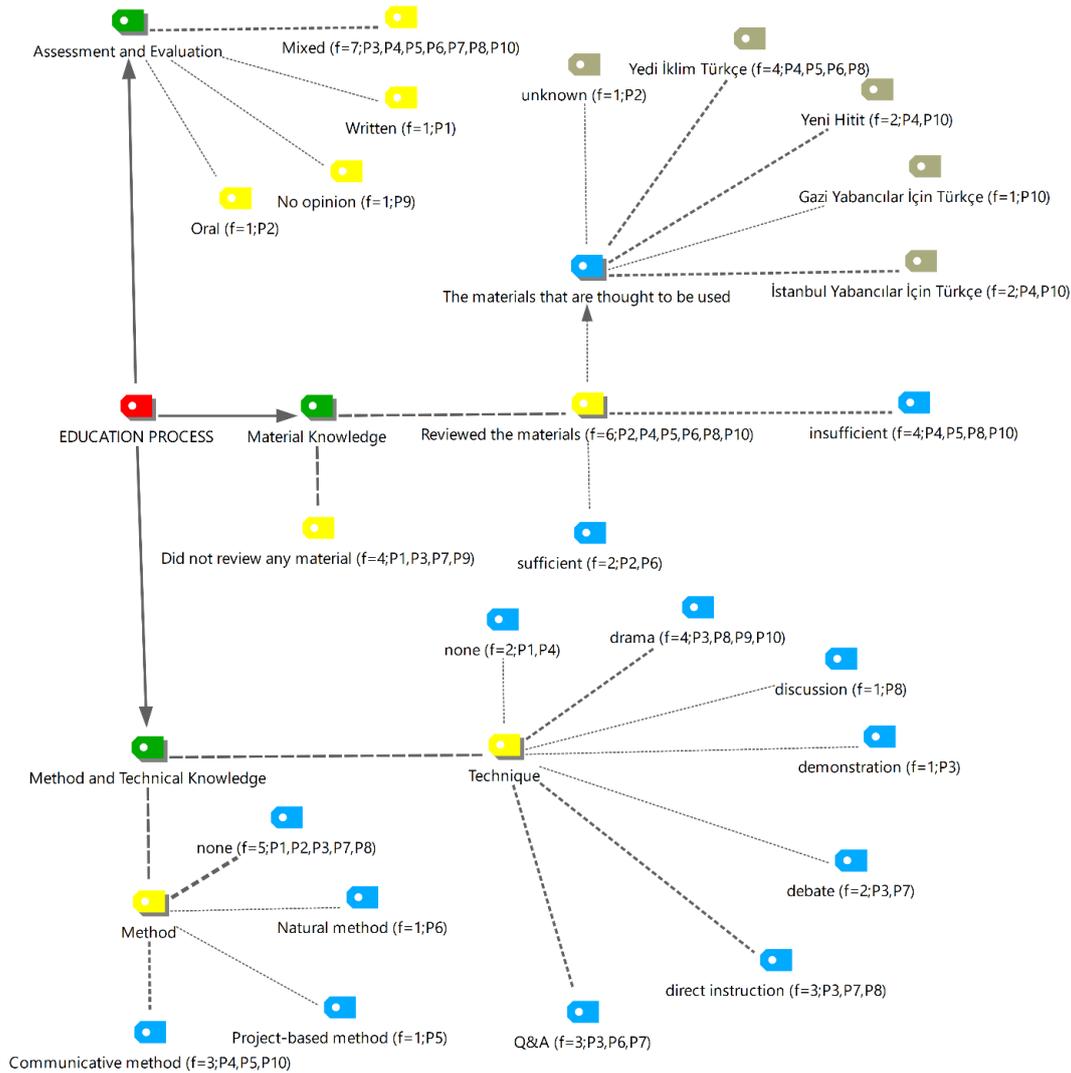


Figure 2. Education Process

Questions on methods-techniques, material-planning and assessment-evaluation phases were directed to the teachers awaiting assignment after having passed the exam held by the Ministry of National Education to be assigned abroad in order to reveal their field knowledge qualifications.

Method and Technical Knowledge

In order to reveal their method-technical knowledge on the field, the participants were asked the question "What methods and techniques do you intend to use in the classroom?". It was determined that the participants preferred to use the communicative method (3), natural method (1) and project-based method (1) while 5 of the participants did not intend to use any method. Regarding technique, drama (4), Q&A (3), direct instruction (3), debate (2), demonstration (1) and discussion (1) techniques were preferred while 2 of the participants did not state any technique.

Views on the method preferences were presented below:

Natural method: *“Technically, I aim to teach student-oriented lessons in the form of dual Q&A. My main priority is to stay in constant communication with my students, making sure that they are actively engaged, teaching student-oriented lessons and creating an environment of active participation and natural life, which can be summarized as the natural method. (K6)”*

Communicative method: *“I will mostly use the communicative language method as I think that this method would be beneficial in emphasizing student skills in connection with each other. (K10) “I aim to use a communication-based process assessment, a formative evaluation that is enriched by materials. We can call this the communicative method but it includes various other aspects such as the integration of technology. (K4)”*

Project-based method: *I want to use a method that integrates technology-based projects. That is because even if I engage with the class for six hours, what students do outside the classroom will still be very important as they learn Turkish in the environment of a foreign language. I want to give them assignments such as instead of intense homework. (K5)”*

Sample quotations were not presented for the views related to technique preferences as one-word answers were given by the participants.

Material Knowledge

In order to determine their material knowledge, the study group was asked the questions "Did you review the material related to this field? Do you think they are sufficient? What materials do you intend to use?". It was concluded that 4 of the participants did not review any material, 6 of the participants reviewed the materials, that 4 out of 6 participants found the material to be insufficient and the other 2 found them sufficient. Additionally, the books *Yedi İklim Türkçe* (4), *İstanbul Yabancılar İçin Türkçe* (2), *Yeni Hitit* (2) and *Gazi Yabancılar İçin Türkçe* (1) were considered to be used while one participant did not state any book set.

Participants who did not review any material: *“No, not exactly, I briefly examined some of the books of the Yunus Emre Institute after a seminar I attended. (K1) “I only examined the book prepared for Syrians. I have no knowledge about the others. (K3)”*

The views of the participants who reviewed the materials are presented below:

The participant who found the materials insufficient: *“Certainly not. There are issues of authenticity and currentness. Also, I consider the materials and method studies of Turkish education as a new field. In this sense, I think that a very different teaching method, that can also be harmful, was designed. It appears to be directly grammar-based. I find it insufficient in this sense. (K5)”*

The participant who found the materials sufficient: *“Yes, I think they are sufficient, although the extent of application should be broadened. I do not have an opinion on what the most beneficial book is. (K2)”*

Assessment and Evaluation

In order to determine their assessment and evaluation knowledge, the study group was asked the question "What kind of assessment-evaluation phase do you intend to carry out in the field of teaching Turkish to foreigners?". 7 of the participants stated that they would carry out the process in a mixed way while 1 participant stated oral, 1 stated written and one participant did not state an opinion.

Direct quotations regarding the codes generated according to the assessment and evaluation preferences are presented below:

No opinion: "I am not well-informed about the practices as I am inexperienced. (K9)"

Mixed: "First, I will get information from the other teachers, then I plan to make assessments through written exams and interviews. I will obtain more information on topics such as written exams, pre-tests and individual interviews. (K8)" "I can use assessment-evaluation tests. Regular exams will be held anyway. Applications will be made towards reading, writing and speaking. I am planning to make my assessments in this manner. As for assessment tools, I plan to review articles in different fields and prepare unique questions based on them. (K7)"

Written: "I will hold written examinations and make assessments based on textbooks (K1)"

Oral: "I plan to make assessments through conversation. (K2)"

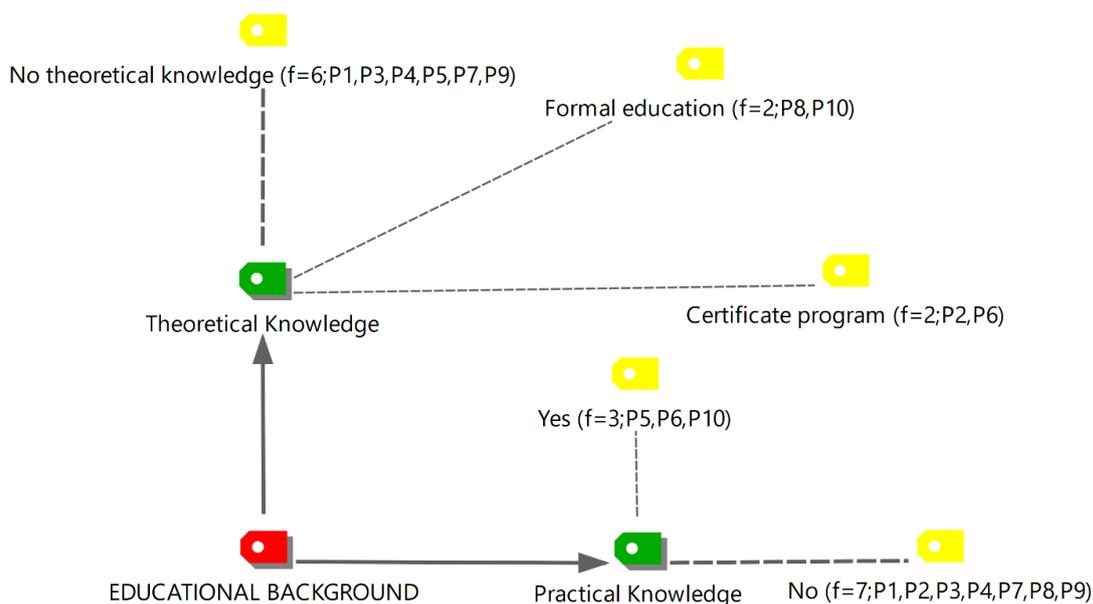


Figure 3. Educational Background

In order to reveal whether they were trained in their field, the participating teachers were asked the question "Did you take any undergraduate/graduate/postgraduate classes or attend a certificate program in the field of Turkish as a foreign language?"

Theoretical Knowledge

According to the study findings, 2 of the participating teachers took classes related to the field in formal education (graduate, postgraduate, doctorate), 2 of them attended certificate programs and 6 of them did not take any classes or attend a certificate program. Based on these findings, it can be said that the teachers to be assigned abroad generally lack theoretical knowledge about the field.

No theoretical knowledge: *"No, I did not take classes or attend a program. (K1)" "I attended seminars. I did not attend any certificate, undergraduate or graduate program. (K5)" "No, I have not attended any program on Turkish in years, I only participated in a study conducted by the Ministry of National Education on Syrian students. (K3)"*

Formal education: *"I study English Teaching as a second graduate program, I took a class on teaching Turkish to foreigners at the graduate level and attended two certificate programs. (K10)" "I took classes during undergraduate and graduate education. I applied for a certificate program but did not hear back. But I would like to attend one as soon as possible. (K8)"*

Certificate program: *"Sure. I took French classes up to the advanced level during my graduate education. I have an intermediate French certificate from Galatasaray University. I attended a German course but could not progress beyond the beginner level. Last year, I took a one-month English course at Oxford. I have a B2 certificate. I attended the TÖMER certificate program at Sakarya University. (K6)" "I attended a certificate program, I have a certificate. (K2)"*

Practical Knowledge

In order to determine whether they have previous experience in their field, the study group was asked the question "Do you have any previous experience in this field?". It was revealed that 7 of the participants had no previous experience while 3 of them worked in the field before. According to the study findings, it can be said that the teachers to be assigned abroad are generally inexperienced in the field. The answers given by the study group are as follows.

Yes: *"I do not have any experience abroad. I teach Turkish to foreigners in Turkey. I work at TÖMER. (K6)" "I do. The University of Maryland has a program in İncirlik Air Base in Adana. I taught Turkish to Americans for two years in addition to academic writing. I also worked at a private teaching institution. I taught Turkish for approximately a year there. (K5)"*

No: *"I have no previous experience. (K2)" "No, I did not work in this field before. (K7)" "I do not. (K9)"*

Discussion and Conclusions

In this section of the study, results based on the findings obtained as a result of the analysis of the field qualifications and perceptions of the teachers to be assigned in the field of teaching Turkish as a foreign language are presented. Discussions were made based on the study results. First, in order to reveal the duty awareness of the educators to be assigned abroad, questions on their purpose to be in

this mission and perception towards the foreign mission, teaching their native language as a foreign language and planning were directed to them.

Based on the findings obtained in the study, a significant part of the educators stated that they wanted to be included in this mission for motivations such as self-interest or self-improvement, economic reasons and the education of their children. Only 2 out of the 10 teachers in the study group stated that they wanted to be in this duty for a certain sense of mission. On the other hand, according to the study results, the educators interpreted this duty as an exciting process and thought that it would benefit them in various ways (language learning, postgraduate education, cultural diversity, cultural interaction, new perspectives). The main objectives in teaching and learning a foreign language are; interacting with different societies and individuals through language, increasing the importance of the specific language among world languages, cultural promotion, increasing the number of international students and integrating the foreign elements in the society (Gün and Memiş, 2019; Vigner, 2001). Therefore, educators that will serve abroad with this mission are required to adopt the aforementioned objectives. Otherwise, the educational process cannot produce a healthy outcome and go beyond the self-improvement of teachers.

According to the study results, half of the educators had a general idea of what methods to follow, what programs to implement and the content of their planning phase at the beginning of their duty. The other half did not have any prior knowledge and idea on their planning phase. Preplanning assessment and evaluation practices are among the main principles of foreign language teaching (Gün and Memiş, 2019). Additionally, the course content and material should be prepared in the planning phase. However, the study results indicate the opposite situation. It was observed that half of the participants were unaware of the contents of the planning phase.

The majority of the participating educators stated that culture and culture education cannot be separated from foreign language education. This result shows that the educators have low language teaching perceptions. Language is the reflection of the civilization and culture of a nation. Culture is reflected to ideas and gets expressed with language, therefore language is the tool used to express the ideas and culture of a nation (Humbolt, 1903, Trans. Akarsu, 1998). According to Erdal (2018), learners of a language learn the culture associated with that language, even if they are foreigners, so language and culture are inseparable twins much like language and ideas. In the study titled "Intercultural Sensitivity of the Turkish as a Foreign Language Teachers" by Saygılı and Kana (2018), it was found that language and culture together formed a whole, and this finding supports the results of the present study.

The knowledge levels of the participating educators on the educational processes they plan to implement in their duties were examined. These can be listed as method and technical knowledge, material knowledge and assessment and evaluation processes. Half of the participants stated that they

had no method knowledge. According to the findings obtained in the study, it was concluded that the technical knowledge of the participants was weak. Two of the participants did not state any techniques while certain participants stated that they would use techniques that are very hard or impossible to implement in foreign language teaching. Additionally, the levels where the techniques can be used were overlooked in the answers. One of the most important aspects of foreign language teaching is the determination of methods. Student preparedness, language skills emphasized by textbooks and student needs are some of the factors that influence method selection (Uysal, 2019). Learning strategies include the integrative features of the process. The strategy is related to the implementation of learning activities in the application phase and learning, activity and material selection in the process of acquiring knowledge and skills. Not only the learners, but also the educators should implement strategies that facilitate learning and increase success in order to achieve educational goals (Günday, 2015). The competencies of teachers and the methods and techniques they use enable students to experience an interesting learning process. From this aspect, the competencies of teachers and the methods and techniques they use are shaped by teacher cognition, and when this is reflected in the classroom, the lessons become more interesting for the students. Teachers are individuals who direct teaching processes and act as guides to learning. Teachers can make the process of teaching the educational schedules they prepare in line with the learning outcomes successful (Kurudayıoğlu and Sapmaz, 2016). However, study results show that the participants had weak method and technical knowledge related to their field.

When the participating educators were asked whether they reviewed the material, it was observed that six of them reviewed the material while four of them did not. Some (f=4) of the educators who stated that they have reviewed material emphasized that they reviewed the "Yunus Emre Institute, Yedi Hitit Türkçe" set that was introduced by the Ministry of National Education in a briefing seminar. This set also stood out as the source that the said educators planned to implement. Although digital environments have gained popularity due to technological developments, textbooks are still valid in terms of carrying out educational activities in a planned way (Özkan, 2010). Therefore, teachers are required to read, study and learn about the textbooks they will be using in the educational process.

According to the analysis data of the assessment - evaluation processes that the participants plan to implement, most of the participants stated that they would carry out the process using both written and oral assessment methods. One participant stated that they had no idea about the process. Assessment and evaluation, which are the complementary elements of the education process, are implemented with different methods and techniques in all fields. The methods and techniques used in language teaching in particular are very different from other fields. That is because assessment and evaluation towards linguistic proficiency are on the forefront. Therefore, the plan to hold both written and oral exams would indicate a lack of professional knowledge in the field. Understanding whether

goals are achieved and coming up with solutions to potential problems are very important in the process of language education.

The reason why the aforementioned study results are generally negative can be associated with the theoretical knowledge and field knowledge results presented below. The levels of theoretical and practical knowledge of the participating educators in the field of teaching Turkish to foreigners were examined. According to the findings obtained, it was concluded that most of the educators did not receive theoretical training in the field while some of the participants took field classes in formal education and some participants attended certificate programs. It was determined that most of the participants were inexperienced in terms of practical knowledge. The results in this section constitute the main section of the study. That is because the most important qualification of a teacher is field knowledge, therefore field competency. In the report titled "The General Qualifications of the Profession of Teaching" published by the Ministry of National Education (2017), teacher qualifications were stated under three main items as occupational knowledge, occupational skills and attitudes and values. Field knowledge and field training were stated below occupational knowledge. The cognitions formed by the experience and training of Turkish as a Foreign Language teachers affect the educational process. The process of language teaching can be completed successfully with qualified teachers (Kurudayıoğlu and Sapmaz, 2016). Preparation for the profession of teaching is done with general knowledge, special field knowledge and occupational knowledge (Demirel, 1999, p. 192). It should be acknowledged that teaching Turkish as a foreign language effectively is an area that requires expertise (Metek and Gürsoy, 2013). In the literature, there are studies that show the importance of experience alongside field knowledge. According to the data based working years, teachers with 0-5 years of experience who recently joined the field have higher sensitivity and awareness towards the issue of teaching Turkish as a foreign language. Teachers who have been in the field for 16 years or more are knowledgeable about the issue after years of experience (Metek and Gürsoy, 2013). It was observed that teachers who lacked experience were inadequate in time management, classroom management and planning (Kara, Öztürk and Dağıstanoğlu, 2017). According to the results of the present study, only three of the educators had occupational experience. In this context, it would be more appropriate to assign experienced individuals for a serious task such as teaching a foreign language in foreign universities. On the other hand, there are also educators who were not trained in the related field as part of undergraduate or graduate education but attended certificate programs for training. The most important cause of this situation is the fact that graduates of departments such as Turkish Language and Literature, English Language and Literature etc. are also accepted. Eight of the ten educators included in the study group of the present study were graduates of Turkish Language and Literature and English departments. The majority of these educators completed their graduate education in fields such as Modern Turkish Literature and Folk Literature. There are no courses related to teaching Turkish as a foreign language in these departments. The adequacy of

certificate programs in such a serious field is also questionable. According to Yüce (2016), Turkish cannot be taught to foreigners with short-term certificate programs and it cannot be overlooked that this task requires skill and a strong structure. Özbay and Bahar (2016) emphasized the importance of reducing the number of such applications as they are problematic in terms of education. In addition, it was observed that almost all of the participants of these paid certificate programs are certified as successful (Barın, Çangal and Başar, 2017). Findings that support the results of this study were found in the similar studies conducted in the field (Kurudayıoğlu and Sapmaz, 2016; Kalfa, 2015; Mete and Gürsoy, 2013; Göçer, 2009)

Recent international studies have revealed that the quality of teachers was a critical factor in student learning results (Australian Professional Standards for Teachers, Consulting Report, 2013). The qualifications and competencies of teachers are the most important factors in the success of educational activities (Büyükkaragöz, 1998). “Teachers’ knowledge and skills are the most vital in-school factors influencing children’s learning.” (Leigh and Mead, 2005).

Peyton (1997) listed the qualifications required to be possessed by foreign language teachers as follows:

“In addition to demonstrating competencies in the general areas of education, interpersonal skills, and professional education (Met, 1989, p. 177), good foreign language teachers need the following:

- A high level of language proficiency in all of the modalities of the target language--speaking, listening, reading, and writing.
- The ability to use the language in real-life contexts, for both social and Professional purposes.
- The ability to comprehend contemporary media in the foreign language, both oral and written, and interact successfully with native speakers in the United States and abroad (Phillips, 1991).
- A strong background in the liberal arts and the content areas.
- Understanding of the social, political, historical, and economic realities of the regions where the language they teach is spoken.
- Pedagogical knowledge and skills, including knowledge about human growth and development, learning theory and second language acquisition theory, and a repertoire of strategies for developing proficiency and cultural understanding in all students (Guntermann, 1992).
- Knowledge of the various technologies and how to integrate them into their instruction.”

Based on the results obtained in the study, the following suggestions were developed:

- Educators to be assigned abroad by the ministry should be required to graduate from the Turkish teaching undergraduate graduate or postgraduate programs related to teaching Turkish to foreigners.
- Experienced teachers who are experts in their field should be prioritized in educator selection if experienced academicians are inadequate.
- The widespread presence of institutions that operate in the field of teaching Turkish to foreigners such as the Yunus Emre Institute and Ankara TÖMER and the assignment of lecturers abroad based on the increasing demand shows that teaching Turkish to foreigners is an active field. Therefore, with a more professional approach, the number of academic departments should be increased instead of certificate programs to meet this emerging demand.

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Mentor Teachers' Mentoring Practices in Science Teaching: Views of Pre-service Early Childhood Teachers

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Abstract

Practical experiences in teaching settings are an important component of pre-service teacher education programs. Pre-service teachers advance what they learn and improve their science teaching (ST) skills as well as other subjects in early childhood education for the period of teaching practices. In addition, teaching science in early childhood education requires more practices for improving teaching skills. Mentor teacher (classroom teacher) is valuable as well as professors in teacher education programs to pre-service teachers while teaching science. The purpose of this study is to reveal mentor teachers' mentoring practices in ST according to pre-service early childhood teachers' views. The method employed method was descriptive study. The sample is composed of 96 pre-service early childhood teachers and their mentors (N=41). Data were collecting within MEST survey. The results showed that most of the pre-service teachers reported their mentor teachers demonstrated less mentoring practices on the system requirement about ST. The pre-service teachers also pointed out that their mentor teachers mostly showed mentoring practices on personal attributes, pedagogical knowledge, modeling, and feedback factors. Knowing and understanding the mentoring skills of early childhood teachers in system requirement, pedagogical knowledge, modeling, giving feedback, and personal attributes would have an important growing on preservice early childhood teachers science teaching skills. That will be helpful for shaping new teaching practices and field experiences in different majors for improving teachers teaching skills.

Keywords: Mentoring, science teaching, teaching practices, early childhood education, pre-service teachers

DOI: 10.29329/epasr.2020.236.6

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Introduction

Teachers face many challenges during the first years of teaching, such as planning and implementing curriculum, assessing, motivating, managing the classroom, and feeling overwhelmed (Roehrig, Pressley, & Talotta, 2002). In recent years, there has been a growth of support, guidance, and practice programs for preservice teachers to prepare them at the beginning of teaching career. However, they do not feel that they are prepared to deal with the reality of teaching and are scared to ask for help because they may feel as if they appear inadequate (Boss, 2001; Riedler & Eryaman, 2016). Some countries went through policy changes about mentoring preservice teachers during their school-based teaching experiences at the end of 1980s (Hobson, Harris, Buckner-Manley, & Smith; 2012). During this time, most countries, such as United States, Australia, China, and Turkey have spent more time and resources to develop mentoring programs and prepare preservice teachers. After excessive works in this area, researchers (Ginns, Tullip, Watters, & Lucas, 1995; Kazempour, 2014; Putman, 2012; Author, 2016) found that teachers' confidence and ability to teach science was the major issue in ST. In addition, researchers suggested that universities need to enhance programs to prepare preservice teachers who are new in the field for effective ST (Eryaman, 2007; Murphy, Neil, & Beggs, 2007).

Mentoring

In the field of teacher education programs, the mentor teachers play an important role in the development and training of future teachers (Hudson, Uşak, & Savran-Gencer, 2009; Ngoepe, 2014). Johnson (2008) described the mentor teacher as an experienced teacher who is skilled in understanding standards, has the ability to transmit effective teaching strategies, and can engage in open communication with beginning and/or preservice teachers. The mentor can provide systematic guidance to a mentee (preservice teacher) and help them tackle the problems that many beginning teachers face (Vonk, 1996). Likewise, the role of the mentor is described by Haigh and Ward (2004) as an encourager, role model, feedback giver, observer, and supporter. The importance of mentoring programs, due to the success in improving classroom practices, preservice teachers' mentor teachers were significant in the impact of their mentees (Murray, P. Hudson, & Hudson, 2011). In Turkey, the roles and responsibilities of mentor teachers during teaching practicum are guided by the Ministry of National Education (MoNE, 1998). Based on that, mentor teachers are assessing their mentees' teaching, modeling classroom management strategies, and other skills.

Quality mentor programs support prepare preservice teachers in ways that enable them to become highly effective teachers in their professional careers (Murray, et al., 2011; Slick, 1995). Most of the studies ([Author, 2016]; Hudson & Skamp, 2002) identified quality indicators of effective mentors. For example, Hudson and Skamp (2002) stated effective mentorship focuses more on improving pedagogical knowledge of preservice teachers, modeling of teaching, the provision of productive feedback, and assisting preservice teachers in planning effective instruction in specific

areas of curriculum, such as science and mathematics. Hudson and Skamp (2002) evaluated five mentoring behaviors on ST as: (a) personal attributes, (b) system requirements, (c) pedagogical knowledge, (d) modelling, and (e) feedback based on the mentor teachers' mentoring.

Personal Attributes

Researchers stated that mentor teachers display their personal attributes as facilitating supportive learning environment (Ganser, 1991; Kennedy & Dorman, 2002; Rippon & Martin, 2006). Moreover, during ST, mentor teachers may show positive attitudes towards science when their mentees are in classroom. Similarly, they can also listen their preservice teachers' issues on teaching and assist them how they can improve their ST skills ([Author, 2016]; Hudson & Skamp, 2002)

System Requirements

System requirements of mentoring refers to curriculum documents, systemic aims, and school policies to regulate and demonstrate the quality of teaching practices for preservice teachers (Hudson, 2007; Hudson et al., 2009). Mentor teachers should also have adequate skills on system requirements while mentoring preservice early childhood teachers during ST (Simsar, 2016). Harlen and Holroyd (1997) stated that preservice teachers requested some help with regard to practical work on searching, collecting, checking and using science equipment within the classroom.

Pedagogical Knowledge

Mentor teachers should also have adequate pedagogical knowledge to facilitate effective mentoring (D. Hodson & Hodson, 1998; Zanting, Verloop, & Vermunt, 2003). The preservice teachers' development of pedagogical knowledge can be enhanced by a competent and experienced mentor (Allsop & Benson, 1996). With regards to subject-related pedagogical knowledge of teachers, researchers concluded that teachers need someone to show them how to do it (Harlen & Holroyd, 1997). Researchers stated that early childhood teachers have lack of science pedagogical knowledge and it was seen as a significant barrier to developing ST and learning in their classroom (Fleer, 2009; Kallery & Psillos, 2001; Nilsson, 2015; Shulman, 1986; Tu, 2006). That is why most of the early childhood teachers stated that science is the subject that they less enjoy teaching, because they afraid that they can't answer child's questions that are related with science and science contents (MacDonald & Sherman, 2007; Murphy & Beggs, 2003). To improve pedagogical knowledge in science contents, early childhood teachers requested first-hand experiences both in their teacher professional development and experiences during teaching practicum.

Modeling

Mentor teachers also provide systematic guidance to preservice teachers and help them solve the problems that many beginning teachers face when they start their career (Vong, 1996). Teachers also model teaching, show classroom management, and give constructivist feedback to their preservice

teachers (Simsar, 2016). Carroll (2005) stated when experienced teachers discuss and model his or her own teaching with preservice teachers, the mentees got the idea of teaching on certain subjects easily, such as science. Moreover, when preservice early childhood teachers and their mentors have concrete experiences to discuss within context it makes the relationships more powerful between mentors and mentees (Simsar, 2016).

Giving Feedback

Giving feedback, which is one of the important mentoring skills, in teaching will be more useful if it address the preservice teachers' needs within effective teaching (Jarvis, McKeon, Coates, & Vause, 2001). Outcomes that are linked to indicators of effective practices may provide clearer directions for both mentors and preservice teachers, which can lead towards offering evidence on the achievement of such outcomes (Hudson, 2004). For example, teachers who have been educated in mentoring for teaching are more confident in raising issues, expect specific learning outcomes, place greater emphasis on pedagogical knowledge, and aim to improve their own skills of observing teaching practices (Jarvis et al., 2001).

Teaching Experiences / Practica

Teaching experiences are critical elements of teacher education programs because preservice teachers observe their mentors, and interact with them, and in doing so, they receive important feedback information (Hudson, 2007; Hudson et al., 2009; Ngoepe, 2014; Slick, 1995). Slick (1995) highlighted the importance of teaching experiences as "... preservice teachers meld theory into practice through application of concepts, principles, and ideals gleaned from instructional specialists" (p.1). Moody (2009) identified four key elements that contribute toward quality teaching experiences: (a) support from supervising teacher, (b) freedom to develop own teaching style, (c) constructive feedback, and (d) approach to assessment. In addition, according to researcher preservice teachers usually want to observe their mentors' teaching so that they can determine how they can teach in accordance with their own teaching styles.

McIntyre, Bryd, and Foxx (1996) suggested that preservice teachers were very nervous about teaching and they were expecting their supervising teachers to be supportive during their teaching experiences. Similarly, Beck and Kosnik (2002) showed that emotional support provided a crucial benefit that preservice teachers gained from their teaching experiences. Likewise, in a large-scale study of 3,162 preservice teachers, researchers specified emotional and professional support to be important components that most preservice teachers hoped to receive during the teaching practicum (Hobson et al., 2006). In addition, it has been suggested that school-based teacher education requires mentor teachers who are expert in the related contents and show well modeling behavior for how to teach it to their student teachers (Nilsson & Driel, 2010). In sum, such conclusions illustrate why mentoring and related experiences can be considered influential factors in shaping preservice teachers' ST in early

childhood education. That is why the current study is important for developing preservice early childhood teachers' ST skills which the science content are shown as hardest topic for explaining and teaching by teachers early years (Fleer, 2009; Kallery & Psillos, 2001; Nilsson, 2015; Shulman, 1986; Tu, 2006).

Science in Early Years

Teaching science in early years has potential benefits and is important for helping children later learning and interest in science careers (Bredenkamp & Copple, 1997; Kamay & Kaşker, 2006; National Science Teachers Association, 2014). Research in over past two decades showed that science helps children to engage in observations, inquiry, and experiments (Conezio & French, 2002; Greenfield et al., 2009). However, studies showed that, most of the Pre-K teachers spend less time on ST it is because of their confidence on ST skills (Tu, 2006; Yılmaz-Tuzun & Topçu, 2008). Therefore most of teachers in early care and education focused on children's social, emotional, and physical development and gave little time on scientific skills and experiences (Worth, 2010). Similarly, many teachers have invalid preconceptions about science (Lind, 2000) and they mislead their mentees who visit their classroom during teaching practice. Conezio and French (2002) stated that in early years, some teachers would like to use more science activities in education programs. However, most of the early childhood teachers don't know how they can do that. Researchers suggested that preservice teachers need to be given opportunities to practice student centered methods to improve their ST epistemological beliefs (Yılmaz-Tuzun & Topçu, 2008) Due to the spent little time on ST, feel unqualified to teach science, and lack ST skills, one possible way of doing this is by providing them with more teaching experiences and modeling how to teach science in early childhood classroom (Ginns et al., 1995; Kazempour, 2014; Putman, 2012).

The purpose of this study is to examine preservice early childhood teachers' views about their mentors' mentoring in ST based on mentoring practices. The study describes mentor teachers mentoring practices due to their mentoring on personal attributes, system requirements, pedagogical knowledge, modeling, and feedback which help their preservice teachers while teaching science. Based on the purpose of this study, the research question was: "What were the preservice early childhood teachers' views about their early childhood mentor teachers' mentoring in ST?"

Method

Research model/design

This study was a descriptive study which was designed to investigate the mentor teachers' mentoring in ST when their preservice early childhood teachers were in the classroom. The descriptive research approach is carried out to describe some phenomenon as it exists and get a detailed description about the situations (Creswell, 2012; Kerlinger & Lee, 2000; Slavin, 2007). In this study, preservice teachers completed the Mentoring for Effective ST (MEST) instrument by giving their

views about their mentor teachers mentoring behaviors during teaching practicum.

Research sample

The sample is composed of 96 (17 male and 79 female) senior Turkish preservice early childhood teachers. The participants in the current study included 81 (84.4%) who attended their field placement once a week and the remaining 15 (15.6%) were at their field placement 2-3 days a week. Each preservice teacher was mentored by one mentor teacher during their teaching practicum. However, some of the mentor teachers worked with more than one preservice teacher. A total of 32 (33.3%) had been placed in classrooms with 3 to 4-year-old children and 64 (66.7%) were placed in classrooms with 5 to 6-year-old children. In addition, the preservice early childhood teachers were asked to indicate the numbers of science classes they had taken during their teacher education programs. A small number of participants (3 or 3.1%) had taken no science courses as part of their undergraduate degree programs. In contrast, 90 (93.8%) of the participants had taken 1 or 2 science courses, and 3 (3.1%) had taken 3 or more science courses. A total of 30 (31.3%) of the participants believed that the science courses that they had taken were sufficient preparation for them to teach science in pre-K classrooms. However, most of the participants 66 (68.8%) believed that the science courses that they had taken were not sufficient preparation for them to teach science in pre-K classrooms. Moreover, preservice teachers shared their data about how long they observed their mentor teacher's ST and ST by themselves. Preservice teachers stated that their teaching time ($M = 192.08$, $SD = 67.01$) and observation time ($M = 155.26$, $SD = 107.91$). Preservice teachers also stated that in some classrooms they never observed any ST and they spend at least 75 minutes in ST.

The data also showed that 2 (4.9%) of the mentor teachers were males and 39 (95.1%) of the teachers were female ($N = 41$). There was a wide age range including 3 (7.3%) under 25 years, 28 (68.3%) between 26 and 35 years, and 10 (24.4%) from 36 to 45 years old. In addition, the mentor teachers were relatively experienced in that most had been teaching for 7 or more years ($M = 3.95$, $SD = 1.04$). Most of the mentor teachers had worked with preservice early childhood teachers for several years. However, a large proportion 23 (56.1%) had mentored preservice early childhood teachers for fewer than 4 years ($M = 2.51$, $SD = .95$).

The data also showed that 33 (80.5%) of the mentor teachers had a science corner/center in their classrooms, while only 8 (19.5%) mentor teachers did not have a science corner/center. In addition, the majority of the mentor teachers taught science 1-2 days a week (56.1%), and 12 of the mentors (29.3%) never taught any science activities in their early childhood classroom ($M = 1.92$, $SD = .81$). However, concerning about mentor teachers' mentoring when preservice early childhood teachers teach science, a majority of the mentor teachers, 37 teachers (90.2%), reported that they mentored their preservice teacher during classroom science activities, and only 4 (9.8%) indicated they did not provide any mentoring experiences.

Data collection

In the current study, the preservice early childhood teachers participated in their field experiences each week and observed their mentor teachers. During their student teaching, preservice early childhood teachers taught science and observed their mentor teachers' ST practices in classroom. It is because; one of the contexts of the curriculum in early childhood education is science. Each week, within their early childhood classrooms, mentor teachers gave time to their mentees on how they can manage a classroom, interact with children, and teach activities which included art, language, math, music, and science.

In order to estimate the views of preservice teachers about their mentors mentoring practices in ST based on personal attributes, system requirements, pedagogical knowledge, modelling, and feedback, preservice teachers completed the Mentoring for Effective ST (MEST) instrument. The MEST survey was adapted from the Mentoring for Effective Primary Science Teaching (MEPST) which was developed by Hudson (2007). Demographic information of preservice early childhood teachers also was collected by the MEST survey.

The survey consists of 34 items and it utilizes a 5 point Likert type scale (Strongly Agree, Agree, Uncertain, Disagree, and Strongly Disagree). Each factor includes its own set of items as follows: personal attributes items 1, 17, 22, 23, 26, 31 (total score=30), system requirements items 4, 11, 25 (total score = 15), pedagogical knowledge items 3, 6, 8, 10, 14, 18, 21, 24, 27, 30, 32 (total score = 55), modelling items 2, 5, 7, 9, 12, 15, 19, 29 (total score=40), and feedback items 13, 16, 20, 28, 33, 34 (total score=30).

The original survey (MEPST), designed for preservice primary science teachers, was adopted for the purposes of the Simsar's study (2016) by slightly modified it for early childhood preservice teachers. For example, the wording of item 7 was modified so that it referred to early childhood teachers: 'had a good rapport with the early childhood students doing science.' The reliability of the English version of the instrument was within an acceptable range with Cronbach alpha scores of each factor as follows: personal attributes $\alpha=.93$, system requirements $\alpha=.76$, pedagogical knowledge $\alpha=.94$, modelling $\alpha=.95$, and feedback $\alpha=.92$ (Hudson, 2007). However, for the validity of the study, the three colleagues were checked its Turkish version. After the changes on the MEST items, its reliability was checked. For the reliability of the Turkish version of MEST, it is also stated that MEST survey's cronbach alpha scores were reported scores as follows: $\alpha=.89$ for personal attributes, $\alpha=.82$ for system requirements, $\alpha=.93$ for pedagogical knowledge, $\alpha=.90$ for modeling, and $\alpha=.80$ for feedback. Furthermore, Cronbach's alpha for the Turkish version of the MEST was also within an acceptable range ($\alpha=.97$). The data seems reliable for using in the current study due to the previous studies Cronbach alpha scores (Simsar, 2016).

Results

The descriptive analysis was run and results were shown at tables. Each factor is explored due to their related items and descriptive statistics were shown below. Preservice early childhood teachers' positive and negative views related to the factors were also shown via percentages pie charts. In the each factors, related items were coded such as PA3, F2, and SR1. For example, PA3 refers to items 3 of Personal Attributes. The results were also compared with previous studies which used same survey for the looking Australian preservice primary science teachers (Hudson, 2007) and Turkish preservice primary teachers (Hudson et al., 2009)

The Results of the Current Study

Table 1. Descriptive statistics of 'Personal Attributes' for mentoring in science teaching

Mentoring Practices 'Personal Attributes'	<i>N</i>					<i>M</i>	<i>SD</i>
	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree		
PA1. My mentor was supportive of me for teaching science.	10	16	10	52	8	3.33	1.16
PA2. My mentor seemed comfortable in talking with me about science teaching.	5	12	15	47	17	3.62	1.08
PA3. My mentor instilled positive attitudes in me towards teaching science.	7	22	12	38	17	3.37	1.22
PA4. My mentor assisted me to reflect on improving my science teaching practices.	11	17	17	35	16	3.29	1.26
PA5. My mentor made me feel more confident as a science teacher.	8	16	30	29	13	3.23	1.14
PA6. My mentor listened to me attentively on science teaching matters.	7	17	20	28	24	3.46	1.24

Table 1 show that preservice teacher' views about their mentor teachers mentoring activities based on personal attributes. The descriptive statistics of personal attributes show that mentor teachers mostly mentoring in the practices of PA2 ($M = 3.62$, $SD = 1.08$). In addition, as shown by the data regarding statement PA5 in Table 1, preservice teachers' responses were more negative about their mentors' success at making them feel confident as science teachers ($M = 3.23$, $SD = 1.14$).

Table 2. Descriptive statistics of ‘System Requirements’ for mentoring in science teaching

Mentoring Practices ‘System Requirements’	N					M	SD
	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree		
SR1. My mentor discussed with me the school policies used for science teaching.	19	37	20	18	2	2.44	1.07
SR2. My mentor outlined state science curriculum documents to me.	19	46	13	13	5	2.36	1.10
SR3. My mentor discussed with me the aims of science teaching.	14	35	19	22	6	2.70	1.16

Preservice early childhood teachers also stated their views about mentor teachers’ mentoring practices on the system requirements. As shown by the data regarding statement SR3 in Table 2, preservice teachers’ responses were more positive about their mentors’ success at making them feel more confident during ST ($M = 2.70$, $SD = 1.16$). However, preservice teachers’ responses were negative about their mentors mentoring in the statement SR2 ($M = 2, 36$, $SD = 1,10$).

Table 3. Descriptive statistics of ‘Pedagogical Knowledge’ for mentoring in science teaching.

Mentoring Practices ‘Pedagogical Knowledge’	N					M	SD
	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree		
PK1. My mentor guided me with science lesson preparation.	8	26	11	42	9	3.17	1.17
PK2. My mentor assisted me with classroom management strategies for science teaching.	6	20	9	42	19	3.50	1.20
PK3. My mentor assisted me towards implementing science teaching strategies.	7	18	7	49	15	3.48	1.17
PK4. My mentor assisted me with timetabling my science lessons.	15	42	11	23	5	2.59	1.16
PK5. My mentor developed my strategies for teaching science.	9	31	21	29	6	2.91	1.12
PK6. My mentor discussed with me questioning skills for effective science teaching.	11	27	16	33	9	3.02	1.21
PK7. My mentor discussed with me the knowledge I needed for teaching science.	17	21	19	29	10	2.93	1.28
PK8. My mentor gave me clear guidance for planning to teach science.	10	26	25	27	8	2.96	1.14
PK9. My mentor provided strategies for me to solve my science teaching problems.	13	15	22	34	12	3.17	1.23
PK10. My mentor gave me new viewpoints on teaching science.	14	22	26	27	7	2.90	1.17
PK11. My mentor showed me how to assess the students’ learning of science.	12	19	10	39	16	3.29	1.30

Pedagogical knowledge is another factor that mentor teachers’ mentoring in ST. Table 3 shows the descriptive statistics of preservice early childhood teachers’ views about mentor teachers’ mentoring practices regarding pedagogical knowledge. As shown by the data regarding statement PK2

in Table 3, preservice teachers mostly had positive feelings about their mentor’s success in the pedagogical knowledge section ($M = 3.50, SD = 1.20$). However, preservice teachers stated that their mentor teachers practiced less mentoring experiences concerning PK4 statement ($M = 2.59, SD = 1.16$).

Table 4. Descriptive statistics of ‘Modeling’ for mentoring in science teaching.

Mentoring Practices ‘Modeling’	N					M	SD
	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree		
M1. My mentor used science language from the current early childhood science syllabus.	7	20	28	32	9	3.16	1.09
M2. My mentor modelled science teaching.	12	25	25	23	11	2.95	1.21
M3. My mentor had a good rapport with the early childhood students doing science.	6	12	20	40	18	3.54	1.12
M4. My mentor displayed enthusiasm when teaching science.	12	16	28	30	10	3.10	1.18
M5. My mentor modelled effective classroom management when teaching science.	11	25	17	32	11	3.07	1.23
M6. My mentor was effective in teaching science.	8	20	17	41	10	3.26	1.15
M7. My mentor used hands-on materials for teaching science.	12	21	12	36	15	3.21	1.29
M8. My mentor had well-designed science activities for the students.	12	18	27	22	17	3.14	1.27

Preservice teachers also stated that their mentor teachers’ mentoring in ST based on their modeling behavior on ST in classroom. Table 4 shows that preservice teachers stated that their mentor teachers mostly showed the mentoring practices regarding M3 statement ($M = 3.54, SD = 1.12$). However, regarding M2, preservice teachers specified that their mentor teachers practiced less mentoring skills on this sections ($M = 2.95, SD = 1.21$). It is probably about 29% of the mentor teachers were not spending time in science activities in their early childhood classrooms.

Table 5. Descriptive statistics of ‘Feedback’ for mentoring in science teaching.

Mentoring Practices ‘Feedback’	N					M	SD
	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree		
F1. My mentor discussed evaluation of my science teaching.	12	25	13	30	16	3.13	1.31
F2. My mentor provided oral feedback on my science teaching.	6	20	19	39	11	3.30	1.11
F3. My mentor provided me with written feedback on my science teaching.	26	35	12	16	7	2.40	1.25
F4. My mentor reviewed my science lesson plans before teaching science.	8	15	13	27	33	3.64	1.32
F5. My mentor clearly articulated what I needed to do	11	21	10	31	23	3.35	1.36

to improve my science teaching.

F6. My mentor observed me teach science before providing feedback.	11	9	12	28	36	3.71	1.35
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Feedback is another factor of mentoring practices which mentor teachers mentoring in ST. As shown by the data regarding F6 in Table 5, most of the preservice teachers' mentor teachers had positive impacts on their ST self-efficacy beliefs ($M = 3.71$, $SD = 1.35$). Though, the data results showed that few of them concerned that their mentor teachers showed less success about F3 statements in the table ($M = 2.40$, $SD = 1.25$).

Current Study vs Previous Studies

The results of the current study were compared with the previous study conducted by Hudson (2007) and Hudson, et al., (2009) (see Table 6). Both of the studies were conducted with preservice primary science teachers. Hudson (2007) was conducted in Australia with 331 (284 female and 47 male) preservice primary science teachers. Hudson, et al., (2009) was conducted in Turkey with 304 Turkish primary science teachers. As shown by the data in Table 6, preservice early childhood teachers mostly stated that PA2 ($M = 3.62$, $SD = 1.08$) and few of them PA5 ($M = 3.23$, $SD = 1.14$) on the Personal Attributes in the current study. On the other hand, PA1 ($M = 3.46$, $SD = 1.31$; Hudson, 2007) and PA1 ($M = 4.43$, $SD = 0.79$; Hudson, et al., 2009) was mostly selected by preservice primary teachers. In addition, few of the preservice teachers selected PA4 ($M = 2.72$, $SD = 1.15$; Hudson, 2007) and PA1 ($M = 2.07$, $SD = 1.29$) and PA6 ($M = 2.08$, $SD = 1.29$) on Hudson et al. (2009).

On the system requirement section of mentoring, preservice early childhood teachers in the current study and primary science teachers from Hudson (2007) mostly selected SR3 ($M = 2.70$, $SD = 1.16$) and SR3 ($M = 2.40$, $SD = 1.11$; Hudson, 2007). Additionally, SR2 ($M = 4.65$, $SD = 0.82$) was mostly selected by preservice teachers from Hudson et al. (2009). However, preservice teachers' responses were negative about their mentors' mentoring in the statement SR2 ($M = 2.36$, $SD = 1.10$) in the current study. SR1 ($M = 2.40$, $SD = 1.11$; Hudson, 2007) and ($M = 2.68$, $SD = 1.32$; Hudson, et al., 2009) was chosen as less mentoring skills by preservice teachers from other studies (see Table 6).

Table 6 showed that preservice early childhood teachers mostly selected PK3 ($M = 3.48$, $SD = 1.17$) as their mentor teachers Pedagogical Knowledge skills. However, PK1 ($M = 2.87$, $SD = 1.27$; Hudson, 2007) and ($M = 4.60$, $SD = 0.60$; Hudson, et al., 2009) was selected by preservice primary teachers from other studies. Mentor teachers showed less mentoring experiences concerning PK4 statement ($M = 2.59$, $SD = 1.16$; current study) and ($M = 1.58$, $SD = 1.00$; Hudson, et al., 2009). Additionally, PK9 ($M = 2.60$, $SD = 1.10$) was selected as less mentoring skills by preservice primary teachers on the study of Hudson (2007).

Related with modeling preservice early childhood teachers in the current study and primary science teachers from Hudson (2007) were mostly selected M3 ($M = 3.54$, $SD = 1.12$) (current study)

and M3 ($M = 3.36, SD = 1.24$; Hudson, 2007). Additionally, M5 ($M = 4.51, SD = 1.12$) was mostly selected by preservice teachers from Hudson, et al., (2009). However, preservice teachers' responses were negative about their mentors mentoring in the statement M2 ($M = 2.95, SD = 1.21$) in the current study, M1 ($M = 3.04, SD = 1.22$) by Hudson (2007), and M8 ($M = 2.52, SD = 1.31$) by Hudson et al. (2009; see Table 6).

Preservice early childhood teachers in the current study and primary science teachers from Hudson (2007) were mostly selected F6 ($M = 3.71, SD = 1.35$; current study) and F6 ($M = 3.72, SD = 1.37$; Hudson, 2007) as feedback skills of mentor teachers. Moreover, F1 ($M = 4.66, SD = 0.93$) was mostly selected by preservice primary science teachers from Hudson et al. (2009). However, preservice teachers' responses were negative about their mentors mentoring in the statement F3 ($M = 2.40, SD = 1.25$) in the current study, F5 ($M = 2.75, SD = 1.23$) by Hudson (2007), and F3 ($M = 3.95, SD = 0.93$) and F4 ($M = 3.95, SD = 0.93$) by Hudson et al. (2009; see Table 6)

Table 6. The comparison of results by the Hudson (2007) and Hudson et al. (2009)

Mentoring Practices		Current Study			Hudson, 2007			Hudson, et al., 2009		
		% ^a	M	SD	% ^a	M	SD	% ^a	M	SD
Personal Attributes	PA2. My mentor seemed comfortable in talking with me about science teaching.	66.7*	3.62	1.08	56	3.30	1.22	53	3.62	0.96
	PA1. My mentor was supportive of me for teaching science.	62.5	3.33	1.16	64*	3.46	1.31	90*	4.43	0.79
	PA3. My mentor instilled positive attitudes in me towards teaching science.	57.3	3.37	1.22	45	3.07	1.23	69	4.05	1.09
	PA6. My mentor listened to me attentively on science teaching matters.	54.2	3.46	1.24	53	3.19	1.31	17**	2.08	1.29
	PA4. My mentor assisted me to reflect on improving my science teaching practices.	53.2	3.29	1.26	35**	2.72	1.25	17**	2.07	1.29
	PA5. My mentor made me feel more confident as a science teacher.	43.7**	3.23	1.14	46	3.10	1.28	67	3.91	1.00
System Requirements	SR3. My mentor discussed with me the aims of science teaching.	29.2*	2.70	1.16	23*	2.40	1.11	71	3.91	0.89
	SR1. My mentor discussed with me the school policies used for science teaching.	20.9	2.44	1.07	16**	2.27	1.11	26**	2.68	1.32
	SR2. My mentor outlined state science curriculum documents to me.	18.7**	2.36	1.10	18	2.22	1.07	92*	4.65	0.82
Pedagogical Knowledge	PK3. My mentor assisted me towards implementing science teaching strategies.	66.6*	3.48	1.17	35	2.70	1.19	37	2.91	1.37
	PK2. My mentor assisted me with classroom management strategies for science teaching.	63.6	3.50	1.20	44	2.85	1.32	48	3.03	1.29
	PK11. My mentor showed me how to assess the students' learning of science.	57.3	3.29	1.30	31	2.64	1.22	70	4.07	0.91
	PK9. My mentor provided strategies for me to solve my science teaching	53.9	3.17	1.23	25**	2.60	1.10	45	3.60	1.02

	problems.									
	PK1. My mentor guided me with science lesson preparation.	53.2	3.17	1.17	45*	2.87	1.27	96*	4.60	0.60
	PK6. My mentor discussed with me questioning skills for effective science teaching.	43.8	3.02	1.21	31	2.67	1.21	67	3.83	1.10
	PK7. My mentor discussed with me the knowledge I needed for teaching science.	40.6	2.93	1.28	35	2.73	1.19	25	2.55	1.30
	PK5. My mentor developed my strategies for teaching science.	36.5	2.91	1.12	41	2.86	1.23	57	3.79	1.16
	PK8. My mentor gave me clear guidance for planning to teach science.	36.4	2.96	1.14	37	2.72	1.23	76	4.07	0.91
	PK10. My mentor gave me new viewpoints on teaching science.	35.4	2.90	1.17	35	2.81	1.23	69	4.05	1.09
	PK4. My mentor assisted me with timetabling my science lessons.	29.2**	2.59	1.16	44	2.91	1.27	6**	1.58	1.00
	M3. My mentor had a good rapport with the early childhood students doing science.	60.5*	3.54	1.12	58*	3.36	1.24	66	3.92	1.33
	M6. My mentor was effective in teaching science.	53.1	3.26	1.15	42	3.11	1.22	54	3.50	1.12
	M7. My mentor used hands-on materials for teaching science.	53.1	3.21	1.29	41	3.01	1.26	45	3.60	1.01
	M5. My mentor modelled effective classroom management when teaching science.	44.8	3.07	1.23	43	2.96	1.30	88*	4.51	1.12
	M1. My mentor used science language from the current early childhood science syllabus.	42.7	3.16	1.09	40**	3.04	1.22	63	3.92	1.01
	M4. My mentor displayed enthusiasm when teaching science.	41.7	3.10	1.18	48	3.08	1.24	82	4.36	0.93
	M8. My mentor had well-designed science activities for the students.	40.6	3.14	1.27	44	3.09	1.26	25**	2.52	1.31
	M2. My mentor modelled science teaching.	35.5**	2.95	1.21	44	2.68	1.25	83	4.32	0.81
	F6. My mentor observed me teach science before providing feedback.	66.7*	3.71	1.35	74*	3.72	1.37	67	3.91	1.01
	F4. My mentor reviewed my science lesson plans before teaching science.	62.5	3.64	1.32	54	3.13	1.32	65**	3.95	0.93
	F5. My mentor clearly articulated what I needed to do to improve my science teaching.	56.3	3.35	1.36	33**	2.75	1.23	70	3.89	0.92
	F2. My mentor provided oral feedback on my science teaching.	52.1	3.30	1.12	62	3.32	1.28	84	4.32	0.90
	F1. My mentor discussed evaluation of my science teaching.	48.0	3.13	1.31	46	2.96	1.29	95*	4.66	0.67
	F3. My mentor provided me with written feedback on my science teaching.	24.0**	2.40	1.25	45	2.95	1.38	65**	3.95	0.93

Discussion, Conclusion and Recommendations

This study investigated preservice early childhood teachers' views of their mentors' mentoring practices in early childhood ST. Teaching experiences are critical elements of teacher education programs because preservice teachers may have opportunities to observe their mentors, interact with them, and in doing so, they receive important feedback (Hudson, 2007; Hudson et al., 2009; Ngoepe, 2014; Slick, 1995). However, in the current study, it was found that some of mentor teachers (29 %) did not give time to ST in their classrooms. This situation may negatively impact their mentees who would like to learn how science can be thought. It has been seen that when the current studies' results compared with Hudson (2007) and Hudson et al. (2009), preservice early childhood teachers conducted less modeling behavior on "*My mentor modeled science teaching.*" However, preservice teachers conducted less mentoring skills on "*M8. My mentor had well-designed science activities for the students.*" (Hudson et al., 2009). It is showed that, preservice primary science teachers from Hudson et al. (2009) may had compared their ST skills and their mentor by the having more science experiences (83%) during teaching practica. It is probably interesting results when primary science teachers and early childhood teachers.

During teaching practices, mentors need to display personal attributes that facilitate a supportive learning environment (Ganser, 1991; Kennedy & Dorman, 2002; Rippon & Martin, 2006). Similarly, regarding personal attributes, the current study also identified that preservice teachers stated that their mentor teachers may help them when they improve their confidence level during ST. Researchers stated that mentor teachers' personal attributes can be improved with positive attitudes and confidence in the preservice teachers (Beck, Czerniak, & Lumpe, 2000; Matters, 1994) and promoting classroom environment as constructively teaching practices for preservice teachers (Zachary, 2002). This shows the importance of improving personal attributes. In the current study, most of the preservice teachers stated that their mentors had practices related to the personal attributes more when it compared with other mentoring practices in ST. Similarly, Hudson et al. (2009) stated that preservice primary science teachers got more mentoring experiences from their mentors based on the personal attributes.

In addition, mentors' articulation of system requirements provides mentees with departmental directions for teaching (Lenton & Turner, 1999). In the current study, few of the preservice teachers were getting mentoring experiences on the system requirement about ST in early childhood education. Similarly, Hudson (2007) stated that mentor teachers were giving less mentoring practices when system requirement compared with modeling, pedagogical knowledge and feedback. This could be because of the mentor teachers' skills on ST. In the current study, the data results showed that mentor teachers were teaching science a few days per week. Due to this, they may have less knowledge about how they can show mentoring due to system requirements in ST in early childhood classrooms.

Pedagogical knowledge was another important factor that preservice teachers should improve their skills in ST. The current study showed that some of the preservice early childhood teachers stated that their mentors had mentoring practices on pedagogical knowledge in ST. A study conducted by Ekiz (2006) had investigated mentoring practices and experiences showed a lack of mentoring or poor mentoring practices in pedagogical knowledge. However, in this study, most of the preservice early childhood teachers stated they had chances to improve their pedagogical knowledge, which may be because of their mentor teachers' mentoring practices on pedagogical knowledge.

Although effective practices of modeling appears key to many successful mentoring programs (Barab & Hay, 2001), 'non-expert' mentors of primary subjects may not be able to model or discuss effective teaching practices in those subject areas (Moody, 2009). However, in the current study, preservice early childhood teachers stated their mentor teachers were relatively experienced and that most had been teaching for 7 or more years. Most of mentor teachers had worked with preservice early childhood teachers for several years. That is why most of the preservice teachers stated their mentor teachers were modeling ST when they were in the classrooms. This may be because most of the mentor teachers were teaching science one or two days a week. Mentors' modeling practices in ST are probably happening during preservice teachers' time in the classroom. However, it is found that, some of the mentor teachers don't spend time in science activities. It may be because they help their mentees in another area of mentoring practices such as system requirements, personal attributes, and feedback.

Moreover, in another study Hudson (2007) found that preservice primary science teachers stated that most of their mentor teachers gave feedback about their ST. Therefore, when classroom teachers demonstrate how science can be taught in early childhood classrooms, the preservice teachers who observe the lesson will most likely improve how they teach science (Hudson, 2007; Hudson et al., 2009). Similarly, in the current study, mentor teachers showed mostly mentoring practices in feedback. This may be because most of the mentor teachers were giving feedback with preservice teachers before and after the preservice early childhood teachers' teaching. This is rule of teaching practicum by the guided MoNE (1998) for mentor teachers. Mentor teachers also help while preservice teachers create lesson plans for teaching. During lesson planning time and also after teaching, it is likely that mentor teachers were giving feedback to their mentees on how they can teach better in science instruction. Surprisingly, some of mentor teachers (29%) never taught science in their early childhood classroom, but the results showed that they probably mentored to their mentees during lesson planning (62.5%) and teaching (66.7%) by giving feedback.

In conclusion, the current study explored several essential experiences about preservice early childhood teachers' teaching practicum and their mentor teachers mentoring on science. The results showed several important factors for mentor teachers' mentoring practices. These factors could bring new and vital ideas to build teacher education programs with regards to science in early childhood education. One of the significant findings in the current study was that there are less mentoring skills

on system requirement in ST. The current study explored how mentor teachers do lack helping their mentees on system requirements. However, they can share their experiences on system requirements on ST to improve their mentees ST skills in the future.

Furthermore, the results also highlighted the significance of giving feedback to mentees, improving pedagogical knowledge and personal attributes of preservice teachers. Murray et al. (2011) expressed their concerns about the quality and quantity of mentoring preservice teachers. In this study, it was found that, some of the teachers do not spend time in ST but, surprisingly, they still help their mentees on how they can teach science. As it is underlined by researchers, mentoring of preservice early childhood teachers is undertaken by classroom teachers who may not have the necessary skills to support preservice teachers in regard to ST (Murray et al., 2011). That is why, the findings of the current study suggested that mentoring and/or teaching practicum programs of preservice early childhood teachers could be modified based on the mentor teacher's important roles on preservice teachers' ST skills. Moreover, Murphy et al. (2007) suggested in their study that primary science teacher education programs need to develop new primary teachers' confidence and effective ST. Similarly, the findings of the current study suggested that early childhood teacher education programs could be redesigned in regards to their teaching practicum experiences and science classes regarding ST in early childhood classroom. In addition, modifications of teaching practices should address each mentoring practice of mentor teachers such as modeling, feedback, pedagogical knowledge, and system requirement.

This study focused on mentor teachers' mentoring practices in ST through the perspective of preservice early childhood teachers' views in early childhood classrooms. Future studies, could use similar mentoring practices for investigating other subjects which are taught in early childhood education (mathematics, language-arts, music, etc.). This could help to improve mentoring programs for preservice early childhood teachers'. In addition, mentor teachers may need training through in-service programs on how they can better give mentoring experiences based on the mentoring practices on the pedagogical knowledge, system requirement, personal attributes, modeling and feedback. This could be beneficial for preparing future early childhood teachers.

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Science Methods Course Influence on Pedagogical Orientations of Pre-Service Science Teachers

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Abstract

The main purpose of the study is to gain insight on to what extent taking a science methods course correlated with the science teaching pedagogical preferences of pre-service science teachers. The study recruited twenty K-8 teacher education students enrolled in lower division science courses at a large American public university, some of whom had completed a science methods course and some not. A sequential exploratory mixed-methods design involving both quantitative and qualitative parts was used. The quantitative data were collected using the POSTT assessment instrument to identify pedagogical orientations profiles of the participants. A subset of students was subsequently interviewed so that they could explain their responses to the POSTT items. The data points out that many participants whether they had taken a methods course or not tended toward an inquiry science teaching orientation. When participants chose similar instructional preferences, however, their reasons often varied. The data indicated that students having taken a methods course think more broadly about factors that should influence choices of instructional practice (e.g., grade level, prior knowledge, interest areas). The findings suggest that a science methods course can have a positive influence on pre-service teachers with respect to the development of an inquiry science teaching orientation. The POSTT items have potential use within science methods courses for the formative assessment of pre-service teachers' orientations toward science instruction.

Keywords: Pedagogical orientation, preservice science teacher education, science methods course

DOI: 10.29329/epasr.2020.236.7

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Introduction

Implementing successful science instruction to teach science for conceptual understanding is demanding. Pre-service science teachers should learn to combine science content knowledge with science pedagogical knowledge such that they develop an appropriate science teaching orientation. Primary teacher education programs worldwide typically include at least one science methods course that will have many topics with the goal that pre-service teachers learn effective science pedagogy (Abell, Appleton, and Hanuscin, 2010). There are many approaches to the teaching of science and so the science methods course not only helps pre-service science teachers learn about the differences between effective and ineffective science teaching, but also about the many best practices of teaching science. Most methods courses promote student-centered pedagogies, but pre-service teachers may have orientations toward science teaching that range from teacher-centered (traditional) to student-centered (constructivist), from direct instruction to instruction through open discovery (Chan and Elliott, 2004; Hewson, 2007). What the science education community typically expects is that the science methods course leads students to develop more student-centered, inquiry orientations toward science teaching (NRC, 2012; NGSS, 2013).

Theoretical Framework

The theoretical framework for this study was drawn from Shulman's (1986, 1987) work on Pedagogical Content Knowledge (PCK) as extended by Grossman (1990) and Magnusson, Krajcik, and Borke (1999) to include teaching orientations. PCK refers to content specific pedagogical knowledge as opposed to knowledge about general instructional strategies. The modified PCK/teaching orientations model involves nine teaching orientations: didactic, academic rigor, process, activity-driven, discovery, conceptual change, project-based science, inquiry, and guided inquiry (Magnusson et al., 1999). Later, Friedrichsen (2002) classified these orientations under the two main categories: teacher-centered orientations (didactic and academic rigor) and orientations based on reform efforts (process, activity-driven, and discovery) and associated curriculum projects (conceptual change, project-based science, inquiry, and guided inquiry). Cobern, Schuster, Adams, Skjold, Muğaloğlu, Bentz, and Sparks (2014), having a specific interest in the teaching of science content, developed an assessment device that borrowed from the concepts of PCK and Ausubel's theory of meaningful learning (Ausubel et al., 1986) to develop the idea of a Science Teaching Orientation based on a Science Teaching Orientation Spectrum: didactic direct, direct active, guided inquiry, and open discovery. With respect to this spectrum and the concept of a Science Teaching Orientation, Cobern et al. (2014) reported the development and validation of a science teaching assessment instrument called the Pedagogy of Science Teaching Test (POSTT)¹. The POSTT items are intended to

¹ For more details concerning validity of the instrument see (Schuster et al., 2007).

represent instruction for meaningful learning ranging from direct to inquiry instruction as defined below (Cobern et al., 2014, p.2270):

I.Didactic Direct (DD): The teacher presents the science concept or principle directly and explains it. The teacher illustrates with an example or demonstration. No student activities, but the teacher takes student questions and answers them or clarifies.

II.Direct Active (DA): Same as the direct exposition above initially, but this is followed by a student activity designed to demonstrate the presented science concept.

III.Guided Inquiry (GI): Topics are approached by student exploration of a phenomenon or idea, with the teacher guiding them toward the desired science concept or principle arising from the activity. The teacher may explain further and give examples to consolidate. Questions are dealt with by discussion.

IV.Open Discovery (OD): Instruction is minimally guided by the teacher. Students are free to explore a phenomenon or idea in any way they wish, and to devise ways of doing so.

The first two instructional strategies refer to direct-based learning and second two instructional strategies refer to inquiry-based learning. Each POSTT item presents a classroom vignette describing a specific science topic in a realistic K-8 science teaching context. Each vignette is followed by possible responses ranging from direct instruction through guided inquiry to discovery learning as mentioned above. The items have a multiple-choice format with four responses representing set teaching strategies. An item example from POSTT survey is provided in the Appendix (see Appendix1). The responses from several POSTT items are compiled as a profile, in the form of a histogram, with the Science Teaching Orientation Spectrum forming the x-axis and participant response frequency the y-axis (See Figure 1 in Findings). These profiles are indicative of the person's science teaching orientation. Based on such profiles, the study reported in this paper employed POSTT items to address two research questions:

1. What is the range of pedagogical preferences among pre-service science teachers who have taken a science methods course and who have not?

2. What reasons do pre-service science teachers give for their pedagogical preferences?

2a. What are the between-group similarities?

2b. What are the between-group differences?

Methodology

Research Design

Participants responded to selected eight items from the Pedagogy of Science Teaching Test (POSTT) with each participant's responses summarized as a pedagogical preference profile. These POSTT items were selected from amongst 100 items. These eight items decided to apply in order to involve primary school grade levels and the content of the science curriculum. The qualitative data were subsequently collected through semi-structured interviews with a targeted subset of participants to help interpret their POSTT survey results. Audio recordings of the interviews were transcribed and coded by the authors. Thus, the study used a sequential explanatory mixed-methods design involving both quantitative and qualitative data. The qualitative and quantitative data formed an integrated database (Creswell & Plano Clark, 2007). In our use of this approach, we report quantitative statistics in support of qualitative quotes from the database. We also explain and interpret quantitative results by analyzing follow-up qualitative data (Creswell, 2014, p.211).

Research Participants

Twenty pre-service, K-8 teacher education students enrolled in three lower division science courses at a large American public university participated in the study. Thirteen of these had not yet taken a science methods course and seven had. The participants completed the POSTT survey online using a Qualtrics survey software program. Subsequently, participants were invited by email to attend follow-up interviews. The science methods course taken by students at this university is typical of such courses. A primary course aim is for students to develop science pedagogical content knowledge for student-centered science instruction in elementary and middle school science classrooms.

Data Collection Procedures

To address the first research question, the participants took the POSTT assessment instrument. The participants were instructed to read each POSTT item vignette and evaluate the teaching in the vignette by choosing among the responses listed after each item (see Appendix 1 for the example of POSTT item). In addition, a blank box was placed under each POSTT item so that the participants could share reasons or comments for their instructional choices. A profile was constructed for each participant.

To address the second research question, a subset of four participants were subsequently interviewed. Two had taken a methods course and two had not. The interviewees were purposely selected so that each interviewee who had taken the methods course was matched with one who had not. Two interviewees were matched for having given similar profiles and similar responses to the same POSTT items. Conversely, two interviewees (one who had taken the methods course and one who had not) were matched having different profiles and quite different responses (direct vs inquiry) to the same items.

During the interviews, participants were shown their own POSTT responses and asked questions about their responses. The researcher probed for explanations illuminating why a participant would prefer one teaching strategy instead of another. Referring to the POSTT items, an interview concluded by asking the interviewee for any additional comments on how he or she would teach any of the science lessons (see interview protocol in Appendix 2). The length of the interviews ranged from 20 to 30 minutes. Interviews were audio recorded and the records were transcribed for analysis. The second author conducted an independent validation of the coding. Themes in response to the research question were derived from the codes.

Data Analysis

Figure 1 below shows the profiles for each participant. The audio recorded interviews were transcribed and coded using standard techniques to identify reasons interviewees had for choosing similar or dissimilar instructional preferences in response to different instructional vignettes. The coding of each transcript was reviewed and compared until an agreement was reached with the second investigator (to secure inter-coder reliability). Codes were developed into categories, and finally merged to generate themes addressing the second research question. The first investigator performed all the initial data analyses and interpretation. The second investigator conducted independent analyses. The analyses were discussed until consensus was reached.

Findings

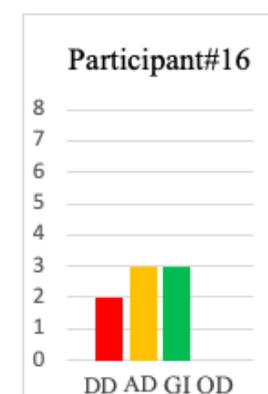
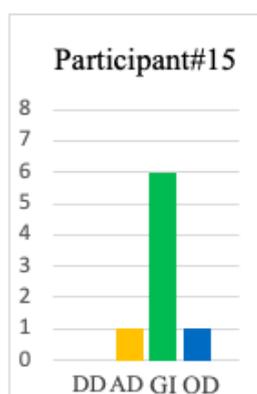
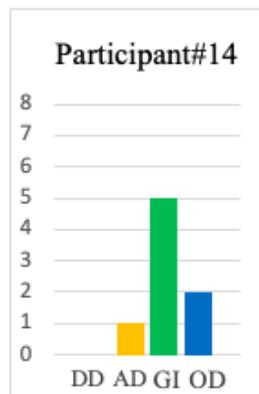
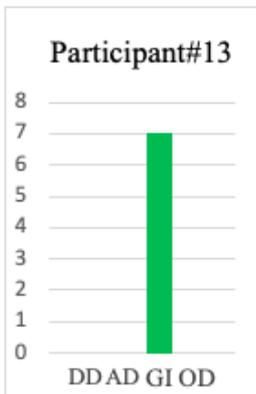
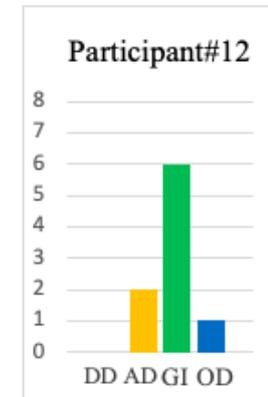
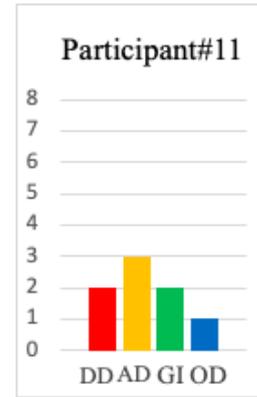
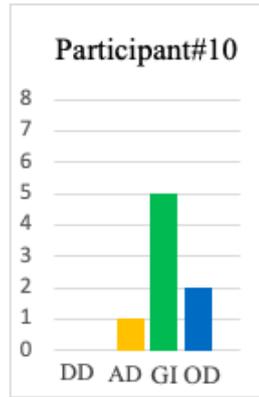
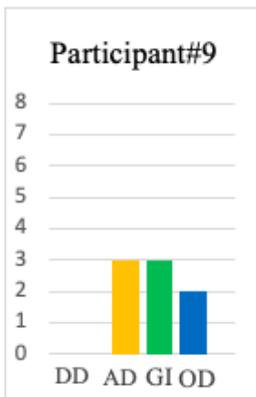
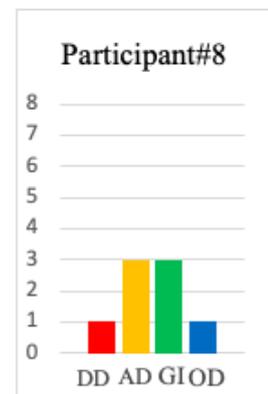
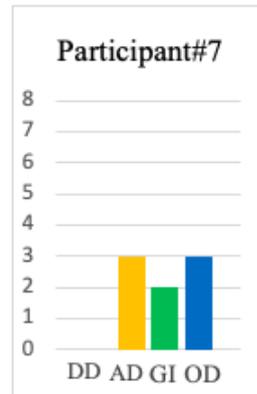
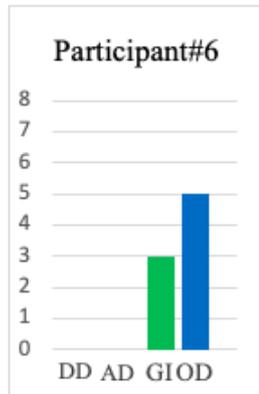
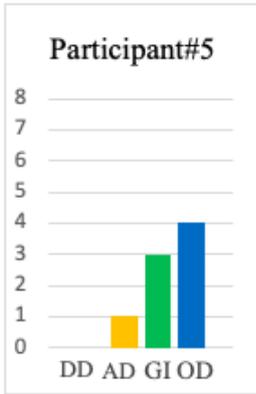
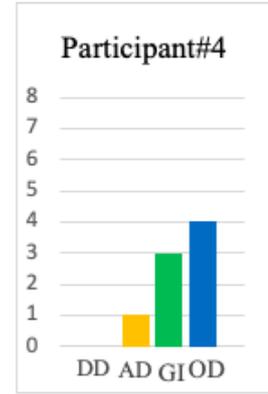
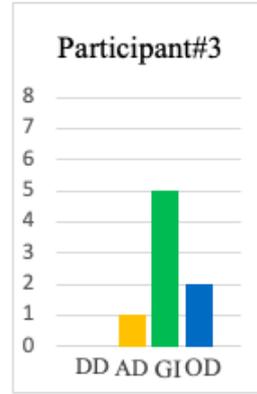
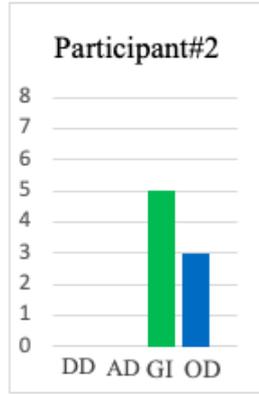
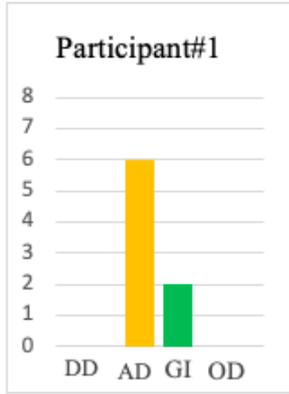
Our research first asked about the range of pedagogical preferences among pre-service science teachers who have taken a science methods course and who have not. The findings in response to this research question are summarized in Tables 1, Table 2 and Figure 1 below. The participants who had not taken a methods course used the full range of the Science Teaching Orientation Spectrum. The participants who had taken a methods course used much of the Spectrum, but not Didactic Direct. Fourteen of 20 participants favored some form of inquiry whether or not they had taken a methods course. The Guided Inquiry and Open Discovery approaches were chosen more frequently than the Didactic Direct and Direct Active approaches. The profiles of the participants indicated that those who had not taken the science methods course were more likely to choose a direct instruction response than were the participants who had. However, the characteristics of the response distribution for all the participants showed a tendency to prefer inquiry-based instructional preferences (111 of 160) rather than direct instructional preferences (49 of 160). Especially guided inquiry was chosen because almost half of the responses were this pedagogical instruction (76 of 160).

Table 1. Instructional Preferences of the Participants

Items								
Participant	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8
P1	DA	DA	DA	GI	GI	DA	DA	DA
P2	GI	OD	GI	OD	GI	GI	OD	GI
P3	DA	OD	GI	OD	GI	GI	GI	GI
P4	DA	OD	GI	GI	GI	OD	OD	OD
P5	OD	DA	GI	OD	GI	GI	OD	OD
P6	GI	GI	GI	OD	OD	OD	OD	OD
P7	DA	OD	OD	OD	GI	GI	DA	DA
P8	DA	DA	DA	GI	GI	GI	DD	OD
P9	DA	DA	OD	GI	GI	GI	DA	OD
P10	DA	OD	GI	GI	GI	GI	GI	OD
P11	DA	OD	GI	DA	GI	DD	DD	DA
P12	GI	GI	GI	GI	GI	DA	DA	GI
P13	GI	OD	GI	GI	GI	GI	GI	GI
P14	DA	OD	GI	GI	GI	GI	GI	OD
P15	GI	GI	OD	GI	GI	GI	DA	GI
P16	DD	DA	DD	GI	DA	GI	GI	DA
P17	DA	GI	GI	GI	GI	GI	GI	OD
P18	DD	DA	GI	DA	GI	DD	DA	DA
P19	DA	OD	GI	GI	GI	OD	DA	OD
P20	DD	DD	DD	DD	GI	GI	DD	DD

Table 2. Aggregated item response for each participant

Participant	Direct Didactic	Direct Active	Guided Inquiry	Open Discovery	Science Methods Course
P1	0	6	2	0	No
P2	0	0	5	3	No
P3	0	1	5	2	No
P4	0	1	3	4	Yes
P5	0	1	3	4	No
P6	0	0	3	5	Yes
P7	0	3	2	3	Yes
P8	1	3	3	1	No
P9	0	3	3	2	No
P10	0	1	5	2	No
P11	2	3	2	1	No
P12	0	2	6	0	Yes
P13	0	0	7	1	Yes
P14	0	1	5	2	No
P15	0	1	6	1	Yes
P16	2	3	3	0	No
P17	0	1	6	1	Yes
P18	2	4	2	0	No
P19	0	2	3	3	No
P20	6	0	2	0	No
Total (n=160)	13		76	35	---



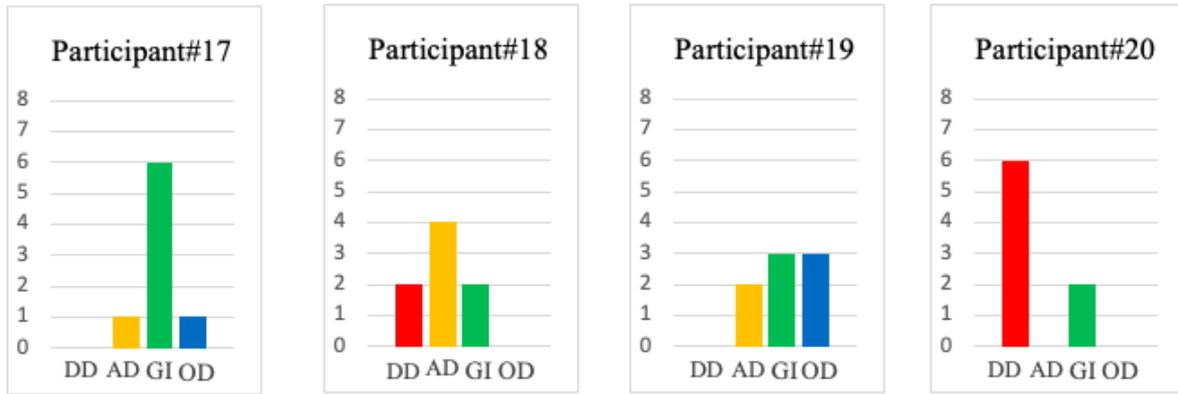


Figure 1. Item response histograms for each participant

The second question we asked was about the reasons participants had for their pedagogical preferences. We addressed this research question by comparing the pedagogical reasoning given by two participants who made the same pedagogical choice on a particular item (between-groups similarities), and the pedagogical reasoning given by two participants who made different choices on a particular item (between-groups differences).

Between-group Similarities

Item 1 is about a 6th grade frog dissection lesson. Participant 1 (who had not taken the methods course) and Participant 7 (who had) both chose the DA response: the dissection should be used as a *‘follow-up step-by-step student activity after Mr. Goodchild explains exactly what students will need to notice about the frog anatomy.’* For Participant 1, teacher guidance was clearly important noting that rather than beginning with the activity:

“[the students need] a little bit of guidance. Then, they dissect and just the teacher is kind of there to just help them or explain if they have a confusion about what they saw.” (P1_{Interview, Item1})

Participant 1 also suggested that the teacher:

“...could pass out a diagram worksheet and get student participation with explaining [or] filling in the parts of the frog anatomy. Then they can do the lab by looking at their sheets and comparing [the] diagram info with the real thing...” (P1_{Interview, Item1})

Participant 1 noted the importance of the teacher’s role commenting that,

“...giving them a frog and having them open it. It is kind of leaving them a little bit too blind.” (P1_{Interview, Item1})

Reflecting on her own educational experiences, Participant 1 commented that:

“I have been in multiple classes where they hand me stuff and... OK, what do they even want me to do with this? I think it just leaves you a little bit blind. Yes, it allows you to be creative I

guess, but if you really have no idea what is going on it leads to a lot of confusion and I think a lot of waste of time in education, when there could be just a quick 5-minute discussion of the whole class, so everybody is on same page...” (P1_{Interview})

As important as is the teacher, Participant 1 also noted the importance of student activity and limitations on direct instruction.

“I don’t like teacher led discussion... students should kind of figure it out after they have initially seen what the teacher told them in the beginning. The teacher gives them a little bit of guidance.” (P1_{Interview})

“[the teacher] doing all the explaining isn’t too appropriate.” (P1_{Interview})

“[the students] start... like they formulate some questions. I kind of like that and just a little bit... teacher-driven, but kind of letting them, answer their own questions through experiments and stuff...” (P1_{Interview})

As noted, Participant 1 had not taken the science methods course but she had taken several science content courses designed for K-8 pre-service teachers. Her occasional comments about these courses suggest that they may have influenced her ideas about the importance of teacher direct instruction coupled with student activity. Across the eight items, Participant 1 chose the DA response six times and the GI response twice.

Although Participant 7 also chose the DA response for Item 1, her reasons were quite different and indicated the influence of her science methods course. Participant 7 specifically used the word ‘*inquiry*’ and commented several times on the importance of student involvement in the lesson. For example:

“I think to me inquiry-based means getting the students involved as much as possible by doing the labs, allowing them to do the labs themselves... hands-on stuff, instead of just writing it down on the board and having them copy it or just lecturing to them. And then, I mean I would like to be able to do it with you know trying to have many activities and labs as possible... try to get them involved, get them out of their seats, get them doing hands-on activities as much possible in the classroom.” (P7_{Interview})

Across the eight items, Participant 7 chose the DA response three times while choosing inquiry-oriented responses five times. The frog dissection item, however, was one of the items where she preferred the DA response over an inquiry-oriented response. She reasoned that the students would not have sufficient prior knowledge for a less direct instruction lesson to be effective.

“... if you are going to have [the students] go through and dissect a frog that is great inquiry with them involved... but I... don’t think you are going in blind, not really knowing what they are dissecting. So, I think after you teach and explain the different parts of the frog or anatomy

that the students need to know. Then I think they can go through and dissect the frog with at least some background, of what they are doing.” (P7_{Interview, Item1})

“I feel like [the students] wouldn’t really know what they were looking at if they haven’t really learned about it. If they have had background knowledge... they know [what] they are looking at.” (P7_{Interview, Item1})

“Once students have learned about the anatomy of the frog, they can dissect one to get a better understanding of the anatomy. It’s a good idea to give them some information before dissecting so they have some idea what they’re looking at.” (P7_{Interview, Item1})

Participants 1 and 7 appear to agree that the inquiry-oriented responses for Item 1 are too ‘blind.’ They both use this word suggesting that they both think that for the lesson to be successful the students need more background knowledge. Unlike Participant 1, however, Participant 7 gives evidence of knowing more about pedagogy in that she specifically speaks of inquiry instruction but never suggests that a ‘teacher-driven’ lesson might be appropriate.

Item 5 is about an 8th grade light reflection lesson. Participant 1 (who had not taken the methods course) and Participant 7 (who had) both chose the GI response:

“The light reflection should be investigated by students through posing a question about reflection. Then, the students should experiment and discuss about their findings. Last, the lesson should be completed by giving a summary of the law of reflection.” (Item5)

For the light reflection lesson, Participant 1 underlined the importance of student exploration instead of memorization. She approved of the fact that:

“...the teacher gave a question about reflection and they were able to explore’ and that, ...they were given multiple resources to explore...” (P1_{Interview, Item5})

However, Participant 1 also suggested that the teacher should guide students for better understanding. Referring to the scenario, Participant 1 commented approvingly that,

“... [the teacher] gave them little bit of guidance then they explored for a while and then she explained what that their findings meant...” (P1_{Interview, Item5})

Participant 1 reasoned that guidance is important because comprehension is important,

“...for improving state test score of the students...” (P1_{Interview, Item5})

Participant 1 approves of students ‘summarizing in their own notes of what they have seen’ and the teacher:

“...giving a summary at the end’ so that what the students have is ‘the teacher’s knowledge in combination with they saw.” (P1_{Interview, Item5})

Participant 1 seemed to think that the students will not adequately comprehend the lesson without at least some direct instruction. When asked about GI and DA instruction, Participant 1 commented:

“[GI] seems good! [DA] wouldn’t be bad either because I do think the law [of reflection] is important to know. Maybe a combination.” (P1_{Survey Comment})

Participant 1’s reasoning about Item 5 is thus similar to her reasoning about Item 1 where her preferred pedagogy was DA.

As with Item 1, Participant 7 also chose the GI response, and again her reasons were different and indicated the influence of her science methods course. For example, Participant 7 reasoned that grade level was an important factor when deciding on an instructional approach. She approved of an inquiry approach:

“Especially since [the students] are older 8th grade students you can challenge them little bit more with ‘...’ giving them ... questions, so they have to do the investigation and they have to come up with reasoning for it. Instead of just giving them, telling them about reflection. First you can allow them to do their own investigations and then you can kind of reflect back on it. Let them tell you what they think and then give them a little summary of reflection.” (P7_{Interview, Item 5})

Whereas with Participant 1 there was some ambiguity as to her preferred pedagogy, Participant 7 clearly prefers inquiry strategies. With respect to teaching science, she commented that:

“... biggest part is just getting them involved as much as possible and not just giving them worksheets because, I mean that is the way when I was in school that is how and it always was, kind of just do some worksheets and it was more of a special occasion to do a fun lab or do something like that; like that was considered a treat to do something fun like that.” (P7_{Interview})

“The best way for students to learn is through inquiry.” (P7_{Survey Comment})

Participant 1 made no similar declaration about inquiry instruction.

Item 8 is about a 1st grade magnetism lesson. Participant 1 (who had not taken the methods course) and Participant 7 (who had) both chose the DA response:

“The teacher should recall magnets attract materials which contain iron and then small groups of students should use bar magnets to sort the food containers aspect of coining iron or not.”
(Item8)

Participant 1 thought that the teacher should remind students of what they had learned about magnetism in a previous lesson. Thus, the students would have ‘a reason’ for doing the magnetic attraction activity, which she also thought was important. Referring to item 8, she said:

“I would tell the class to recall the magnet... that magnets attract, so it was something they previously had found. So, even if it something like that, just refresh memories, start them with something not just hand them all the stuff and say find what you find. You know they need a reason why you are doing the experiment... [the students] are really investigating something and he is just giving them the resources to investigate.” (P1_{Interview, Item 8})

The balance between direct instruction and student activity, for Participant 1, appears to be about a perceived need for the students to have a clear goal or rationale for activities:

“You know the students need a reason why you are doing the experiment.” (P1_{Interview, Item 8})

She thinks that activities need to be goal-driven with teachers giving:

“A little bit of help... but students are mainly doing [the activity] with the teacher still wrapping stuff up.” (P1_{Interview, Item 8})

“They have a goal... and they were able to complete that goal with given materials, yet not a direct layout of how to find out.” (P1_{Survey Comments, Item 8})

Like Participant 1, Participant 7 thinks the teacher should give some directions for the activity; but her specific reason is that ‘students were 1st graders.’ She contrasts 1st and 8th graders:

“... you just gave them the stuff and said go ahead and with 8th graders you can do that with a little more older students, but for 1st graders you want to let them explore by themselves as much possible but you also don’t want to just... you can’t expect the 1st graders to be able to do same as 8th grader or 5th grader. ...You have to give them a little more structure with the lab or whatever you are doing.” (P7_{Interview, Item 8})

“With younger students, you need to make sure to let them explore, but you [can’t] just give 1st graders a magnet and some materials and expect them to learn much. You have to give them some guidance.” (P7_{Survey Comments Item 8})

Participant 7 drew on her personal experience noting that:

“I’ve been in a 1st grade classroom, I mean you wouldn’t get a lot done that way because they are not old enough or advanced enough at that point to ...” (P7_{Interview, Item 8})

Summarizing the findings for Research Question 2a, both participant 1 and 7 preferred a more direct instructional approach but one that involved student activities for 1st grade lesson on magnetism. Their preference was for DA instruction. However, they held this preference for different reasons. Although she approved of students having activities to do, Participant 1 preferred DA instruction because it is the teacher’s job to provide the students with direction. The activities need to be goal-driven with the goal provided by the teacher. Participant 7, however, who clearly preferred inquiry instruction for Item 5, considered the effect of student age in Item 8. She believed that 1st graders as

younger students needed more information before the doing the activity than would 8th graders. As with Item 1, her preference for inquiry instruction is moderated by other factors.

Similar instructional strategy preferences can be held for different reasons. In general, while Participant 1, who had not taken the science methods course, thinks the duty of the teacher is to directly define the knowledge and purpose of the lesson, Participant 7, who had taken the science methods, considered the importance of grade level and science content in choosing same teaching strategy. In addition, even though Participant 1 thinks that student involvement in a lesson is important, she thinks that the teacher needs to lead the activity and finally summarize the lesson. In contrast, Participant 7 maintains the teacher should encourage the students to lead and then summarize their experiment themselves.

Between-group Differences

Item 2 is about a 1st grade Earth rotation lesson. Participant 20 (who had not taken the methods course) chose DD and Participant 17 (who had) chose the GI response. In this item, as Ms. Rice shines a flashlight on a globe, she poses questions to her students to help them understand ‘how day and night are related to Earth’s rotation.’ Participant 20 disagreed with Ms. Rice’s indirect teaching approach noting the importance of teacher explanation and demonstration. Drawing on her personal experience she commented that:

“I like people to explain stuff to me... for instance if you are telling me something I would like you to explain to me what you are trying tell me, so I have a better understanding of what I am doing or make sure I understand exactly what you are saying.” (P20_{Interview})

“... if you the teacher can show me and explain it and better understanding because I’m more visual I’m a visual learner. So, I have to see everything and then by me seeing it will help me be able to understand and then by someone explaining it to me...” (P20_{Interview, Item 2})

Reflecting on how she teaches, Participant 20 commented that:

“...when I teach it is going to be presentation and experience experiments, so they (the students) have that hands-on and visual and be able to understand the concept of what is being taught...” (P20_{Interview})

“...how I would teach chemistry is [that] I would start it off with a presentation to explain each one of my topics [then] I would do that experiment... so my students would be able to understand how the topic connects with their experiments.” (P20_{Interview})

Although Participant 20 chose the DD response for Item 2, some of her comments suggest that she values hands-on learning when the hands-on activity follows teacher instruction. For example, she commented that the teacher can catch student interest or curiosity for the experiment by first explaining the experiment:

“So, with an, experiment being able to see how it’s done, having hands-on, it will make the experiment more exciting for students... Even though you are going to be explaining you... also will be able to do that experiment and be able to understand how it works... what happens... throughout the experiment you will be see that.” (P20_{Interview})

Participant 20 might more accurately be described as a DA teacher.

Unlike Participant 20, Participant 17 approved of Ms. Rice’s GI approach though she thought that there could have been more class discussion.

“I think with 1st graders especially like beginning with a lecture saying like trying to explain it before they see it; it really wouldn’t grab their attention. But, having, you know a cool activity and like watch this and try to explain how it happens and then saying well this is what was happening. I think is a lot more attention grabbing for 1st graders...” (P17_{Interview, Item 2})

“I wanted to add that (the teacher) should have... a class discussion and then... get their ideas instead of just telling them and then follow that by saying like these are the true things about how day and night happens...” (P17_{Interview, Item 2})

However, because these students were only in 1st grade, Participant 17 thought that some teacher direction was important. She thought that the teacher should guide the students more after the students did the experiment and finally they should summarize their own knowledge. She shared her idea with commented that:

“I think 1st grade students could have fun doing it their own. But, I think they would need a lot of guidance just seeing it, seeing her perform it and then trying to come up with conclusions.” (P17_{Interview, Item 2})

From her response to Item 2 and from her comments, Participant 17 appears to favor GI instruction. When asked about her methods course, Participant 17 commented that she had completely changed her ideas about teaching science due to her methods course.

“... [Before taking science methods course] I [would] have been more teacher-based, like worksheets, books and stuff like that. And I didn’t enjoy teaching that way. So, it wasn’t really my preference, but after having experience with inquiry and using it in like my pre-internship, that is my preference now. I would rather have students explore. And then, kind of harness those ideas than just give them the ideas because it is more fun for them. It is more meaningful. But I can’t say that I really had a preference. I just didn’t know about inquiry before because as a student I never came across it yet.” (P17_{Interview})

Participants 20 and 17 both appear to value hands-on learning. They clearly differ in that Participant 20 values direct instruction leading to hands-on activities, while Participants 17 is much

more inquiry-oriented. The difference as reported by Participant 17 is her experience with the science methods course.

Item 7 is about a 7th grade lesson on how a sundial works. Ms. Navetta has a demonstration model with lines marked at various angles and labeled with the hours of the day. As with Item 2, Participant 20 (who had not taken the methods course) chose the Didactic Direct response and Participant 17 (who had) chose the GI response. When asked about how to conduct the sundial lesson, Participant 20 favored direct instruction. She believed that the teacher should explain the sundial to the students before conducting a demonstration. She reasoned that that the students would not be familiar with a sundial.

“I would have to explain to them what a sundial is because most people don’t know what sundial is.... For instance, like explaining then showing. And then see how the sundial they can actually see how it actually works.” (P20_{Interview, Item 7})

As noted under Item 2, Participant 20 refers to herself as a ‘visual learner’:

“I am a visual learner, so I have to see stuff before actually be able to explain to someone like what it is... you actually have a model, you are showing them a model and then you also explain... so they could see how the sundial indicates the correct time of day coming back.” (P20_{Interview, Item 7})

Like Participant 20, Participant 17 saw the need for teacher guidance in this lesson; but unlike Participant 20, Participant 17 preferred to use the demonstration in an inquiry fashion.

“... [the teacher] didn’t just throw them into a situation that could confuse them, so she explained how to set up the sundial even though she didn’t call it that or explain it. And then, she just asked them to come out and observe it every hour. And then, they would find a pattern in that... I would summarize at the end with the whole class have a discussion.”(P17_{Interview, Item 7})

On the other hand, Participant 17 also thought that the OD option was viable commenting that:

“I think [OD] could have been a good option too.” (P17_{Interview, Item7})

Participant 17 emphasized the importance of making the lesson relevant to the students:

“I would connect it to historical context because they would, that would probably be one of their questions is, ‘What is this good for because we all have digital clocks and cell phones now?’ But, and then I would talk about I would ask them... when would this not be right. Is the sundial always right or is it, sometimes could it be wrong? Just again, most of my questions I put at the end I would summarize at the end with the whole class have a discussion.” (P17_{Survey Comment})

As with Item 2, Participants 20 and 17 clearly differ in that Participant 20 places more value on direct instruction, while Participant 17 is much more inquiry-oriented. In Item 7, Participant 17 also demonstrates sensitivity to the importance of helping students see the relevance of a lesson.

Item 8 is about a 1st grade magnetism lesson. The students have already learned that bar magnets attract materials containing iron. For today's lesson Mr. Golden provides a variety of containers made of plastic, aluminum, steel, and glass. In responding as to how they would conduct the lesson, Participant 20 (who had not taken the methods course) chose the DD approach while Participant 17 (who had) chose the OD approach.

Participant 20 chose the response that says: 'I would remind the class that magnets attract materials which contain iron (including most steels), and then show them how the bar magnet attracted the containers made from steel or iron, but not any of the other containers.' For her, it was important that the teacher explain lesson concepts:

"... [the teacher] is explaining to students what magnets are and what type of iron it contains and then it shows them how magnets contain, attracts the containers and how they are made... [the teacher] gives more general information that they will need to know about magnets."
(P20_{Interview, Item 8})

When asked about the DA response, she commented that although the DD and DA responses were similar, she preferred the DD response because the DA response:

"... doesn't give that much information." (P20_{Interview, Item 8})

Again, she demonstrates the value she places on direct instruction. When specifically asked about the GI approach, she indicates that with the GI approach the students are not given enough information:

"And for GI it tells students about the assignment and they have to think about... they don't really get... information about magnets. So, they really basically [are] not told about the assignment. They are not told... what is [a] magnet ... [the approach] doesn't give information about that." (P20_{Interview, Item 8})

When asked about OD, Participant 20 contrasts DD with OD. For DD, the students were:

"... basically given... the container so they be able to see and then they will be able to know how the magnet bars contain, attracts to the containers." (P20_{Interview, Item 8})

Participant 20 is implying that the teacher is giving information to the students. Whereas for the OD approach:

“[The students] don’t have that. It just like a more hypothesis and no experience like no experience or observation of them being able to see what is going on like visualize.”
(P20_{Interview, Item 8})

Apparently Participant 20 views OD as something different from regular science teaching. About the OD approach, she commented that:

“I thought this was more of like a science hypothesis, more like a science experiment... more like them having hands on and being able to see like which container like they have would be they have the options to see which container holds magnets and which container doesn’t.”
(P20_{Interview, Item 8})

While Participant 20 values direct instruction, it is not clear what role a science experiment might play in a science lesson.

Participant 17 only had a few comments about Item 8 and they were quite opposite to Participant 20. First, she took note of the grade level:

“... because they are 1st graders, I don’t think that they would know what iron is and, so asking them to find out which ones contain iron or not, you would have to explain that iron is a metal and I just think there is too many... because of their age I think there is too many... too many directions left out. I don’t think they would automatically know all, we have to use bar magnets.” (P17_{Interview, Item 8})

At first glance, the above comment might be interpreted to mean that Participant 17 thought the lesson needed more direct instruction. However, she goes on to indicate that she thinks the content is beyond 1st graders but that a lesson allowing students to ‘play’ with the materials would be appropriate.

“They would be provided with the bar magnets and the food containers and they would know to play with those two things instead of having to figure out to go get bar magnet on their own.” (P17_{Interview, Item 8})

Participant 17 went on to say that she had:

“... done a similar lab with 4th graders and they were able to conclude that magnets attract to metals. I had to explain that it is not all metals, just iron.” (P17_{Survey Comment})

For Item 8, it was clear again that Participant 20 values direct instruction while Participant 17 values inquiry instruction. Across eight items, Participant 20 chose the DD response six times and the GI response twice. Across the same eight items, Participant 17 chose the DA response only one time while choosing inquiry-oriented responses seven times. The other difference between the two is the sensitivity that Participant 17 shows toward the importance of grade level when making instructional decisions.

Summarizing the findings for Research Question 2b, Participant 20 and 17 clearly prefer different instructional strategies. Participant 20, who has not taken the science methods course values direct instruction leading to hands-on activities, while Participant 17, who had taken the science methods course, is much more inquiry-oriented. Participant 20 values direct instruction; participant 17 does not. Moreover, Participant 17 thinks that it is important for students to see the relevance of a lesson, and she thinks that grade level must be considered when making instructional decisions. In contrast, Participant 20 did not mention other factors that might be important to consider when making instructional decisions.

In summary Research Question 2, the results suggest that K-8 pre-service teachers who had taken the methods course and who had not taken both similar and dissimilar pedagogical preferences held for different reasons. The participants who had not taken the science methods course often preferred the more teacher-based, direct instruction item responses. These participants appear to think that students obtain knowledge and comprehend the purpose of a lesson better when the teacher provides explanations and explicit instruction. These participants supported the use of hands-on activities but under the control of the teacher. However, some participants who had taken the science methods course also favored more direct instruction in some circumstances. These participants explained that depending on students' prior knowledge, the science content of a lesson, student grade level, and their own teaching experience, a DA instructional approach can be preferable.

Both participant groups preferred the guided-inquiry responses for one or more of eight items. The participants who had taken the methods course used the word 'inquiry' in their explanations for their choices and appeared to understand its meaning. On the other hand, although choosing an inquiry-type response, the participants who had not taken the methods course did not use the word 'inquiry' and they seemed to have difficulties explaining their choice for inquiry-based instructional strategies.

While for some items, the two types of participants responded similarly to the same items, often they did not. The participants who had not taken the methods course were more likely to choose direct instruction responses. In contrast, the participants who had taken the science methods course tended to choose more inquiry-based responses. These participants seemed to focus more on learning processes. They appeared to hold the opinion that inquiry instruction leads to meaningful learning. They also paid more attention to student interest and curiosity, the importance of posing questions, observing, discovery, group discussion, and experiment summary of students.

Discussion

The findings indicate that the participants who had taken a science methods course and those who had not can have both similar and dissimilar instructional preferences. When the preferences are similar, however, the two groups have different reasons for their preferences. Even when both groups

prefer the same strategy, the reasoning of the pre-service science teachers who had taken a science methods course involved more factors, such as prior knowledge of the students, science content, and grade level when they decide on a specific instructional strategy. Whether the two groups agree or not on an instructional preference, the reasoning of the pre-service science teachers who had taken the science methods course tended to be more detailed.

Moreover, most of the pre-service science teachers who had taken a science methods course knew the meaning of inquiry instruction. Several pre-service science teachers, when interviewed, said that they had changed their minds about science instruction after taking a science methods course. Their preferences shifted from direct instructional approaches to inquiry instructional approaches. Whereas the interview data indicated that many of the pre-service science teachers who had not taken the science methods course had an inadequate understanding of inquiry-based teaching and tended to choose more direct instructional approaches. Especially, they assume that doing activity refers to inquiry-based teaching and prefer Direct Active instructional approach pretending inquiry instructional approach.

Conclusion

This study was grounded in Shulman's concept of Pedagogical Content Knowledge as augmented by the work of Magnusson et al. (1999) and others. We specifically drew upon the Cobern et al. (2014) theoretical and empirical work that developed the Science Teaching Orientation Spectrum (didactic direct, direct active, guided inquiry, and open discovery) and the POSTT. Our work contributes to previous POSTT research by Asrin, L. (2014), Güven et al. (2015), and Ramnarain and Schuster (2014). We were able to use the POSTT to address research questions regarding the impact of science methods instruction on preservice K-8 teachers' orientation towards science instruction. Our findings suggest that taking a methods course does make a difference with respect to preservice teachers' orientations toward science teaching approaches aspect of their instructional preferences. However, we also note a significant limitation of our research. Our data is self-report data and it remains to be seen whether what preservice teachers say they will do in the classroom is what they actually do.

On the other hand, Sahingoz (2017) suggests that teacher self-reports can be accurate. We conclude by noting that the POSTT has potential as a formative assessment tool within a science methods course. Using POSTT items could promote classroom discussion about approaches to teaching science and help methods instructors better assess their students' instructional orientation development.

Acknowledgement

The authors would like to thank K-8 pre-service science students who participated in the study for their cooperation.

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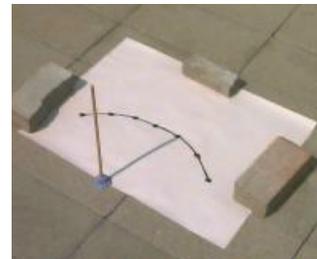
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APPENDIX

Appendix 1. An item example from POSTT survey

Sundial

Ms. Navetta is planning a 7th grade lesson on the changing position of the sun in the sky during the day and how this is the basis of a simple ‘sundial’ to tell time of day. The basic sundial is simply a vertical stick on a piece of board, and in sunlight the angle of the stick’s shadow can be marked on the board. Ms. Navetta also has a larger demonstration model with lines marked at various angles and labeled with hour of day.



Ms. Navetta considers various ways to conduct the lesson. Of those below, which is most similar to how you would teach?

A. Explain how a sundial works related to sun position in the sky. Have each group assemble a basic sundial, using a prepared handout sheet with lines and hour markings. Then take the students outside to try out their sundials and see that they indicate the correct time of day. **(DA)**

B. Do not explain sundials but take the students outside and have each group set up a stick and board. Ask them to brainstorm what this might be useful for, and to expand on their ideas. Have them come back every hour, anticipating that they will mark a series of shadow lines to make a sundial. **(OD)**

C. Explain how a sundial works, in relation to sun position in the sky. Then gather the class outside around the demonstration model, so they can see how the sundial indicates the correct time of day. Come back an hour later to see that the shadow has moved to the next marking. **(DD)**

D. Instead of explaining sundials take the students outside and note the location of the sun in the sky. Have each group set up a stick and board and mark the position of the shadow. Ask them to suggest how this might be used as a ‘shadow clock’ to tell time of day. Have them come back every hour and mark a new shadow angle, labeling it with the hour, to make a sundial. **(GI)**

Appendix 2. Interview Protocol

1. Could you look at “...” question? Please, explain why did you choose response “...”?
2. Why did you not choose the other responses?
3. How would you teach this science lesson?
4. Do you think taking science methods course affected your teaching strategy preferences?
Could you explain it? (for the participants who have taken science methods course)

An Action Research on the Improvement of Writing Skill in Teacher Training

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Abstract

The aim of the research is to improve the writing skills of students with procedure-based gradual writing training practice by positively changing their writing perception, attitude and motivation, anxiety and fear, lack of education, writing difficulties, and writing process. The present research is considered to be significant in terms of affecting the writing perception, attitude and motivation, anxiety and fear, writing training and process as a result of performing the writing training with a gradual procedure. The research was conducted with action research model from the qualitative research designs. The study group consists of 15 first grade students, 7 male and 8 female, who were studying in the Turkish Teaching Program at the Faculty of Education in a university in the fall semester of 2018-2019 academic year. The criterion sampling method was used among the non-probability sampling methods in the determination of the study group. Data collection was performed with a semi-structured interview form. The research data was analyzed with the content analysis technique. A code-category map of the obtained data was created by using a qualitative data analysis program, MAXQDA 12. Based on the results of the present study, it can be suggested to give adequate importance to writing education in teacher training, conduct studies towards eliminating students' unwillingness and negative attitudes toward writing, perform writing activities to improve the writing perception of students and eliminate writing anxiety and fear, and carry out procedure-based writing training in an incremental manner.

Keywords: action research, teacher training, writing process, writing skills, writing training,

DOI: 10.29329/epasr.2020.236.8

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Introduction

Writing can be defined as the narration of exercises and experiences by the opinions, ideas, and emotions people who possess the power of thought on a selected subject by planning their interest in the subject and in accordance with the rules of the language (Göçer, 2010). The writing activity includes skills that are difficult to carry out such as reading, thinking, and conveying thoughts (Ungan, 2007). Writing skill, which is defined as the way of conveying what we understand, also constitutes a substantial part of language education (Pilav, 2014). Since writing is not a skill in which we state our ideas randomly, it requires methods of which we can plan and organize our ideas with a certain discipline. For this reason, writing skill can be provided formally through an appropriate educational environment, different from the listening and speaking skills which take place automatically in the natural environment (Tağa and Ünlü, 2013). Elftorp (2007) defines writing skills as one of the ways of expression that humans use in expressing themselves along with speaking. Briefly, it is possible to evaluate it as a skill that consists of conveying emotions, thoughts, and knowledge through written communication channels (Carter, Bishop, and Kravits, 2002).

A practice-based education is required for the acquisition of writing skills which has a significant place in Turkish education (Yılmaz, 2018). The reason for this is the fact that writing is directly related to learning through experience. Because writing training requires activities such as critical thinking, creative thinking, possessing study skills, obtaining problem-solving skills, and using Turkish correctly (Ungan, 2007). As the writing skills improve, students can transmit knowledge better, edit and review their thoughts more efficiently and this situation provides the production of writings with a higher level (Akyol, 2013). According to Yıldız (2018), the main purpose of writing training is to provide the expression of ideas, thoughts, emotions, and experiences. For this, students should be aware of why do they write, for who do they write, and in which genre they should write. Because writing skill can be obtained through writing (Demirel and Şahinel, 2006). It is required for students to possess certain qualifications in order to reach a certain maturity in writing skills. Possessing certain knowledge, culture, and significant experiences, using Turkish efficiently and accurately, possessing the technical knowledge of writing, establishing a cause and effect relation between the incidents by developing a different point of view, performing analysis, synthesis, and evaluations, distinguishing different ideas and opinions in accordance with certain principles can be listed among these qualifications (Göçer, 2010).

Writing skill requires a process that includes certain stages. Writing is a chain process in which ideas are transformed into a certain draft with preparation and shaped by performing various changes before sharing the ideas with other people. The stages that comprise this process are preparation before writing, forming a draft, editing, reviewing, and publishing (Tompkins, 2007, Trans. by Yıldız, 2018). In language education programs, writing skill is included as a process that consists of certain stages and each stage is the preparer of the following stage (Canada Ontario Language

Curriculum, 2006; Australia English Curriculum, 2012; Authorship and Writing Skills Course Curriculum, 2018). These stages progress by supervising each stage, returning and editing when necessary instead of a linear progression. In the Authorship and Writing Skills Curriculum (2018), the writing process consists of preparation, planning, improving, editing, and presenting stages. Several researchers emphasize that writing is a skill that consists of certain stages (Arıcı and Urgan; 2017; Eryaman, 2008; Güneş, 2013; Karatay, 2013; Tekşan, 2013; Yıldız, Okur, Arı and Yılmaz, 2013). Researchers also state that conducting the writing process gradually has an important place in the development of writing skills (Bruning and Horn, 2000; Graham and Sandmel, 2011; Karatay, 2013; Neuman, 2007).

Importance of the Research

The competence of teachers who are the practitioners of the process in writing training has great importance in acquiring writing skills to the students. Individuals who would be teachers should possess four basic skills. Reaching a certain competence in language skills for prospective Turkish teachers is considered to be significant in terms of acquiring these skills to the students. Conveying the emotions, opinions, and knowledge to the students in different grades in written and oral form by teachers is directly proportionate with the development level of understanding and expressing skills (İşeri and Ünal, 2012). Teachers can actualize the writing process, restructure the student and subject, and guide the process. For this reason, the qualification of the teacher plays an important role in shaping the process (Tağa and Ünlü, 2013). Acquiring writing to students which is a product of thinking and requires certain knowledge, process, and skill can be performed through the existence of a teacher who has efficient writing skills.

Concretizing the writing process by realizing its stages would bring along the positive changes in the writing perception of students, their motivation and attitude, writing anxiety and fear, writing training, writing skills. The present research is considered to be significant in terms of affecting the writing perception, attitude and motivation, anxiety and fear, writing training and process as a result of performing the writing training with a gradual procedure.

Aim of the Research

The aim of the research is to improve the writing skills of students with procedure-based gradual writing training application by positively changing their writing perception, attitude and motivation, anxiety and fear, lack of education, writing difficulties, and writing process. Answers were sought for the following questions in accordance with the aim of the research:

1. Does gradual writing training application create positive changes in the writing perception of students?
2. Does gradual writing training application increase the writing motivation of students and positively change their attitude?

3. Does gradual writing training application decrease/eliminate the anxiety and fears of students towards writing?
4. Does gradual writing training application decrease/eliminate the writing difficulties that students experience?
5. Does gradual writing training application fill the deficiency of the writing training of students?
6. Does gradual writing training application develop the writing skills of students?

Method

Research Design

Action research is regarded as a research method as well as a process. In this process, data is collected and analyzed systematically and the analyzed data is presented as feedback to the participants, thus, it is provided to develop action plans in a planned way (Seggie and Bayyurt, 2017). Action research was preferred as the research design since it mentions certain problems in an institution or society (Patton, 2014). Action research is a research pattern used to develop skills of individuals in the field of education. Since this research was conducted within the scope of developing writing skill, the research was carried out with action research.

Study Group

The study group consists of 15 first grade students, 7 male and 8 female, who were studying in the Turkish Teaching Program at the Faculty of Education in a university in the fall semester of 2018-2019 academic year. The criterion sampling method was used among the non-probability sampling methods in the determination of the study group (Creswell, 2013; Cohen, Manion & Morrison, 2007; Robson; 2017). The criteria for determining the study group are as follows: Being a first-grade student in the Turkish Teaching Program, not feeling insufficient in writing, volunteering. The students were coded as S1, S2, S3... The age range of students was 18-20.

Data Collection Tool

Data collection was performed with a semi-structured interview form. Semi-structured interviews merge fixed alternative answers and in-depth analysis in the related field (Büyüköztürk et al., 2018). Two semi-structured interview form was used as before and after the application. The semi-structured interview forms were examined by three experts in the Turkish training field and the experts were asked to evaluate the forms in terms of language-expression, reflecting the related conceptual dimension, and whether or not the questions serve the purpose of the research. The interview form was finalized after the evaluations of 3 experts.

Data Collection

The data of the research was collected in two stages from the students in the study group as before and after the application. Before the application, the writing perception, motivation, and attitude towards writing, writing anxiety and fear, writing difficulty, writing training and process of students were revealed with semi-structured interview form. The application lasted 6 weeks (2-course hours per week). The application consists of preparation, planning and forming a draft, writing, editing and reviewing, correction and presentation, and evaluation processes, respectively. After the application, it was tried to determine the changes in writing perception, writing anxiety and fear, writing difficulty, writing training and process of students. Therefore, the effects of gradual writing training were measured.

Data Analysis

Data analysis is the process of exporting the meaning of the data. Exporting the meaning of the data includes merging, reduction, and interpreting what people say and what the researcher observes and read (Merriam, 2013). The data of the research were analyzed with the content analysis technique. Content analysis is defined as a systematic, iterable technique in which certain words of a text are summarized with smaller content categories based on certain rules (Büyüköztürk et al., 2018). The data obtained from the study group was classified by coding. A code-category map of the obtained data was created by using a qualitative data analysis program MAXQDA 12. The data were made more meaningful by gathering the codes under these categories. The coding was performed twice by the researcher for the reliability of the codes and the consistency between the codes was examined. For this, the formula of Miles and Huberman (2016) was used. Reliability Coefficient = $\text{Agreement} / (\text{Agreement} + \text{Disagreement}) \times 100$. The obtained result from this coding which provides internal consistency should be at least 70%. The reliability coefficient was determined as 95.49% after the recoding performed by the researcher. Furthermore, direct transfer was performed for each code in order to provide the reliability of the codes. Analysis of the research data was carried out in two stages. The data collected before the application in the first stage and the data collected after the application in the second stage were analyzed. The findings of the research were reached with the data analyzed before and after the application and by comparing these data. The data was presented and interpreted with the visuals obtained from the program.

Findings and Interpretation

Writing Perception Before and After the Application

The writing perception of students before the application was demonstrated in Figure 1.

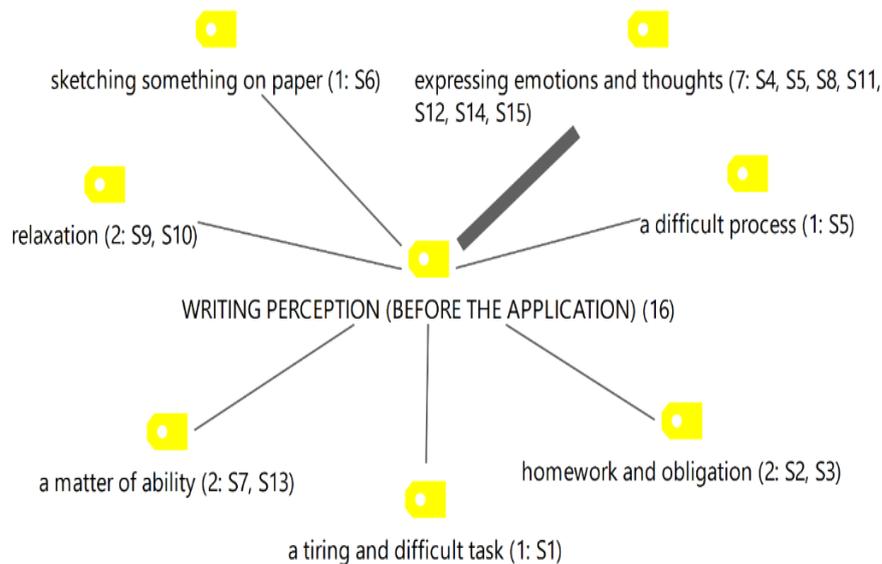


Figure 1. MAX Maps Code Concurrence Model Regarding the Writing Perception before the Application

When Figure 1 is examined, it was observed that the codes regarding the writing perception before the application were *expressing emotions and thoughts*, *homework and obligation*, *a matter of ability*, *relaxation*, *sketching something on paper*, *a difficult process*, *a tiring and difficult task*. Before the application, 7 students perceived writing as expressing emotions and thoughts, 2 students perceived writing as homework and obligation, 2 students perceived writing as a matter of ability, 2 students perceived writing as relaxation, 1 student perceived writing as sketching something on paper, 1 student perceived writing as a difficult process, and 1 student perceived writing as a tiring and difficult task. Codes and opinion samples regarding the writing perception before the application was given in Table 1.

Table 1. Codes and opinion samples regarding the writing perception before the application

Code	Opinion	Student
a tiring and difficult task	<i>Writing is a tiring and difficult task for me</i>	S1
homework and obligation	<i>I perceived writing as homework I am writing because I have to</i>	S2
expressing emotions and thoughts	<i>It is the process of writing down our emotions, thoughts, and feelings.</i>	S15
a difficult process	<i>Writing is a difficult process</i>	S5
sketching something on paper	<i>Writing states sketching something on paper.</i>	S6
a matter of ability	<i>Writing is a matter of ability. Not everyone can write.</i>	S7
Relaxation	<i>I mean, writing is a means for relaxing in my opinion.</i>	S10

The writing perceptions of students after the application were given in Figure 2.

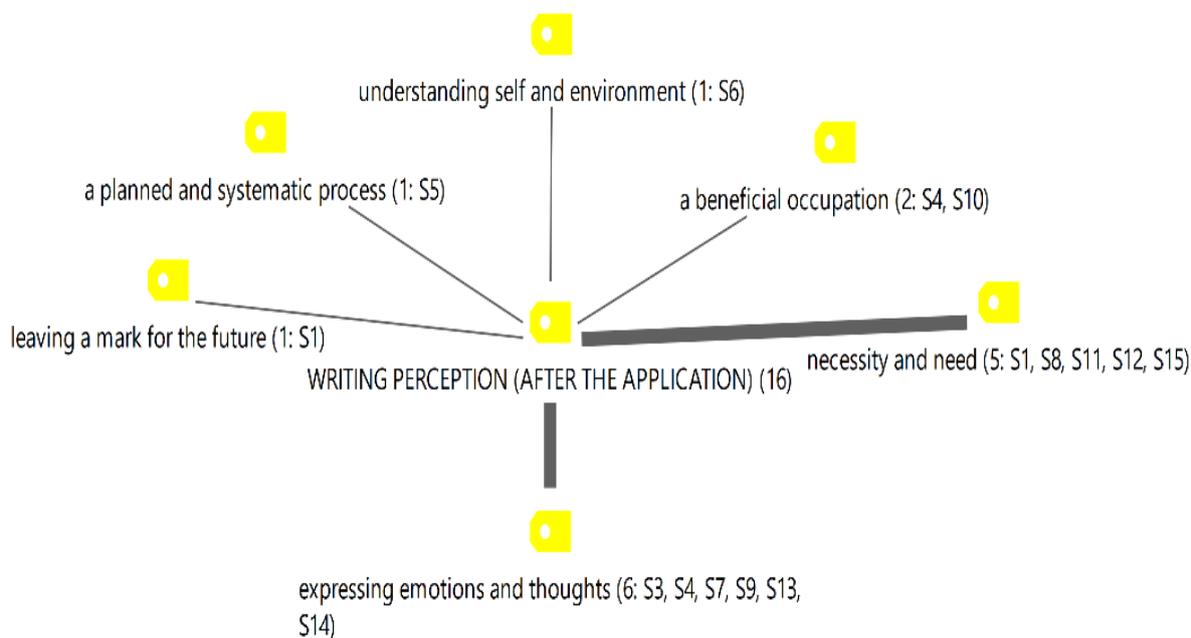


Figure 2. MAX Maps Code Concurrence Model Regarding the Writing Perception after the Application

When Figure 2 is examined, it was observed that the codes regarding the writing perception before the application were *expressing emotions and thoughts*, *necessity and need*, *a beneficial occupation*, *leaving a mark for the future*, *a planned and systematic process*, *understanding self and environment*. After the application, 6 students perceived writing as expressing emotions and thoughts, 5 students perceived writing as necessity and need, 2 students perceived writing as a beneficial occupation, 1 student perceived writing as leaving a mark for the future, 1 student perceived writing as a planned and systematic process, and 1 student perceived writing as understanding self and environment. Codes and opinion samples regarding the writing perception after the application was given in Table 2.

Table 2. Codes and opinion samples regarding the writing perception after the application

Code	Opinion	Student
Necessity and need	<i>Writing has become a necessity for me to express my experiences and memories.</i>	S15
Leaving a mark for the future	<i>We leave our mark from today to the future with writing.</i>	S2
Expressing emotions and thoughts	<i>I believe that writing is the best way to reflect my emotions and thoughts.</i>	S13
A beneficial occupation	<i>After the application, I realized that writing is a beneficial thing.</i>	S4
A planned and systematic process	<i>Writing should progress systematically and planned.</i>	S5
Understanding self and environment	<i>After writing practices, I realized that writing helps me to understand myself and the environment.</i>	S6

When the codes regarding the writing perception that emerge before and after the application were compared, it was observed that students perceived writing as *expressing emotions and thoughts, homework and obligation, a matter of ability, relaxation, sketching something on paper, a difficult process, a tiring and difficult task* before the application and *expressing emotions and thoughts, necessity and need, a beneficial occupation, leaving a mark for the future, a planned and systematic process, understanding self and environment* after the application. This finding indicates that gradual writing training application positively changed the writing perception of students.

Writing Motivation and Attitude Before and After the Application

The writing motivation and attitude of students before the application were given in Figure 3.

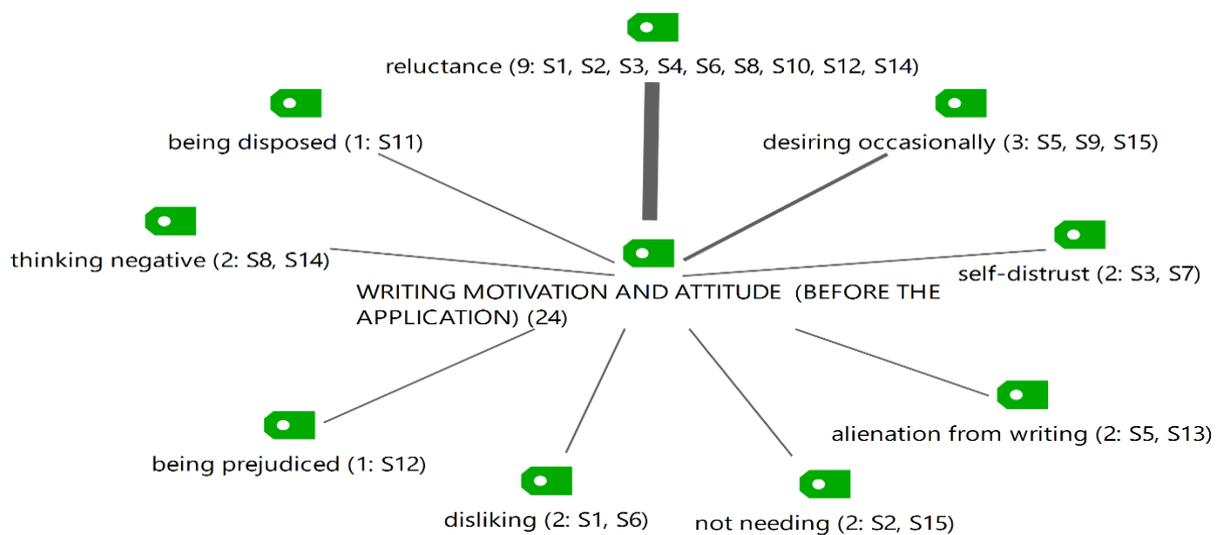


Figure 3. MAX Maps Code Concurrence Model Regarding the Writing Motivation and Attitude before the Application

When Figure 3 is examined, it was observed that the codes regarding the writing motivation and attitude before the application were *reluctance, desiring occasionally, disliking, not needing, self-distrust, alienation from writing, thinking negative, being prejudiced, and being disposed*. Before the application, 9 students stated their attitude and motivation towards writing as being reluctant, 3 students stated as desiring occasionally, 2 students stated as disliking, 2 students stated as not needing, 2 students stated as self-distrust, 2 students stated as alienation from writing, 2 students stated as thinking negative, 1 student stated as being prejudiced, and 1 student stated as being disposed. Code and opinions samples regarding the writing motivation and attitude before the application were given in Table 3.

Table 3. Code and opinions samples regarding the writing motivation and attitude before the application

Code	Opinion	Student
Reluctance	<i>I am reluctant to write anything.</i>	S3
Disliking	<i>I hate writing.</i>	S6
not needing	<i>I only write when I have to, I usually don't need to write.</i>	S15
self-distrust	<i>I always refrained to write since I don't have the writing skill.</i>	S7
alienation from writing	<i>I tried to write several times by being influenced by what I have read, however, I became alienated since I couldn't put my thoughts in order.</i>	S13
sesiring occasionally	<i>I have a desire to write when I feel intense emotions.</i>	S5
thinking negative	<i>It is an activity that I perceive negative since I will fail.</i>	S14
being prejudiced	<i>I have a prejudice against writing</i>	S12
being disposed	<i>I am disposed to writing.</i>	S11

The motivation and attitude of students towards writing after the application was given in Figure 4.

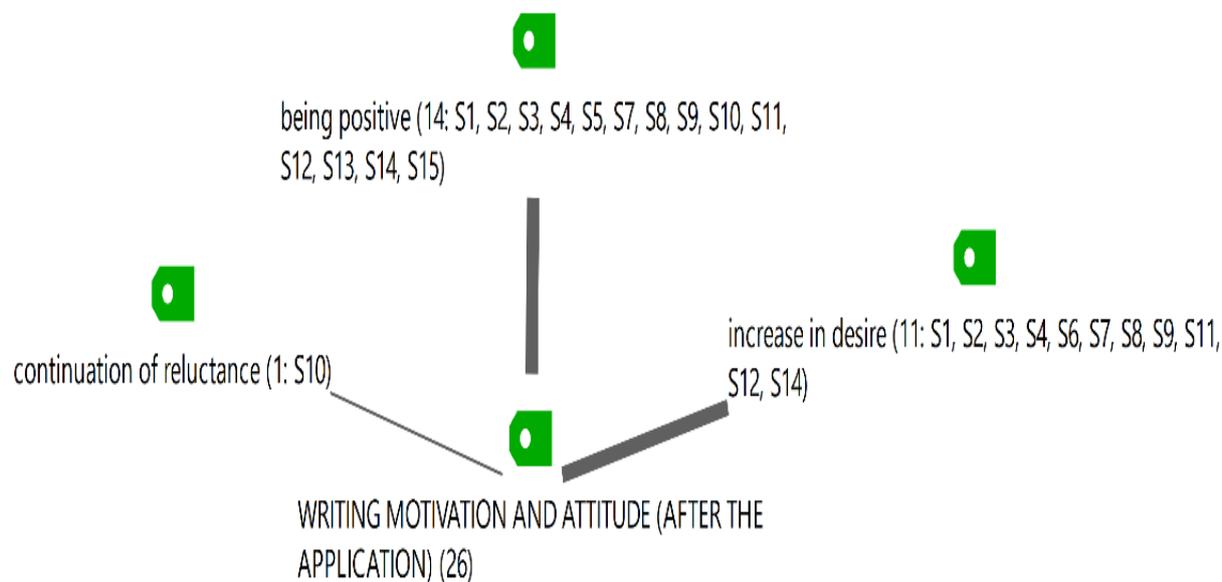


Figure 4. MAX Maps Code Concurrence Model Regarding the Writing Motivation and Attitude after the Application

When Figure 4 is examined, it can be observed that codes regarding the writing motivation and attitude after the application were *being positive*, *increase in desire*, and *continuation of reluctance*. After the application, 14 students stated their writing motivation and attitude as being positive, 11 students as an increase in desire, and 1 student stated as the continuation of reluctance. Code and opinion samples regarding the writing motivation and attitude after the application were given in Table 4.

Table 4. Code and opinion samples regarding the writing motivation and attitude after the application

Code	Opinion	Student
Being positive	<i>I started to think more positive towards writing after performing the application.</i>	S4
Increase in desire	<i>Although I had difficulty and didn't want to write at the beginning, I desire to write to see how much I can improve myself.</i>	S7
Continuation of reluctance	<i>My desire to write has not changed much.</i>	S10

When the codes regarding the writing motivation and attitude before and after the application were compared, it was observed that the writing motivation and attitude of students were *reluctance, desiring occasionally, disliking, not needing, self-distrust, alienation from writing, thinking negative, being prejudiced, and being disposed* before the application and after the application, their motivation and attitude determined as *thinking positive, increase in desire, and continuation of reluctance*. Only 1 student stated that his/her reluctance in writing continued. This finding indicates that gradual writing training practice increased the writing motivation of students and positively changed their attitude towards writing.

Writing Anxiety and Fear Before and After the Application

The writing anxiety and fear of students before the application were given in Figure 5.

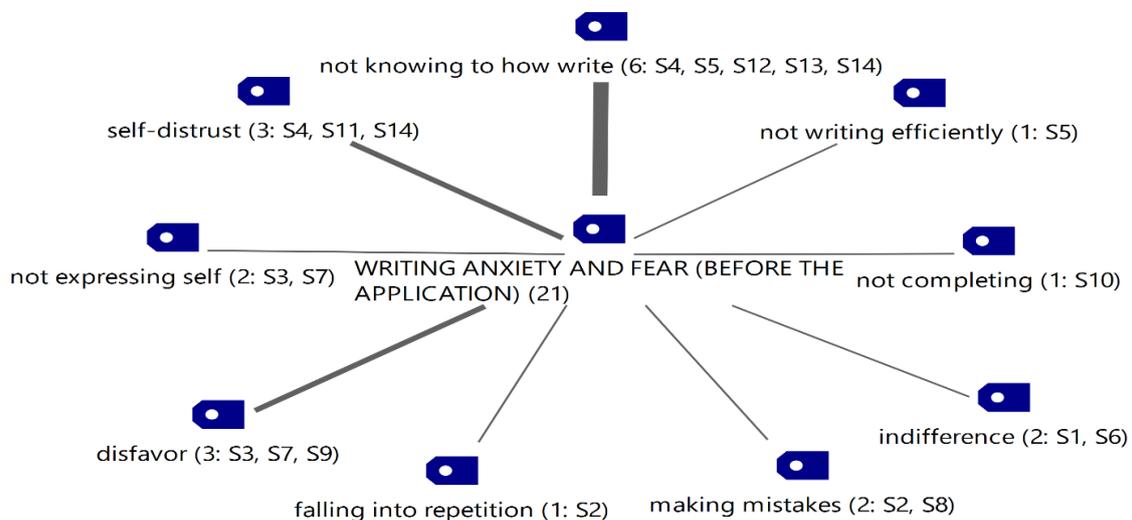


Figure 5. MAX Maps Code Concurrence Model Regarding the Writing Anxiety and Fear before the Application

When Figure 5 is examined, it was observed that the codes regarding writing anxiety and fear before the application was *not knowing how to write, self-distrust, disfavor, not expressing self, making mistakes, indifference, falling into repetition, not writing efficiently, and not completing*. Before the application, 6 students stated their writing anxiety and fear as not knowing how to write, 3 students as having self-distrust, 3 students as being disfavored, 2 students as not expressing

themselves, 2 students as making mistakes, 2 students as being indifferent, 1 student as falling into repetition, 1 student as not writing efficiently, and 1 student as not completing. Code and opinion samples regarding writing anxiety and fear before the application was given in Table 5.

Table 5. Code and opinion samples regarding writing anxiety and fear before the application

Code	Opinion	Student
Indifference	<i>I have anxiety and fear of writing due to my indifference.</i>	S1
Making mistakes	<i>First of all, will I be able to write well? I am anxious about writing because I think of this before starting to write.</i>	S8
Falling into repetition	<i>I feel anxious about falling into repetition when writing.</i>	S2
Disfavor	<i>It frightens me to being mocked or being disfavored by my writings.</i>	S7
Not expressing self	<i>I may not be able to express my opinions and thoughts on a subject.</i>	S3
Not knowing how to write	<i>I feel anxious about writing because I don't know how to start to write and what to write.</i>	S12
Self-distrust	<i>I feel anxious about whether or not I can write since I have not practiced at all.</i>	S4
Not writing efficiently	<i>It frightens me to write inefficiently.</i>	S5
Not completing	<i>When I start to write, I have never completed what I wanted to write. I choke up after several sentences.</i>	S10

The writing anxiety and fear of students after the application were given in Figure 6.

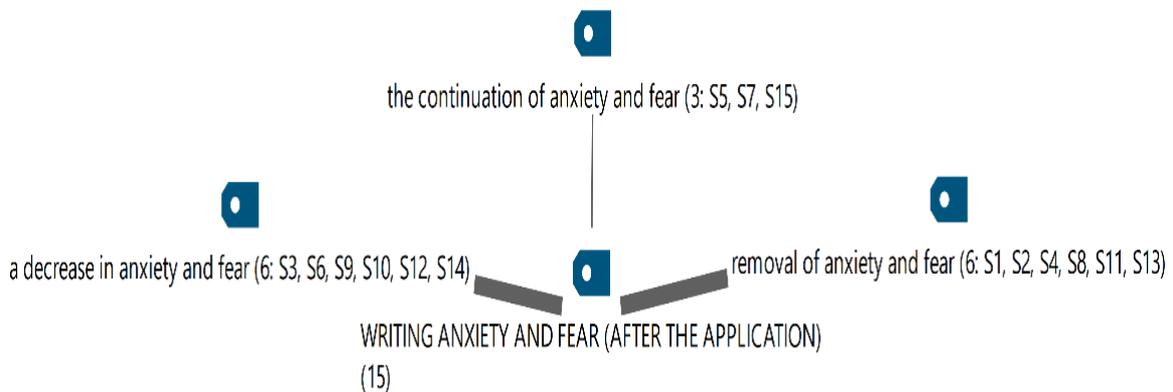


Figure 6. MAX Maps Code Concurrence Model Regarding the Writing Anxiety and Fear after the Application

When Figure 6 is examined, it was observed that the writing anxiety and fear of students after the application were determined as *removal of anxiety and fear*, *a decrease in anxiety and fear*, *the continuation of anxiety and fear*. After the application, 6 students stated that their anxiety and fear were removed, 6 students stated that their anxiety and fear decreased and 3 students stated that their anxiety and fear continued. Code and opinion samples regarding writing anxiety and fear after the application was given in Table 6.

Table 6. Code and opinion samples regarding writing anxiety and fear after the application

Code	Opinion	Student
The decrease in anxiety and fear	<i>Now that we break the writing process into pieces, it became easier and this provided my anxiety to decrease</i>	S10
The decrease in anxiety and fear	<i>My fear of whether or not my sentences will be correct and how will I write is minimized. My self-confidence increased.</i>	S14
Removal of anxiety and fear	<i>I have no anxiety and fear of writing.</i>	S1
Continuation of anxiety and fear	<i>I still worry that I will write badly.</i>	S7

When the codes regarding the writing anxiety and fear of students before and after the application were compared, it was observed that the writing anxiety and fear of students were *not knowing how to write, self-distrust, disfavor, not expressing self, making mistakes, indifference, falling into repetition, not writing efficiently, and not completing* before the application and after the application, their anxiety and fear determined as *removal of anxiety and fear, decrease in anxiety and fear, and continuation of anxiety and fear*. Only 3 students stated that their writing anxiety and fear continued. This finding indicates that gradual writing training applications decreased and removed the writing anxiety and fear of students.

Writing Difficulties Before and After the Application

The factors that affected students' writing before the application were given in Figure 7.

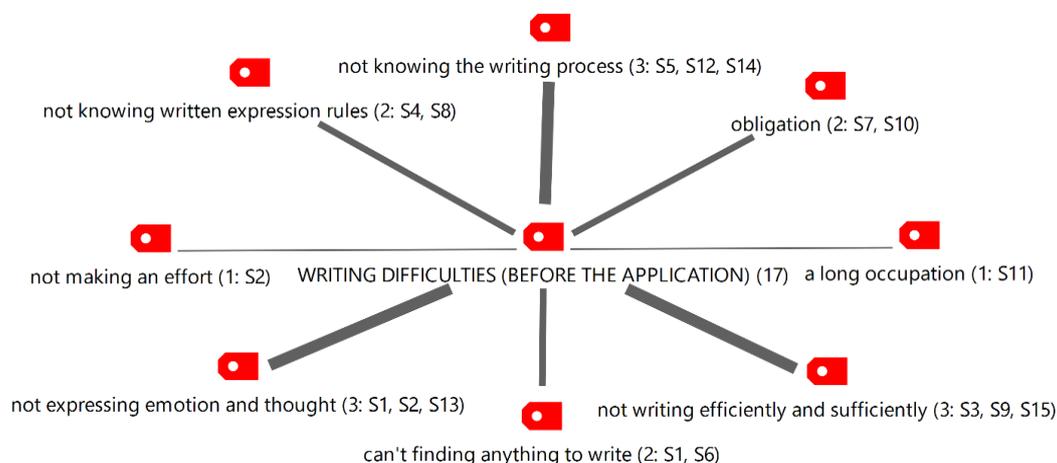


Figure 7. MAX Maps Code Concurrence Model Regarding the Difficulties of Writing before the Application

When Figure 7 is examined, it was observed that the codes regarding the factors which affected students' writing before the application were, *not expressing emotion and thought, not writing efficiently and sufficiently, not knowing the writing process, can't finding anything to write, obligation, not knowing written expression rules, and a long occupation*. Before the application, 3 students stated that not expressing their emotion and thought affected their writing, 3 students stated not knowing the writing process as a reason, 3 students stated not writing efficiently and sufficiently

as a reason, 2 students stated can't finding anything to write as a reason, 2 students stated obligation as a reason, 2 students stated not knowing the written expression rules as a reason, and 1 student stated that writing is a long occupation. Code and opinion samples regarding the factors that affect writing before the application were presented in Table 7.

Table 7. Code and opinion samples regarding the factors that affect writing

Code	Opinion	Student
Can't finding anything to write	<i>I can't find anything to write when I take a pen in my hand.</i>	S1
Not expressing emotion and thought	<i>Writing, putting my thoughts on paper have always been difficult for me.</i>	S13
Not making an effort	<i>Sometimes expressing what I think becomes different when I write. It requires endeavor and I don't make an effort.</i>	S2
Not writing efficiently and sufficiently	<i>It is difficult to form efficient sentences and to write anything more than one page.</i>	S3
Not knowing the written expression rules	<i>Writing has difficulties such as paying attention to spelling rules, punctuation, and ambiguity.</i>	S8
Not knowing the writing process	<i>Writing requires preparation. We need to know how to prepare in order to prepare for writing. However, I don't know how to prepare for writing.</i>	S5
Obligation	<i>My desire to write disappears when we perform mandatory writing practices.</i>	S7
A long occupation	<i>The difficulty of writing for me is that it is a long occupation.</i>	S11

The writing difficulties of students after the application were given in Figure 8.

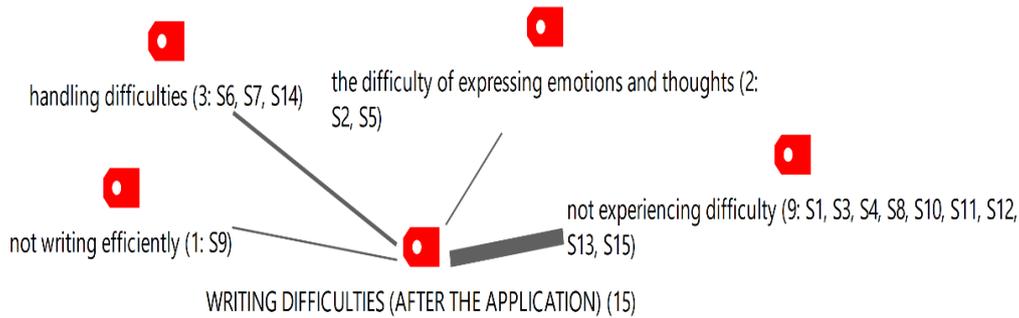


Figure 8. MAX Maps Code Concurrence Model Regarding the Difficulties of Writing after the Application

When Figure 8 is examined, it was observed that the codes regarding writing difficulties of students after the application were determined as *not experiencing difficulty*, *handling difficulties*, *the difficulty of expressing emotions and thoughts*, and *not writing efficiently*. After the application, 9 students stated that they didn't experience difficulty in writing, 3 students stated that they could handle difficulties, 2 students stated the difficulty of expressing emotions and thoughts and 1 student stated that he/she experienced difficulty in writing efficiently. Code and opinion samples regarding the writing difficulties after the application were presented in Table 8.

Table 8. Code and opinion samples regarding writing difficulties after the application

Code	Opinion	Student
------	---------	---------

Not experiencing difficulty	<i>I had difficulty in writing I didn't know how to write. But now, I can write without experiencing difficulty.</i>	S4
Not experiencing difficulty	<i>Writing was a quite difficult and terrific subject for me. Thanks to the application, I realized my mistakes and deficiencies that cause me to consider writing difficult. Thus, it enabled me to understand that writing is not difficult.</i>	S10
The difficulty of expressing emotions and thoughts	<i>It is difficult to write down my thoughts thoroughly.</i>	S2
Handling difficulties	<i>It is difficult in any case, however, I believe that I can overcome the difficulties by practicing more. I didn't think like that before.</i>	S7
Not writing efficiently	<i>It is difficult to write efficiently. Because lots of people write, so few of them are remembered. Therefore, one of the difficulties of writing is writing efficiently.</i>	S9

When the codes regarding the writing difficulties of students before and after the application were compared, it was observed that the writing difficulties of students were *not expressing emotion and thought, not writing efficiently and sufficiently, not knowing the writing process, can't finding anything to write, obligation, not knowing written expression rules, and a long occupation* before the application and after the application, *not experiencing difficulty, handling difficulties, difficulty of expressing emotions and thoughts, and not writing efficiently* conditions emerged. At the end of the application, only 3 students stated that their writing difficulties were continuing. This finding indicates that gradual writing training application decreased and removed the factors that prevent students to practice writing.

Writing Training Status Before and After the Application

The writing training status of students before the application was given in Figure 9.

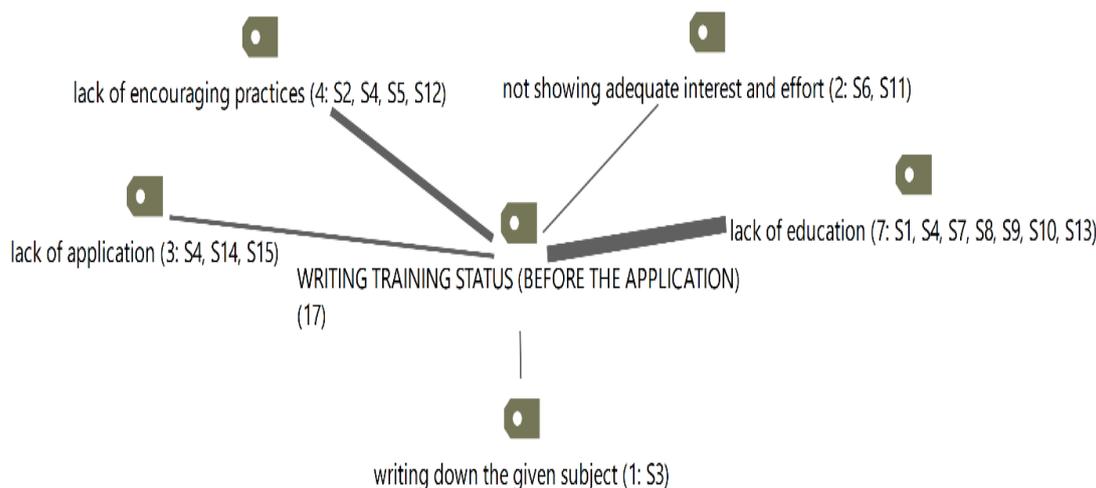


Figure 9. MAX Maps Code Concurrency Model Regarding the Writing Training Before the Application

When Figure 9 is examined, it was observed that the codes regarding the writing training of students before the application were *lack of education, lack of encouraging practices, lack of*

application, not showing adequate interest and effort, writing down the given subject. Before the application 7 students stated their writing training status as lack of education 4 students as lack of encouraging practices, 3 students as lack of application, 2 students as not showing adequate interest and effort, and 1 student stated as writing down the given subject. Code and opinion samples regarding writing training before the application were given in Table 9.

Table 9. Code and opinion samples regarding writing training before the application

Code	Opinion	Student
Lack of education	<i>I didn't receive certain training in writing. There isn't any training that I received from my teachers or training that I found by myself.</i>	S13
Lack of education	<i>Previously, writing practice was neglected in middle school and high school We didn't perform any writing practice.</i>	S7
Lack of encouraging practices	<i>There weren't any activities that would encourage writing in middle school and high school.</i>	S2
Writing down the given subject	<i>We were only asked to write things on certain subjects. We usually didn't determine the subject.</i>	S3
Not showing adequate interest and effort	<i>My biggest inadequacy is myself. I habituate myself to be lazy in writing. This laziness gradually prevailed.</i>	S6

The writing training status of students after the application was given in Figure 10.

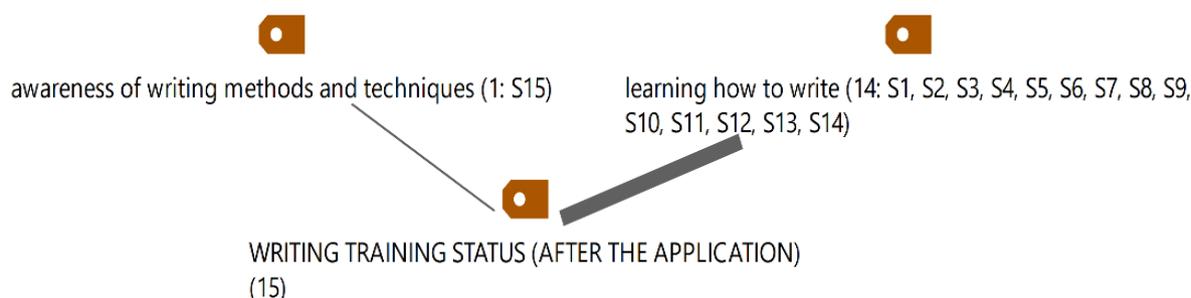


Figure 10. MAX Maps Code Concurrence Model Regarding the Writing Training After the Application

When Figure 10 is examined, it was observed that the codes regarding writing training after the application were determined as *learning how to write* and *awareness of writing methods and techniques*. After the application, 14 students stated that they learned how to write and 1 student stated that he/she became aware of the writing methods and techniques. Code and opinion samples regarding writing training after the application was given in Table 10.

Table 10. Code and opinion samples regarding writing training after the application

Code	Opinion	Student
Learning how to write	<i>I felt remote towards writing since I had no training in writing. When I received training my attitude towards writing changed and I can write easily since I am well-equipped to write.</i>	S4
Learning how to write	<i>I didn't know how to write, what is the criteria, how it is evaluated, and what should I care about when writing. Now, I know the stages of writing, what should I do in which stage, and how it is evaluated.</i>	S9
Awareness of writing methods and techniques	<i>Now, I am aware of the existence of writing methods and techniques.</i>	S15

When the codes regarding the writing training of students before and after the application were compared, it was observed that the writing training of students was *lack of education, lack of encouraging practices, lack of application, not showing adequate interest and effort, writing down the given subject* before the application and after the application, *learning how to write and awareness of writing methods and techniques* conditions emerged. This finding indicates that gradual writing training application removed the deficiencies and inadequacies of students' writing training.

Writing Process Before and After the Application

The writing process of students before the application was given in Figure 11.

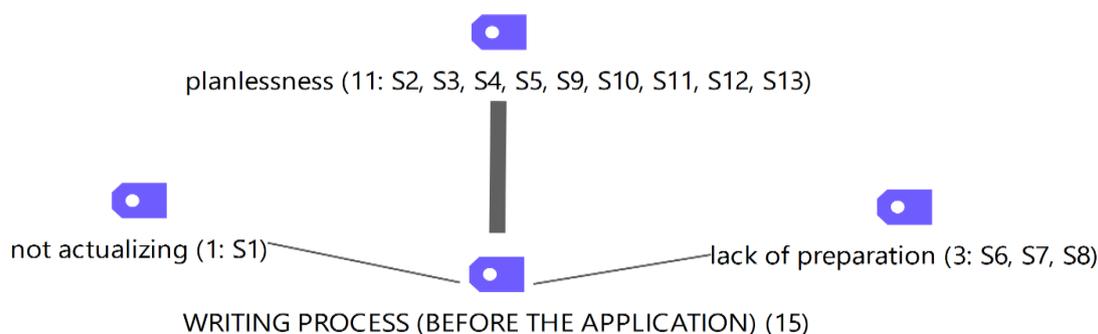


Figure 11. MAX Maps Code Concurrence Model Regarding the Writing Process before the Application

When Figure 11 is examined, it was observed that the codes regarding the writing process before the application were determined as *planlessness, lack of preparation, and not actualizing*. Before the application, 11 students stated that they didn't plan their writing, 3 students stated that they didn't prepare, and 1 student stated that he/she didn't actualize the writing plan. Code and opinion samples regarding the writing process before the application were given in Table 11.

Table 11. Code and opinion samples regarding the writing process before the application

Code	Opinion	Student
Lack of preparation	<i>In fact, there isn't any process in my opinion. I write whenever I want to. There is no such thing as a preparation process.</i>	S5
Planlessness	<i>I used to convey whatever I think without any plans. Thus, there is constantly a disconnection in my writings.</i>	S14
Planlessness	<i>I determine the main idea and subject after I complete writing. Sometimes the things I write contradicts with itself.</i>	S10

Writing process of students after the application was given in Figure 12.

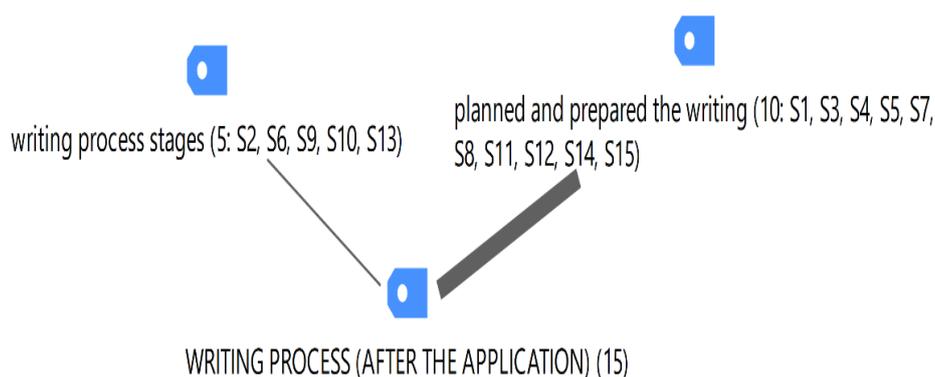


Figure 12. MAX Maps Code Concurrence Model Regarding the Writing Process after the Application

When Figure 12 is examined, it was observed that the codes regarding the writing process after the application were *planned and prepared the writing* and *writing process stages*. After the application, 10 students stated that they wrote planned and prepared and 5 students tried to write in accordance with the writing process stages. Code and opinion samples regarding the writing process after the application were given in Table 12.

Table 12. Code and opinion samples regarding the writing process after the application

Code	Opinion	Student
Planned and prepared writing	<i>First, I designate the subject in my head. Then I create a writing plan.</i>	S7
Planned and prepared writing	<i>Firstly, I make a plan. Then, I write down my thoughts in accordance with my plan.</i>	S4
Writing process stages	<i>I write according to the preparation, planning, correction, editing, and sharing stages.</i>	S2
Writing process stages	<i>I research according to the subject for preparation. Then I create a writing plan and write accordingly. At the end of my writing, I make a final correction and then make a clean copy.</i>	S10

When the codes regarding the writing process of students before and after the application were compared, it was observed that the writing process of students was *planlessness*, *lack of preparation*, and *not actualizing* before the application and after the application *planned and prepared writing* and *writing process stages* conditions emerged. This finding indicates that students can perform gradual writing training application procedure-based.

Code-Category Distribution Before and After the Application

Code-category distribution (Code Matrix Scanner) of students before the application was given in Figure 13.



Figure 13. Code-Category Distribution (Code Matrix Scanner) of Students before the Application

When Figure 13 is examined, it was observed that the codes of which students stated the most before the application was *planlessness (writing process)*, *reluctance (motivation and attitude)*, *lack of education (writing training)*, *expressing emotion and thoughts (writing perception)*, *not knowing how to write (anxiety and fear)*. Before the application, 7 students stated that they perceived writing as expressing emotions and thoughts, 9 students stated that they were reluctant to write, 6 students stated

that they felt anxious and frightened since they didn't know how to write, 11 students stated that they wrote without planning, and 7 students stated that their writing training was inadequate.

Code-category distribution (Code Matrix Scanner) of students before the application was given in Figure 14.

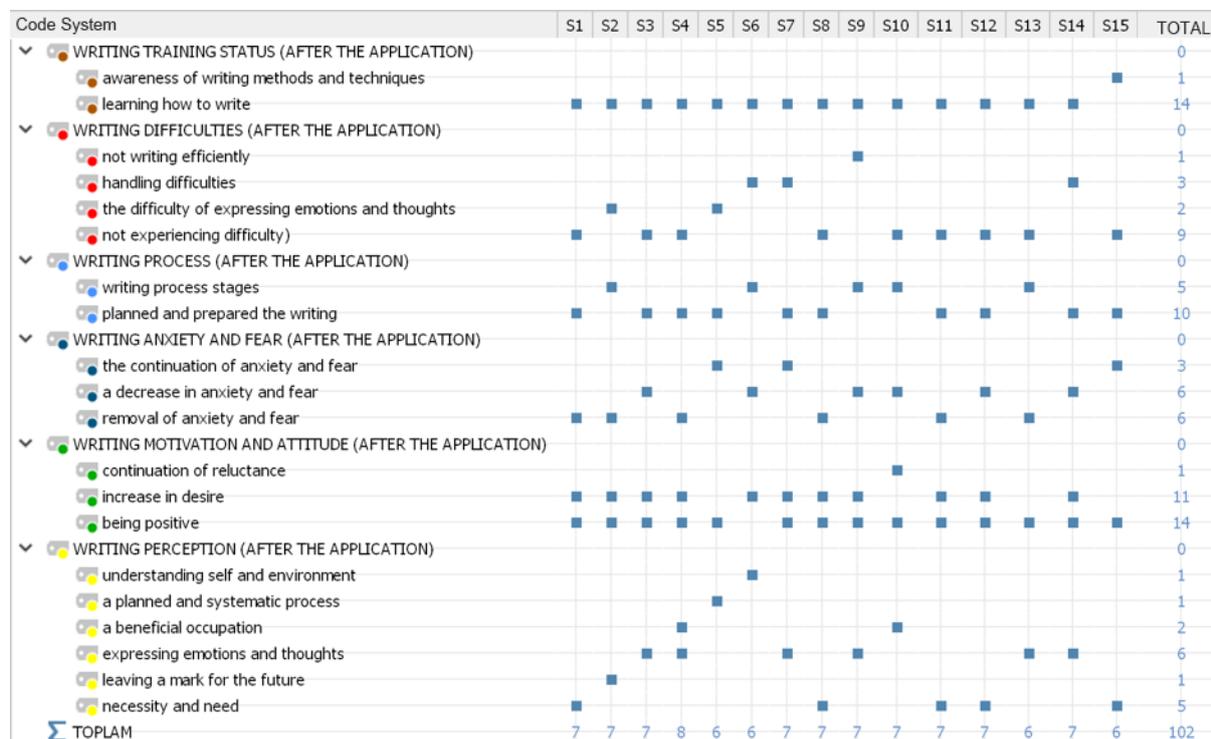


Figure 14. Code-Category Distribution (Code Matrix Scanner) of Students after the Application

When Figure 14 is examined, it was observed that the codes of which students stated the most were *being positive (motivation and attitude)*, *increase in desire (motivation and attitude)*, *decrease in anxiety and fear (anxiety and fear)*, *removal of anxiety and fear (anxiety and fear)*, *planned and prepared writing (writing process)*, *not experiencing difficulty (difficulties of writing)*, *not knowing how to write (writing training)*. After the application, 14 students stated that they were positive about writing, 11 students stated that their desire to write increased, 6 students stated that their writing anxiety and fear decreased, 6 students stated that their writing anxiety and fear were removed, 10 students stated that they can write planned and prepared, 9 students stated that they didn't experience difficulty in writing, and 14 students stated that they learned how to write.

When the codes and their frequency are examined overall before and after the application, it was observed that gradual writing training application positively changed the writing perception of students, increased motivation towards writing and positively changed their attitude, decreased and removed writing anxiety and fear, eliminated the differences experienced in writing, completed the deficiencies in writing training, and provided students to write in accordance with the writing process.

Discussion

With the gradual writing training application, it was aimed to determine the changes that take place in writing processes and the writing perceptions, motivations and attitudes, anxiety and fear statuses, writing difficulties and writing training conditions of the students.

As a result of the application, the writing perceptions of the students were improved, their writing motivations were increased, their attitude towards writing became positive, anxiety and fear towards writing were reduced/eliminated, difficulties in writing were reduced/eliminated, the deficiencies in the writing training conditions were eliminated and the students were able to perform procedure-based writing training in an incremental manner. Nauman (2007) defines writing as a productive process that requires making observations and analyzing, editing and transcribing them. Bayat (2014) concluded that the procedure-based writing approach had a significant effect on writing success and anxiety. Göçer (2010) concluded that classroom teacher candidates adopted a product-based approach in developing the writing skills of students instead of the procedure-based approach. This result reveals the necessity of developing incremental and procedure-based writing skills in teacher training. Karatay (2011) stated that the Turkish teacher candidates in the written expression courses experiment group where the 4+1 planned writing and evaluation model was applied developed their written expression skills to a more significant extent compared to the participants in the control group. Deniz and Demir (2019) concluded that the teacher opinions emphasized the positive effects of the procedure-based writing application on students' attitudes toward writing, writing skills, cognitive and personal development and basic language skills. Many researchers emphasized the necessity to develop the writing skills of students with procedure-based writing training (Bruning and Horn, 2000; Graham and Sandmel, 2011; Karatay, 2013; Neuman, 2007). The statements in the literature related to writing skills and the results of previous studies coincide with the results of the present study.

How students perceive writing is an important factor in the development of writing skills. Lüle-Mert (2013) concluded that Turkish teacher candidates perceived writing in various categories such as writing as a difficult and boring activity, writing as a necessity and writing as an obligation. Baki and Karakuş (2017) concluded that the metaphors created by the teacher candidates towards writing were therapy, accumulation, order, reflection, guide, infinity and complexity. Considering the results of previous studies on writing perception, the present study has revealed the necessity to carry out procedure-based writing education in an incremental way in order to achieve a positive perception towards writing. Writing perceptions of the students has changed positively with the application performed in the study.

It is known that motivation and attitude towards writing are important factors in the development of writing skills. Boscolo and Gelati (2007) stated that the willingness of students to write generally diminishes and disappears. Therefore, it is important to carry out procedure-based writing training applications in an incremental way in order to encourage students to write. Göçer (2017) stated that Turkish teacher candidates are required to motivate their students to write, improve

their writing skills and establish a positive attitude towards writing. In order to achieve this, teachers are required to have high levels of motivation and positive attitudes toward writing. Kurudayıoğlu and Karadağ (2010) stated that most of the students were unwilling to write. Therefore, it is necessary to conduct studies to improve writing skills. Ackerman (2006) emphasized the importance of motivation in writing training, stating that it was not possible for the writer to make significant progress or improvement without the use of motivational methods. Hidi and Boscolo (2006) concluded that the writing performances of students with high motivation and willingness to write were higher compared to students with low motivation and unwillingness to write. Akyol and Aktaş (2018) stated that students with high writing motivations had high story writing scores while Troia, Harbaugh, Shankland, Wolbers and Lawrence (2013) found that students with high writing motivations also had high writing scores. Karatay (2011) stated that procedure-based writing applications and the 4+1 planned writing and evaluation model significantly improved the attitudes of teacher candidates towards written expression courses. Graham and Sandmel (2011) concluded that procedure-based writing applications supported writing motivation. Previous studies stated that motivation and attitude were important factors in obtaining writing skills. Motivations and attitudes of the students have improved with the application performed in the present study. This result coincides with the study results in the literature.

It is of importance to reduce and eliminate anxiety and fear towards writing in the development of writing skills. Teksan (2012) concluded that a significant number of middle-school students had writing anxiety. Karahan (2017) found that Turkish teacher candidates had high levels of anxiety. As a result of the interviews they conducted with classroom and Turkish teacher candidates, Erdoğan and Kalaycı (2017) found that teacher candidates generally disliked writing and experienced writing anxiety. It is important for Turkish teachers to eliminate the writing anxiety of students in terms of improving their writing skills. This can be possible by eliminating the writing anxiety of teacher candidates during training. In the present study, it was found that the majority of the students experienced anxiety and fear towards writing, which were reduced/eliminated with the application performed.

The difficulties experienced during the writing process hinder the development of the writing skills of students. Baki and Karakuş (2017) found that classroom teacher candidates mostly experienced difficulties in planning writing and connecting sentences while Turkish teacher candidates experienced problems in writing rules and punctuation. Kurudayıoğlu and Karadağ (2010) stated that most of the students experienced difficulties in writing. It appears to be impossible for students to obtain writing skills without the elimination of the difficulties they encounter. In the present study, the difficulties experienced by the students were reduced/eliminated with the application performed.

The educational statuses of the students related to writing also have a direct effect on the development of writing skills. Pilav (2018) concluded that students were reluctant towards writing and

therefore it was important for teachers to encourage their students towards writing in order to develop their writing skills. Temizkan (2008) found that Turkish and classroom teacher candidates were inadequate in terms of editing and evaluating instructive and narrative texts. In the present study, it was found that the educational statuses of the students related to writing were insufficient and the deficiencies in this subject were corrected.

Conclusion And Suggestion

The results that emerged within the framework of the sub-problems of the study are as follows:

It was concluded that the students perceived writing as *expressing feelings and thought, homework and necessity, skill, relaxation, scribble, a difficult process, a tiring and difficult task* before the application and as *expressing feelings and thought, necessary and needed, a beneficial activity, leaving a mark, a systematic process, understanding oneself and the environment* after the application. When the results before and after the application were compared, it was concluded that the gradual writing training application influenced a positive change in the writing perceptions of the students.

The students stated their motivation and attitude towards writing as *unwillingness, partial willingness, dislike towards writing, not feeling the need to write, lack of self-confidence, being distanced from writing, negative opinions towards writing, prejudice towards writing, willingness towards writing* (1 student) before the application and it was determined that the students *leaned towards writing and their willingness increased*, while *unwillingness towards writing* persisted for 1 student after the application. When the results before and after the application were compared, it was concluded that the gradual writing training application increased the writing motivations of the students and positively affected their attitudes.

It was determined that the factors of writing anxiety and fear experienced by the students emerged in the forms of *not knowing how to write, lack of self-confidence, being disliked, inability to express oneself, making mistakes, disinterest, repeating oneself, inefficient writing and inability to conclude* before the application and that *writing anxiety was reduced/eliminated* while *writing anxiety and fear* persisted for 3 students after the application. When the results before and after the application were compared, it was concluded that the gradual writing training application reduced/eliminated the writing anxiety of the students.

It was determined that the students experienced difficulties such as *inability to convey thoughts and feelings, inability to write efficient and sufficient, lack of knowledge on the process of writing, inability to come up with a subject, obligation, not knowing the rules of written expression and considering writing as a long process* before the application and it was found that the students *did not experience difficulty in writing and overcame the difficulties of writing* while 2 students experienced difficulty in *expressing thought and feelings*, and 1 student experienced difficulty in

inefficient writing after the application. When the results before and after the application were compared, it was concluded that the gradual writing training application reduced/eliminated the writing difficulties experienced by the students.

It was determined that the educational statuses of the students towards writing consisted of *lack of education, lack of motivational studies, lack of applications, demonstrating inadequate interest and effort* and *writing on the given subject* before the application and that the students *learned how to write* and *got informed about writing methods and techniques* after the application. When the results before and after the application were compared, it was concluded that the gradual writing training application eliminated the deficiencies in writing training.

It was determined that the students experienced *a lack of planning, unpreparedness* and *inability to realize* in the writing processes before the application and they were *planned, prepared* and *able to work in accordance with the phases of the writing process* after the application. When the results before and after the application were compared, it was concluded that the gradual writing training application enabled the students to carry out procedure-based writing.

It was determined that the most common student opinions were on *lack of planning (writing process), unwillingness (motivation and attitude), lack of education (writing education), expressing thought and feelings (writing perception)* and *not knowing how to write (anxiety and fear)* before the study and on *leaning towards writing (motivation and attitude), increased willingness to write (motivation and attitude), decreased writing anxiety and fear (anxiety and fear), elimination of writing anxiety and fear (anxiety and fear), planned and prepared writing (writing process), writing without difficulty (difficulties of writing), learning how to write (writing training)* after the application. When the codes that emerged from the student opinions and the frequency of codes before and after the study were considered, it was determined that the gradual writing training application positively affected the writing perceptions of the students, improved their motivation and attitudes toward writing, reduced/eliminated their writing anxiety and fear, eliminated the difficulties in writing, corrected the deficiencies in writing training and enabled them to write in accordance with writing processes.

Based on the results of the present study, it can be suggested to give adequate importance to writing education in teacher training, conduct studies towards eliminating students' unwillingness and negative attitudes toward writing, perform writing activities to improve the writing perception of students and eliminate writing anxiety and fear, and carry out procedure-based writing training in an incremental manner.

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Development of the Perceived Middle School Teacher Behavior Scale

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Abstract

The present study aimed to develop a measurement instrument to determine the perceptions of middle school students on their teachers' behavior. The draft scale, developed as a result of the review of the relevant literature, collection of expert views and a pilot scheme, was applied to the students attending different grades in state middle schools under Malatya Provincial Directorate of National Education during the second semester of the 2014-2015 academic year. It was considered that middle school students possessed the ability to make selections, could distinguish good and bad and right and wrong due to their age group. To determine the scale content and face validity, expert views were obtained and for construct validity, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted. Teacher behaviors were categorized as indifferent teacher and authoritative teacher behavior based on the revealed factors. Findings obtained with the implementation of CFA revealed that the Perceived Middle School Teacher Behavior Scale (PMSTBS) construct had adequate fitness indices. It was found that the Pearson Correlation Coefficient between the scores obtained with the test-retest method was 0.86. Thus, it was observed that PTBS was a measurement tool that produced valid and reliable measurements and it was adequate to use the scale with middle school students to measure their perceptions on teacher behavior.

Keywords: Teacher Behavior, Scale Development, Perceived Middle School Teacher Behavior Scale

DOI: 10.29329/epasr.2020.236.9

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Introduction

The school is one of the most common social institutions of our time. Although the schooling times vary across countries, schooling is compulsory in almost every country (Beare, Caldwell, & Millikan, 1989). Primary education, which covers the initial years of schooling, aims to raise awareness about the basic principles of life and the world among children. Social courses provided in middle school aim the children to recognize social events, and science courses aim the children to comprehend natural phenomena. Higher education, on the other hand, allows the individual to become a professional to earn her or his life. A well-organized education also helps promote the development and recognition of new interests by the individual. It improves the selectivity of the individual (Baltas, 1993). One of the factors that influence the selectivity is the achievements at school. School achievement is the progress that the individual demonstrates in achieving predetermined goals based on the school, the grade and the course. However, it is observed that the concept of achievement in the contemporary sense cannot be limited to academic achievements, but also includes cognitive behavior such as knowledge and skills, as well as non-cognitive behavior such as interests, personality traits and attitudes. The attitude of the student towards the teacher, the way that the student perceives the teacher, also affects the student's achievements in the course (Eryaman, 2007; Dokuz & Üreyen, 2010). For instance, unequal treatment of the students by a teacher, differences among the attitudes of the teacher between the students, favoring certain students would adversely affect the interests and achievements of the other students (Çelik, 2003). In such a case, the other students might start to exhibit negative behavior in order to attract the attention of the teacher (Ari & Deniz, 2006). Thus, the teacher's attitude in the classroom affects student perceptions and behavior.

If the student perceives the teacher as someone who emotionally understands her or him, his/her participation in the class improves, and this in turn facilitates learning (Kaya, 2002). It is necessary for the teacher to express himself / herself and her/his expectations clearly in order to be understood accurately by the students in the class (Başar, 2003). In contemporary education systems, it may be necessary to include the perceived teacher behavior in the task of increasing student motivation especially in process-based education systems because the teacher's enthusiasm in daily behavior would affect the motivation of the students (Çelik, 2003).

Today, it is known that several private schools pay each teacher a different wage in their contracts. Private hospitals employ medical doctors with different wages. The fact that several businesses employ individuals with different wages is not just because these individuals are very good technical staff, but also due to the impact of the impression they leave and their perceptions about these individuals on the determination of their salaries and on their acceptance. In a study by Zelyurt on 'Reasons for Failure of 2nd Level and Middle School Students in Courses' conducted in 2011, it was

observed that the most important reason for failure was the avoidance of asking questions to the teachers on topics that middle school students could not understand. This would lead to the conclusion that an attempt should be made to change perceived teacher attitudes instead of a system change. In order for the students to perceive teacher behavior accurately, healthy communications should be established between the teacher and the student. The teacher should be a good listener, could empathize during the communication process, could make the students participate voluntarily in classroom activities and use gestures and mimics effectively (Küçükahmet, 2000).

There are in-classroom and out-of-classroom factors that affect student behavior. One of the in-classroom factors is teacher behavior and traits. Teachers' attitudes and behavior, their values, emotional state, interest in the profession, and knowledge are factors that affect active teaching. The teacher facilitates students' learning through good planning and classroom management. Personal traits of an active teacher could be listed as below (Kaya, 2002):

1. Motivating personality
 - Enthusiasm
 - Intimacy and humor
 - Reliability
2. Dedication to achievement
 - High achievement expectations
 - Inspirational and supportive
3. Professional conduct
 - Serious, systematic
 - Adaptive/Flexible
 - Knowledgeable

Active teacher behaviors are as below (Kaya, 2002):

1. Instruction of the course with enthusiasm.
2. Being productive and dedicated to the profession.
3. Ability to utilize various instructional material and methods.
4. Ability to present a topic in a comprehensible manner.
5. Creating opportunities for the students to realize learning.

The teacher's instructional style influences the orientation of the students to the course and extracurricular activities. When the teacher instructs the course in a way to include all students, undesired behavior could be averted (Kaya, 2002).

Teachers exhibit several behaviors in the classroom. The impact of these behaviors on students is sometimes as expected by the teacher, and in other cases, it is the opposite. To understand the reasons for this outcome, it is quite important to recognize the perceptions of the students about their

teacher. Assessments based on the student perspective could improve the curriculum, teacher behavior, and interactions in the classroom. Furthermore, teacher behavior could also affect students' school choices. Thus, the current study aimed to determine the perceptions of middle school students on teacher behavior. Since there is no scale developed to measure student perceptions on teacher behavior in the literature, the study was considered to contribute to the field literature.

Method

Research Design

Since the present study aimed to develop a valid and reliable scale that could be used to describe the teacher behavior as perceived by middle school students, it was designed as a scale development study.

The first study group. Survey model, one of the descriptive research methods, was used in the study. Descriptive method is preferred to describe a given situation as precisely as possible (Büyüköztürk, Kılıç Çakmak, Erkan Akgün, Karadeniz, Demirel, 2010). The study population included middle school students attending different public middle schools during the second semester of the 2014-2015 academic year. The sample size was calculated by power analysis. The study sample included sufficient number of middle school students to represent the population. A total of 1658 student data were analyzed after the scale was applied to the students and the erroneous and / or incomplete forms were excluded from the analysis. In the present study, it was observed that 52.5% ($N= 871$) of the students were male and 47.5% ($N= 787$) were female; 25.5% ($N= 423$) of the students were in the fifth grade, 23.9% ($N= 397$) were in the sixth grade, 25.9% ($N= 430$) were in the seventh grade and 24.6% ($N= 408$) were in the eighth grade.

The second study group. To obtain more healthy results, a second study group for confirmatory factor analysis followed by the exploratory factor analysis was required (Henson & Roberts, 2006). This study group was determined so that it would include a similar sample when compared to the previous study group. Thus, students attending various public middle schools in Malatya during the first semester of the 2015-2016 academic year were included in this study group as well. A total of 257 student data were analyzed after the scale was applied to the students and the erroneous and / or incomplete forms were excluded from the analysis. It was observed that 54.9% ($N= 141$) of the students in the second study group were male, 45.1% ($N= 116$) were female; 24.1% ($N= 62$) of the students were in the fifth grade, 25.7% ($N= 66$) were in the sixth grade, 24.9% ($N= 64$) were in the seventh grade, and 25.3% ($N= 65$) were in the eighth grade.

Development of The Data Collection Instrument

During the development of the "Perceived Middle School Teacher Behavior Scale" by middle school students, scale items were developed, scope validity was determined, a pilot scheme was conducted, construct validity and reliability of the scale were determined (Balci, 1995).

Item pool. In order to develop questions for the study item pool, a literature review on middle school student traits, teacher types, classroom management styles, student failures and motivation was initially carried out. On the other hand, the previously developed similar scales were examined (Albayrak, Güngören, & Horzum, 2014; Atik & Üstüner, 2014; Baykara Pehlivan, 2005; Çağlar, Yakut, & Karadağ, 2005; Kara, İzci, Köksalan, & Zelyurt, 2015; Karadağ, Baloğlu, & Yalçınkayalar, 2006; Nartgün, 2008; Özer, Gençadime, & Ergene, 2011; Saydam & Telli, 2011). Furthermore, 20 middle school students were asked to write an essay on “how the teachers should behave” and 80 draft items were developed based on the student responses. In the next stage, graduate students and middle school teachers were asked to analyze the developed items and items were eliminated or added based on these analyses. An attempt was made to ensure that the statements provided content validity initially. Based on the analyses provided by the students and the teachers, the items in the pool were pre-filtered. As a result, 30 items were included in the item pool. As described in the scale title, the scale that aimed to measure perceived teacher behavior by the students was a 5-point Likert type scale using the following scores: "I completely disagree: 1, I disagree: 2, Undecided: 3, I somewhat agree: 4 and I agree: 5 points”.

Expert opinion (content validity). The items in the pool were presented to eight faculty members that included two educational program specialists, three educational psychologists and three educational administration specialists to obtain their views. Furthermore, support was provided by two faculty members in the field of Turkish Language Teaching in order to ensure that the prepared material was comprehensible and reflected a clear and common meaning, adhering to linguistic rules.

Pilot scheme. A pilot scheme was conducted using the draft scale developed in accordance with the views of several experts with 120 fifth, sixth, seventh and eighth grade students, and the students were asked to determine the items that were difficult to comprehend. All the items identified to be difficult to understand were reorganized based on student views and with the support of the experts. As a result of the pilot scheme, the " Perceived Middle School Teacher Behavior Scale" that included 30 draft items was finalized for the pilot scheme application. After obtaining the expert views and conducting pilot scheme, the scale was applied to a total of 1658 students in different grades attending different public middle schools to collect the study data.

Factor analysis. Factor analysis was conducted after the scale was applied to 1658 students. It was observed that 52.5% (871) of the sample were male and 47.5% (787) of the sample were female students. Based on the analysis results, the items with construct validity were included in the final scale. In the factor analysis, it was noted that the Kaiser-Meyer-Olkins (KMO) values were high.

Determination of the scale reliability. After the factor analysis was conducted, the Cronbach Alpha internal consistency coefficient was calculated for the finalized scale. To avoid any mistakes, all operations were repeated twice under the supervision of three field experts until the operations

conducted by the two field experts separately provided the same result. The Cronbach Alpha coefficient of more than .70 is sufficient for reliability (Bayram, 2004; Bursal, 2017). In order to improve the internal consistency of the scale by excluding the variables that do not reflect the desired common value, which the study aimed to measure from the analysis, reliability tests were first applied on a factor basis to all variables and then applied to all variables (Baş, 2005). In the analysis phase, Item Total Correlation and Cronbach Alpha were used in the determination of the values that do not reflect the common value that would be measured. The operations performed in the SPSS 21.0 software were repeated until no statements that adversely affected the reliability of each factor were left. Then, in the second stage, all factors were tested again. At the end of the analysis, 36 items were excluded from the scale that originally contained 60 items.

Findings and Interpretation

Exploratory Factor Analysis

The scale developed to determine the perceptions of middle school students on the in-classroom behavior, attitudes and the styles of their teachers was named the "Perceived Middle School Teacher Behavior Scale". The draft scale included 60 items before the factor analysis and 50 statements were eliminated in the analysis.

Table 1. Factor Loadings Values

	Item Factor Loads
4- My teacher does not award me	,562
5- My teacher acts nervous	,507
6- I cannot talk about my problems with my teacher	,484
9- My teacher blames me for everything	,440
13- My teacher reprimands me	,501
15- I do not like my teacher	,466
16- My teacher does not care about me	,594
17- My teacher does not help me	,519
26- My teacher does not like me	,495
30- My teacher does not support me	,534

Factor loads for the final scale ranged between .44 and .594 (Table 1). As a result of the factor analysis, it was found that the "Perceived Middle School Teacher Behavior Scale" with 10 items was a valid scale (Nunnally & Bernstein, 1994). Factor analysis conducted on the scale revealed two sub-dimensions. Internal consistency Cronbach Alpha coefficients for the two sub-dimensions are presented in Table 2. Based on these values, it was concluded that the scale was reliable.

Table 2. Reliability and Validity of the Scale

Item Factor Loads	Factor 1	Factor 2	Total
Cronbach Alpha	,829	,529	,823
KMO	,862	,612	,883
Bartlett Test of Sphericity	3560,265	344,689	4476,463
Number of Valid Items	7	3	10

Scale KMO values, the Bartlett test and the Cronbach Alpha internal consistency coefficient were calculated for scale sub-dimensions. As a result of the factor analysis, the statements in the sub-dimensions were examined and the sub-dimensions were named with the support of various middle school teachers, faculty members and the students. Attention was paid to the fact that both subscale and the overall scale KMO values were higher than .75 and that the Bartlett test was significant ($p < 0.05$) (Büyükoztürk, 2004). Factor analysis was repeated after eliminating the items where the factor load was not greater than .40 and that the difference between the item loads of the scale with two subdimensions was not less than .20 (Nunally & Bernstein, 1994). As a result of the repeated factor analysis, it was determined that the KMO was .883, Bartlett test of Sphericity was 4476.463, and Cronbach Alpha was .823 for the scale with two sub-dimensions. The item loads for each attitude statement in the scale are presented in Table 3 as determined with the factor analysis.

Table 3. Post-Factor Analysis Varimax Rotated Components Matrix

	Factor 1	Factor 2
16- My teacher does not care about me	,753	
17- My teacher does not help me	,713	
26- My teacher does not like me	,690	
30- My teacher does not support me	,690	
15- I do not like my teacher	,682	
13- My teacher reprimands me	,626	
9- My teacher blames me for everything	,584	
4- My teacher does not award me		,748
6- I cannot talk about my problems with my teacher		,684
5- My teacher acts nervous		,605

One of the operations conducted with SPSS 21.00 was to determine the extent to which the final items in the two-dimensional scale explained the topic. For this purpose, the Total Variance Explained test was conducted and the results are presented in Table 4 below.

Table 4. Total Variance Explained by the Sub-Dimensions

Sub-dimensions	Eigen Values	Total Explained Variance (%)
Factor 1	4,014	33,861
Factor 2	1,088	51,019

As seen in Table 4, it was determined that both dimensions of the "Perceived Middle School Teacher Behavior Scale" explained over 50% of the total variance. This ratio is acceptable in social sciences (Nunally & Bernstein, 1994). Confirmatory factor analysis was conducted to confirm the exploratory factor analysis.

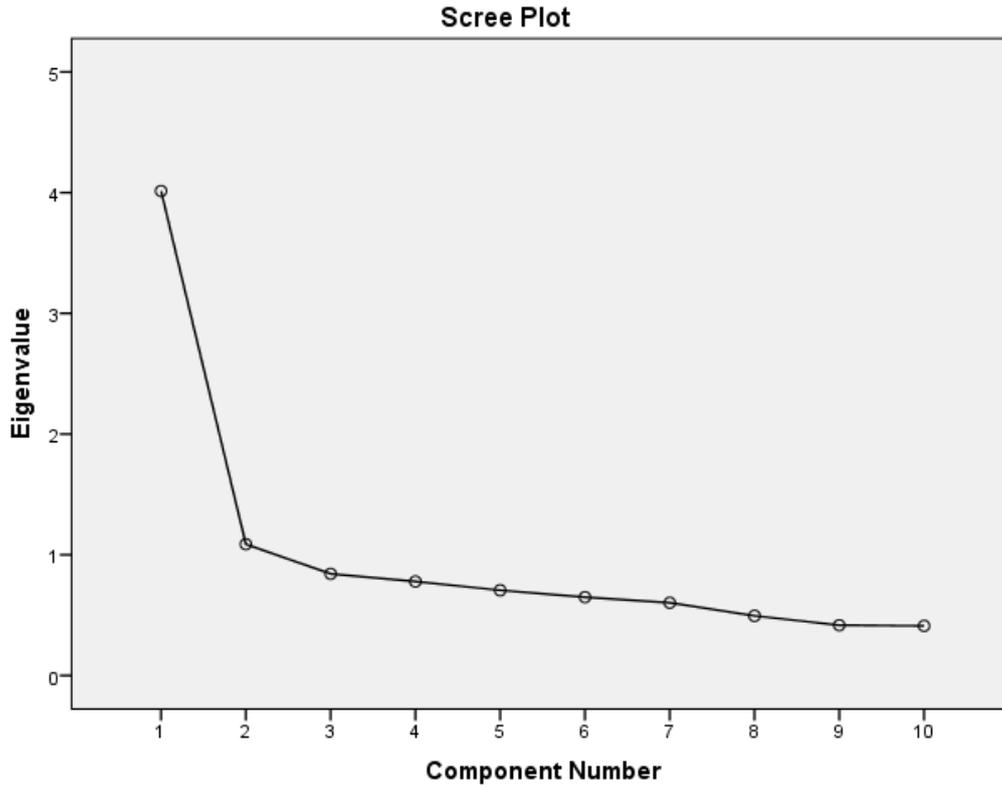


Figure 1. Scree plot

Confirmatory Factor Analysis

For this purpose, Lisrel 8.71 software was used. Confirmatory factor analysis was conducted on the data obtained with the second study group to confirm the 10-item two-factor model obtained in the exploratory factor analysis. For the two-factor model, it was observed that the t values for the explanatory rate of the observed variables by the latent variables were significant at 0.01 level (Çokluk, Şekercioğlu and Büyüköztürk, 2010; Seçer, 2015). In the model, it was observed that the standardized parameter values accurately defined for the observed variables were between 0.77 and 1.08, and the error variances for the observed variables were between 0.44 and 0.87. These values are supported by the studies in the literature (Çokluk, Şekercioğlu, & Büyüköztürk, 2010; Şimşek, 2007; Seçer, 2015). For the model identified in the table 5. below, the goodness of fit values obtained before and after the modifications are presented. As seen in the table, based on the generally accepted criteria, the values obtained for the goodness of fit are depicted as "Excellent, Acceptable or Poor" in the literature (Çokluk, Şekercioğlu, & Büyüköztürk, 2010; Seçer, 2015; Brown, 2006; Şimşek, 2007; Tabachnick & Fidell, 2007).

In confirmatory factor analysis, it was determined that there was a significant difference between expected and observed covariance matrix for two factor model ($p < 0.05$). An insignificant p value is desirable; however, it was considered that this was due to the sample size. Thus, alternative fit

indices were examined. In the first analysis, it was observed that X^2 /sd , SRMR (Standardized Root Mean Square Residual), NFI (Normed Fit Index), NNFI (Non-normed Fit Index), CFI (Comparative Fit Index) parameters exhibited excellent fit, and RMSEA (Root Mean Square Error of Approximation), GFI (Goodness-of-fit Index) and AGFI (Adjusted Goodness of Fit Index) parameters exhibited acceptable fit. Due to the answers of students, results were differed from each other. At this stage of the confirmatory factor analysis, modification proposals should be examined in order to improve the model. Based on Lisrel software findings, it was determined that the correlation between the error variances of the "V10 My teacher does not care about me" and "V9 My teacher does not help me" items should be defined.

Table 5. Confirmatory Factor Analysis

paramaters	Excellent (M)	Acceptable (K)	Pre-Modification	Post-Modification
P	> 0.05	< 0.05	0.00 (K)	0.00 (K)
X^2/sd	<3	3-5	77.83/34=2.28 (M)	66.13/33=2.00 (M)
RMSEA	<0.05	<0.08	0.071 (K)	0.063 (K)
RMR	<0.05	<0.08	0.097	0.09 (Zayıf)
SRMR	<0.05	<0.08	0.044 (M)	0.04 (M)
GFI	>0.95	>0.90	0.94 (K)	0.95 (M)
AGFI	>0.95	>0.90	0.91 (K)	0.92 (K)
CFI	>0.95	>0.90	0.97 (M)	0.98 (M)
NFI	>0.95	>0.90	0.96 (M)	0.96 (M)
NNFI	>0.95	>0.90	0.97 (M)	0.98 (M)

After conducting the proposed modifications, the fit index chi-square (X^2) value decreased significantly. The chi-square that could not be analyzed alone was calculated by its ratio to the degree of freedom and reached perfect level ($X^2/sd = 2.00$). It was also found that the difference between the expected and observed covariance matrix for the model ($p < 0.05$) was also acceptable. It was observed that a fitness index of 0.063, which was at the level of root mean square error of approximation (RMSEA). When the value of RMSEA is less than or equal to 05, the fit is considered perfect, if it is .08 or lower, then the fit is considered acceptable and if the fit is .10 and greater, then it is considered poor. Accordingly, it can be stated that the fitness index obtained in the conducted analysis was acceptable. It was observed that the Standardized Root Mean Residual (SRMR) index was .04. The RMR exhibited poor fit, while a standardized RMR of lower than .05 corresponds to perfect fit, a standardized RMR of lower than .08 corresponds to good fit, and a standardized RMR of lower than .10 corresponds to acceptable fit. Thus, it can be stated that the standardized RMR for the analysis exhibited a perfect fit and the RMR exhibited a poor fit.

It was observed that Goodness of Fit Index (GFI) was .95 and an Adjusted Goodness of Fit Index (AGFI) was .92. GFI and AGFI reflect values that vary between 0 and 1. The fit is excellent when the GFI and AGFI are above .95 and acceptable when these values are between .90 and .94 (Caughlan & Mullen, 2008; Schumacker & Lomax 2004; Hooper,). Thus, it was observed that GFI was close to perfect, whereas AGFI failed to reflect a fit close to an acceptable level.

Analysis of the Non-Normed Fit Index (NNFI), Normed Fit Index (NFI) and Comparative Fit Index (CFI) demonstrated that NNFI was .98, NFI was .96 and CFI was .98. Fit is perfect when the NNFI, NFI and CFI values are above .95, and fit is acceptable when they are above .90 (Sümer, 2000). Thus, it was observed that NNFI, NFI and CFI exhibited perfect fit for the conducted analysis. The resulting path diagram that includes standardized factor loads, error variances and modifications obtained in the confirmatory factor analysis is presented in Figure 2.

Scale Reliability in Time

As a result of the exploratory and confirmatory factor analyses, the correlation coefficient was calculated by conducting a test-retest procedure on score invariance with 200 students attending different grades in middle school to calculate the reliability of the scale in time. The scale was reapplied to the same individuals after three weeks. The Pearson Correlation Coefficient between the scores obtained in these two applications was $r = 0.86$. Based on this result, it was accepted that the scale could be used to conduct reliable measurements (Crocker & Algina, 1985).

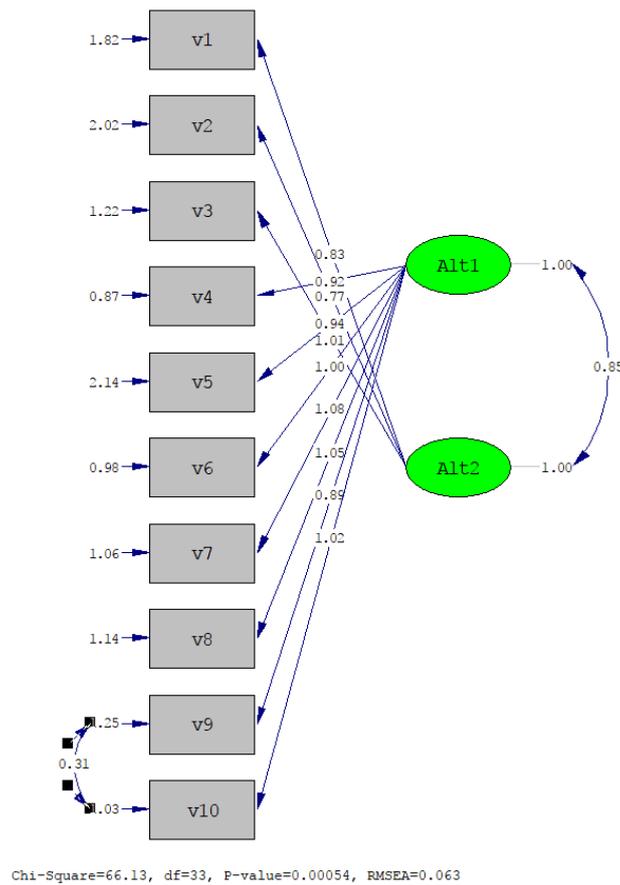


Figure 2- Path diagram for the post-modification two-dimensional model

Conclusion

The study findings demonstrated that the Perceived Middle School Teacher Behavior Scale was confirmed as a two sub-dimensional model and these two dimensions of the scale that was developed to determine the perceptions of middle school students on the behavior of the teachers that instructed their courses were determined as indifferent teacher and authoritarian teacher. Higher scores in the scale reflect higher degree of indifferent and authoritarian behavior. Lower scores in the scale reflect lower authoritarian and indifferent behavior levels exhibited by the teacher. The model was first subjected to exploratory factor analysis and then to confirmatory factor analysis. It was concluded that the item pool and expert views in the exploratory factor analysis, Cronbach Alpha reliability coefficient in the factor analysis conducted after the pilot scheme, KMO and Bartlett Test of Sphericity findings for each sub-dimension, and the total explanatory variance values for the subscales of the final scale were acceptable. Furthermore, the model of fit indexes for the developed model was confirmed as a result of the Confirmatory Factor Analysis. In addition, it was determined that all standardized parameters were at acceptable or excellent levels, and thus all constructs exhibited associative validity (Chou, Boldy, & Lee, 2002). The study results confirmed that the scale was a valid and reliable scale.

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Appendix 1- Perceived Instructor Behavior Scale

Instructions: Below you will find certain statements that aim to determine perceived instructor behavior. Please mark the corresponding answer that is closest to your view with an X. The objective of the present study is purely scientific. We thank you in advance for your sincere and full responses.

	I agree	I somewhat agree	I neither agree nor disagree	I disagree	I completely disagree
1- My teacher does not award me					
2- I cannot talk about my problems with my teacher					
3- My teacher acts nervous					
4- My teacher blames me for everything					
5- I do not like my teacher					
6- My teacher reprimands me					
7- My teacher does not support me					
8- My teacher does not like me					
9- My teacher does not help me					
10- My teacher does not care for me					

Psychological Resilience Level of Individuals Living in Çanakkale, Turkey*

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Abstract

Disasters affect individuals psychologically and some individuals take a long time to get rid of this effect. Psychological resilience is defined as the individuals having a psychologically strong structure, being affected by negative situations as little as possible and getting rid of stressful situations quickly. The aim of this study is to determine the psychological resilience level of individuals living in Çanakkale. Connor-Davidson Resilience Scale was used to determine the participants' resilience level. Participants in the study are 412 individuals, aged between 18 and 60, who are determined by the simple random sampling method living in the Central District of Çanakkale. The data were analyzed using SPSS 21 software. Cronbach's Alpha reliability coefficient of the scale was found to be 0.92. The mean of the psychological resilience level was 3.75. Results showed that the most psychologically resilient people are males, high school graduates, individuals between the ages of 29-39, divorced, those who do not have children, those with a monthly income of more than 3001 TL, those with natural disaster insurance and those who are previously faced a disaster.

Keywords: disaster, resilience, psychological resilience.

DOI: 10.29329/epasr.2020.236.10

* This paper was part of the first author's master's thesis, in which the second author served as the advisor.

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Introduction

Disasters occurring in the world cause more property and life losses day by day (Fahjan et al., 2015). Hewitt (1997) defines disaster as extreme and diverse destruction, the collapse of social life and security. Özmen, Gerdan and Ergünay (2015) defines disasters as “consequences of natural, technological or human origin events”. The fact that these events cause material and moral damage in the environment, to deal with these events and the destruction caused are described as disasters (Hyndman & Hyndman, 2010; Yavaş, 2005). Disaster and Emergency Management Authority (AFAD), an institution working to prevent disasters and minimize disaster-related damages, plan and coordinate post-disaster response, and promote cooperation among various government agencies in Turkey states that “disaster is not an event itself, it is the result it produces” (AFAD,2014, p. 23).

About 230.000 people from 14 different countries died from the earthquake that occurred in 2004 and the tsunami triggered by it (UNISDR, 2015). With the effect of disasters, fixed assets, raw materials and inventories are damaged, emergency response, aid and infrastructure spending increases after disasters, production decreases and may even come to a halt, tax revenues decrease and investment expenditures increase in the disaster area (Pelling et al., 2002).

Disasters negatively affect the psychological state of individuals. Psychologists have observed that those with any trauma and psychological problems are more affected by disasters (Phillips, 2009). Some psychological disorders are observed in individuals after disasters. Fear, panic, depression, disbelief, guilt, sadness, sleep disturbances and anorexia are psychological disorders observed in individuals after disasters (Karancı, 2008). Since the time of the disasters is not known, people's concerns increase and female individuals with low education and income levels are more psychologically affected by disasters (Yeniçeri, 2008).

Individuals who are resilient to disasters will be less affected psychologically and emotionally, they can return to daily life in a short time after disasters and continue their social life (Bonanno, 2005; Bonanno et al., 2007). In situations that disrupt the peace of the individual and cause losses in or around themselves, they do not go far from their behavior in the normal life order. Resilient individuals get rid of negative effects caused by disasters quickly.

Psychologically resilient means characteristic aspects of individuals are strong, mentally healthy and no post-traumatic stress disorder (Dutton & Greene, 2010). Psychological resilience is to be able to get rid of stressful living conditions (Ong et al., 2006). Resilient individuals are brave, caring, hopeful, and trust their own abilities to change (Larkin, 2010). Reich (2006) explains the principles of psychological resilience to disasters as personal control, adaptation to difficult conditions and strong social relationship. Terzi (2008), on the other hand, expresses psychological resilience as a strength to recover in stressful times.

Resilience is to survive difficult conditions and continue normal life. Protective factors are special abilities necessary for resilience. These abilities that individuals must have in order to be successful are health and general competencies (Dyer & McGuinness, 1996). Olsson et al. (2003) defines the characteristics that individuals should have in order to be resilient as follows;

- Constitutional resilience: Psychological, spiritual and emotional soundness.
- Sociability: Close and safe relationships with other individuals in the community.
- Intelligence: Career, success and decision making.
- Communication skills: To be able to use language well.
- Personal attributes: Coping with bad feelings, self-confidence and self-respect, self-control.

Community resilience depends on the success of public institutions and organizations in disaster response at regional and national level. Forming the society, human is the most important factor in a disaster-resilient society. So that, resilience in the disaster will be determined by the intervention of people and society. Many methods are used to determine the resilience to disasters. Research is conducted on individuals, communities, households, systems, regions or countries to determine disaster resilience. Economy, education level and quality, harm reduction plans, studies and expenditures, quality of the service provided in the society, gaining experience from past disasters and using this experience, infrastructure, quality of management, quality of the physical environment experienced by the society are among the variables used in determining the resistance against disasters (Cutter et al., 2008; Cutter, 2016). There are also studies aiming to define and assess resilience to a specific situation in the literature. Such as; women whose husbands are dead (O'Rourke, 2004), individuals after the terrorist attack (Bonanno et al., 2007), women over 60 years old living in the nursing home (Lamond et al., 2009), soldiers returning from war (Pietrzak, 2009), resilience of students (Haddadi & Besharat, 2010), earthquake survivors (Karairmak, 2010) and academic staff (Ülker Tümlü & Receptoğlu, 2013).

Within this context, the main purpose of this study is to investigate the psychological resilience level of individuals against disasters. To help meet this purpose, research questions addressed in the study were: (1) what is the psychological resilience level of individuals against disasters? (2) do psychological resilience level of individuals against disasters differ by gender, educational status, age group, marital status, number of children owned, monthly income, status of being experienced a disaster, status of having a natural disaster insurance, status of having a chronic disease, status of having household emergency plan, status of enrollment in an organization to volunteer in a disaster situation, status of living (with family, with housemate and alone) and status of taking disaster education. The data and the results obtained from this study are expected to contribute to the psychological resilience studies against disasters.

Method

In this section, research design, population and sample, data collection tools, data collection and data analysis processes are explained.

Research Design

In this quantitative study, descriptive and casual-comparative research designs with survey method were used to identify the situation and possible cause and effect relationship between variables.

Population and Sample

The population of this research is individuals between the ages of 18 and 60 who live in the central district of Çanakkale which is a high-risk disaster area. Random sampling method was used since it is not possible to reach the entire population. The simple random sampling method is the sampling in which the individuals who make up the population are completely equal and random by chance to enter the sample (Yazıcıoğlu & Erdoğan, 2007). Çanakkale province central district population was reported as 122.613 in 2016 (Çanakkale Valiliği İl Planlama ve Koordinasyon Müdürlüğü [Çanakkale Governorate Provincial Planning and Coordination Directorate], 2017). In order to ensure a 95% confidence interval in the populations over 100.000, the number of sample must be more than 384 (Can, 2014). Thus, 422 people were reached randomly, but 10 of 422 forms were not included in the study due to missing answers and the study was conducted with data collected from 412 people.

Table 1. Demographics of the Participants

Variable	Groups	f	%
Gender	Male	197	47.8
	Female	208	50.5
Education Status	Literate	6	1.5
	Primary School	28	6.8
	Elementary / K-8	32	7.8
	High School / K-12	73	17.7
	Pre-undergraduate	63	15.3
	Undergraduate or above	201	48.8
Age	18-28	206	50
	29-39	96	23.3
	40-50	80	19.4
	51-60	24	5.8
Marital Status	Married	167	40.5
	Single	222	53.9
	Divorced	17	4.1
	Widowed	5	1.2
Number of Children	None	242	58.7
	1-3	149	36.2
	4 or more	14	3.4
Monthly income	Less than 500 TL	80	19.4
	501-1000 TL	61	14.8
	1001-3000 TL	191	46.4

More than 3001 TL	65	15.8
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According to Table 1, 50.5% of the participants are female and 47.8% of them are male. The remaining 1.7% did not specify their gender. Considering the educational status, undergraduate or above degree graduates are the largest group (48.8%) and literates are the smallest (1.5%). 50% of the participants were between 18-28 ages, 23.3% were between 29-39 ages 19.4% were between 40-50 ages and 5.8% were between 51-60 ages. According to marital status, the group with the highest proportion is singles (53.9%) and the group with the lowest proportion is widows (1.2%). While the group without children has the highest proportion (58.7%), the group with the lowest proportion is the group with 4 or more children (3.4%). Considering the monthly income, the group with the highest proportion is those have monthly income between 1001-3000 Turkish Liras (TL) (46.4%) and with the least proportion is the group those have monthly income between 501-1000 TL (14.8%).

Data Collection Tools

The form used as a data collection tool consists of two parts; personal information form and Connor-Davidson Resilience Scale (CD-RISC) developed by Connor and Davidson (2003).

The personal information form consists of 13 items aimed at determining the participants' gender, educational status, age, marital status, number of children, monthly income, status of being experienced a disaster, status of having a natural disaster insurance, status of having a chronic disease, status of having a household emergency plan, status of enrollment in an organization to volunteer in case of a disaster, status of living with housemates or living alone and status of taken any in-service education about disaster.

The Connor-Davidson Resilience Scale (CD-RISC), on the other hand, consists of 25 items that measure with the Likert-type 5-point scale developed by Connor and Davidson (2003) to determine the psychological resilience level of individuals. Scale items are rated as (1) disagree, (2) partially disagree, (3) not sure, (4) agree, (5) strongly agree. The reliability coefficient, Cronbach's Alfa, of the original English version of the CD-RISC scale was reported as 0.89 (Connor & Davidson, 2003) and 0.89 for the Turkish version of the scale (Karairmak, 2010). The reliability coefficient obtained in this study is Cronbach's Alfa and 0.92. So that the Turkish version of the CD-RISC scale is considered as a valid and reliable measure of resilience.

Data Collection

In this study data collected through a self-administered questionnaire distributed personally to the participants by the researcher in February and March 2016.

Data Analysis

"Statistical Package for the Social Sciences (SPSS) 21 for Windows" software was used to analyze the data. 0.05 was used as the significance level. The compliance of the data to normal distribution was checked with the Kolmogorov-Smirnov test. Comparing the means of two groups, Independent Samples T-Test was conducted if data were normally distributed and Mann-Whitney U Test was conducted if data were not normally distributed. When comparing the means of more than two groups, One-Way Analysis of Variance (ANOVA) was conducted if data were normally distributed and, and Kruskal-Wallis Test was conducted if data were not normally distributed. Thus, Independent Samples T-Test was conducted to compare psychological resilience level by gender and ANOVA was conducted when comparing the psychological resilience level by age groups. Apart from these, "Mann-Whitney U Test" was conducted when comparing the means of two groups and Kruskal-Wallis Test was conducted when comparing the means of more than two groups.

Findings

In this section, the findings of the research are presented in tables and explained together with the results of the analysis in line with the research questions.

Table 2. Psychological Resilience Level of Participants

Items	f	Mean	SD
1. I am able to adapt to change	410	3.78	1.052
2. I have close and secure relationships	410	3.93	.943
3. I believe that sometimes fate or God help me	411	4.04	1.108
4. I can deal with whatever comes my way	410	3.96	.970
5. Pass success gives me confidence for new challenges	412	3.93	1.002
6. I see the humorous side of things	409	3.76	1.059
7. I believe coping with stress strengthens me	411	3.55	1.113
8. I tend to bounce back after illness or hardships	408	3.32	1.193
9. I believe things happen for a reason	411	3.91	1.098
10. I give my best effort no matter what	410	3.90	1.042
11. I believe I can achieve my goals	407	3.98	.954
12. When thing look hopeless, I don't give up	411	3.73	1.034
13. I know where to turn for help	410	3.62	1.093
14. Under pressure, I can focus and think clearly	409	3.36	1.161
15. I prefer to take the leading in problem solving	405	3.43	1.266
16. I am not easily discouraged by failure	410	3.56	1.122
17. I think of myself as a strong person	407	3.82	1.073
18. I make unpopular or difficult decisions	411	3.57	1.161
19. I can handle unpleasant feelings	412	3.62	1.086
20. I have to act on a hunch	412	3.33	1.205
21. I have a strong sense of purpose	410	3.97	.965
22. I am in control of my life	409	3.68	1.112
23. I like challenges	410	3.59	1.210
24. I work to attain my goals	408	4.19	.912
25. I take pride in my achievements	408	4.32	.918
TOTAL	412	3.75	.642

Table 2 illustrates the descriptive statistics of items of the CD-RISC scale. The item with the highest average is "I take pride in my achievements" (M = 4.32, SD = 0.918) and the item with the

lowest average is “I tend to bounce back after illness or hardships” ($M = 3.32$, $SD = 1.193$). The overall average of the scale is 3.75.

Table 3. Comparison of Psychological Resilience Level by Gender

Groups	f	Mean	SD	df	t	p
Male	197	3.7933	.62	403	1.412	.159
Female	208	3.7036	.65			

Table 3 illustrates the Independent Samples T-Test results conducted to compare psychological resilience level of the participants by gender. There was not a significant difference in the psychological resilience level of male ($M = 3.79$, $SD = 0.62$) and female participants ($M = 3.70$, $SD = 0.65$); $t(403) = 1.412$, $p = 0.159$).

Table 4. Comparison of Psychological Resilience Level by Education Status

Groups	f	Mean Rank	df	H	p
Literate	6	168.50	5	10.05	.074
Primary School	28	161.13			
Elementary / K-8	32	165.48			
High School / K-12	73	216.91			
Pre-undergraduate	63	193.41			
Undergraduate or above	201	211.78			

Table 4 illustrates the Kruskal-Wallis Test results conducted to compare psychological resilience level of the participants by education status. The Kruskal-Wallis Test showed that there was not a statistically significant difference in psychological resilience level between the different education status ($H = 10.05$, $df = 5$, $p = 0.074$), with a mean rank resilience level of 168.5 for literates, 161.13 for primary school graduates, 165.48 for elementary school graduates, 216.91 for high school graduates, 193.41 for pre-undergraduate graduates and 211.78 for undergraduate or above level graduates.

Table 5. Comparison of Psychological Resilience Level by Age

	Sum of Squares	df	Mean Squares	F	p
Between Groups	1.240	3	.413	1.009	.388
Within Groups	164.658	402	.410		
Total	165.898	405			

Table 5 illustrates the one-way ANOVA results conducted to compare psychological resilience level of the participants by age groups. There was not a statistically significant difference between groups as determined by one-way ANOVA ($F(3-402) = 1.009$, $p = 0.388$). Psychological resilience level of age groups from highest to lowest is as follows; 29-39 years ($M = 3.80$, $SD = 0.56$), 18-28 years ($M = 3.76$, $SD = 0.61$), 40-50 years ($M = 3.67$, $SD = 0.74$) and 51-60 years ($M = 3.60$, $SD = 0.69$).

Table 6. Comparison of Psychological Resilience Level by Marital Status

Groups	f	Mean Rank	df	H	p	Significant difference
Married	167	189.28				
Single	222	215.72	3	10.945	.012	1-2
Divorced	17	265.06				1-3
Widowed	5	131.9				3-4

1: Married, 2: Single, 3: Divorced, 4: Widowed

Table 6 illustrates the Kruskal-Wallis Test results conducted to compare psychological resilience level of the participants by marital status. The Kruskal-Wallis Test showed that there was a statistically significant difference in psychological resilience level between the different marital status ($H = 10.945$, $df = 3$, $p = 0.012$), with a mean rank resilience level of 189.28 for married participants, 215.72 for singles, 265.06 for divorced participants and 131.9 for widowed participants. Bilateral comparisons made with the Mann-Whitney U test showed significance differences between, married-single ($U = 16148.5$, $p = 0.030$, $z = -2.176$), married-divorced ($U = 909.00$, $p = 0.015$, $z = -2.441$) and divorced-widowed ($U = 15.00$, $p = 0.031$, $z = -2.155$). These results showed that the level of psychological resilience level of divorced people is higher than the others while the level of psychological resilience level of widows is lower than the others.

Table 7. Comparison of Psychological Resilience Level by Number of Children

Groups	f	Mean Rank	df	H	p
None	242	209.81			
1-3	149	193.68	2	2.114	.347
4 or more	14	184.5			

Table 7 illustrates the Kruskal-Wallis Test results conducted to compare psychological resilience level of the participants by number of children. The Kruskal-Wallis Test showed that there was not a statistically significant difference in psychological resilience level between the individuals with different number of children ($H = 2.114$, $df = 2$, $p = 0.347$), with a mean rank resilience level of 209.81 for the participants without children, 193.68 for the participants with 1 to 3 children and 184.5 for the participants with 4 or more children.

Table 8. Comparison of Psychological Resilience Level by Monthly Income

Groups	f	Mean Rank	df	H	p	Significant difference
Less than 500 TL	80	168.19				
501-1000 TL	61	210.43	3	10.275	.016	1-2
1001-3000 TL	191	198.69				1-3
More than 3001 TL	65	227.1				1-4

1: Less than 500 TL, 2: 501-1000 TL, 3: 1001-3000 TL, 4: More than 3001 TL.

Table 8 illustrates the Kruskal-Wallis Test results conducted to compare psychological resilience level of the participants by monthly income. The Kruskal-Wallis Test showed that there was a statistically significant difference in psychological resilience level between the individuals with different monthly incomes ($H = 10.275$, $df = 3$, $p = 0.016$), with a mean rank resilience level of 168.19

for the participants with less than 500 TL monthly income, 210.43 for the participants between 501-1000 TL income, 198.69 for the participants between 1001-3000 TL income, and 227.1 for the participants more than 3001 TL income. Bilateral comparisons made with the Mann-Whitney U test showed significance differences between the participants with less than 500 TL and 501-1000 TL income ($U = 1923.5$, $p = 0.032$, $z = -2.150$), participants with less than 500 TL and more than 3001 TL income ($U = 6466.0$, $p = 0.046$, $z = -1.995$), and participants with less than 500 TL and 1001-3000 TL income ($U = 1826.0$, $p = 0.002$, $z = -3.078$). These results showed that the level of psychological resilience level of low income group (less than 500 TL) differs from the other 3 groups.

Table 9. Comparison of Psychological Resilience Level by the Status of Being Experienced a Disaster

Groups	f	Mean Rank	Sum of Ranks	U	p
Yes	140	210.34	29447	18223.0	.552
No	270	202.99	54808		

Table 9 illustrates the Mann-Whitney U test results conducted to compare psychological resilience level of the participants by the status of being experienced a disaster. From the Table 9, it can be concluded that psychological resilience level of the participants who have faced a disaster was not significantly different than the participants who have not faced a disaster ($U = 18223.0$, $p = 0.552$).

Table 10. Comparison of Psychological Resilience Level by the Status of Having Natural Disaster Insurance

Groups	f	Mean Rank	df	H	p
Yes	116	223.15	2	3.831	.147
No	228	198.23			
Not sure	65	196.37			

Table 10 illustrates the Kruskal-Wallis Test results conducted to compare psychological resilience level of the participants by the status of having natural disaster insurance. The Kruskal-Wallis Test showed that there was not a statistically significant difference in psychological resilience level between the three groups; individuals who have a natural disaster insurance, who have not and who were not sure whether they have a natural disaster insurance or not ($H = 3.831$, $df = 2$, $p = 0.147$).

Table 11. Comparison of Psychological Resilience Level by the Status of Having a Chronic Disease

Groups	f	Mean Rank	Sum of Ranks	U	p
Yes	42	172.73	7254.5	6351.5	.065
No	366	208.15	76181.5		

Table 11 illustrates the Mann-Whitney U test results conducted to compare psychological resilience level of the participants by the status of having a chronic disease. The Mann-Whitney U test showed that there was not a statistically significant difference in psychological resilience level between the those with and without chronic disease ($U = 6351.5$, $p = 0.065$, $z = -1,844$).

Table 12. Comparison of Psychological Resilience Level by the Status of having Household Emergency Plan

Groups	f	Mean Rank	Sum of Ranks	U	p
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Yes	95	250.04	23753.5	10731.5	.000
No	315	192.07	60501.5		

Table 12 illustrates the Mann-Whitney U test results conducted to compare psychological resilience level of the participants by the status of having household emergency plan. The Mann-Whitney U test showed that there was a statistically significant difference in psychological resilience level between the participants with and without household emergency plan ($U = 10731.5$, $p = 0.000$, $z = -4.180$). Those who have a household emergency plan have a higher level of psychological resilience.

Table 13. Comparison of Psychological Resilience Level by the Status of Enrollment in an Organization to Volunteer in a Disaster Situation

Groups	f	Mean Rank	Sum of Ranks	U	p
Yes	43	259.67	11166	5647.0	.002
No	369	200.3	73912		

Table 13 illustrates the Mann-Whitney U test results conducted to compare psychological resilience level of the participants by the status of enrollment in an organization to volunteer in a disaster situation. The Mann-Whitney U test showed that there was a statistically significant difference in psychological resilience level between the participants who were enrolled and not enrolled in an organization to volunteer in a disaster situation ($U = 5647.0$, $p = 0.002$, $z = -3.095$). Those who enrolled in an organization to volunteer in a disaster situation have a higher level of psychological resilience.

Table 14. Comparison of Psychological Resilience Level by the Status of Living with Family, Housemate and Alone

Groups	f	Mean Rank	df	H	p
With Family	277	195.88			
With Housemate	79	220.37	2	6.001	.050
Alone	54	233.1			

Table 14 illustrates the Kruskal-Wallis Test results conducted to compare psychological resilience level of the participants by the status of living. The Kruskal-Wallis Test showed that there was not a statistically significant difference in psychological resilience level between the three groups; individuals who lives with their family, who lives with housemates and who lives alone ($H = 6.001$, $df = 2$, $p = 0.050$).

Table 15. Comparison of Psychological Resilience Level by the Status of Taking Disaster Education

Groups	f	Mean Rank	Sum of Ranks	U	p
Yes	198	223.62	44276.5	14826.5	.000
No	199	174.51	34726.5		

Table 15 illustrates the Mann-Whitney U test results conducted to compare psychological resilience level of the participants by the status of taking a disaster education. The Mann-Whitney U test showed that there was a statistically significant difference in psychological resilience level between the participants who have taken a disaster education and who have not ($U = 14826.5$, $p = 0.000$, $z = -4.265$). Those who took a disaster education have a higher level of psychological resilience.

Discussion, Conclusion and Suggestions

In this study, no significant difference on psychological resilience level was found between genders. Similarly, in a study conducted on academic staff, it was found that the level of psychological resilience does not show a statistically significant difference according to gender, but the level of psychological resilience of females were higher than the males (Ülker Tümlü & Receptoğlu, 2013). In another study conducted on individuals who have experienced the 1999 Marmara earthquakes, it was found that the level of psychological resilience does not show a statistically significant difference compared to gender, but the level of psychological resilience of females is higher (Kararımak & Güloğlu, 2014). Differently, in the study conducted on students between the ages of 13-17 after the earthquake in China, a statistically significant difference on psychological resilience levels of male and female students and the level of psychological resilience of males was higher than females (Yu et al., 2011). According to the study conducted on individuals aged 20 and over, males are more psychologically resilient (Ni et al., 2016). In another a study conducted on the general population in Australia, males were found to be more resilient (Liu et al., 2015). In general, it is stated in the literature that psychological resilience differs according to gender. In order to better evaluate psychological resilience in relation to gender, factors affecting the psychological resilience of males and females should be studied. In this way, more reliable results will be obtained regarding which group will be more psychologically affected in extraordinary situations such as disasters.

On the other hand, it was determined that the level of psychological resilience does not show a significant difference according to the educational level, but the individuals who were graduated from a high school or above are more resilient. This result mostly conflicts with the literature. According to the research conducted in individuals aged 20 and over, it was found that those with a high level of education had a high level of psychological resilience (Ni et al., 2016). In another study conducted six months after a terrorist attack, it was determined that the educational status did not affect psychological resilience (Bonanno et al., 2007). In a study carried out five years after a disaster, it was found that individuals with higher education levels were healthier and showed a faster recovery than those with a low level of education (Frankenberg et al., 2013). In general, according to the literature, it can be said that those who have a high level of education are more psychologically resilient. Theoretically, it can also be said that individuals with higher education levels will be less affected by disasters because they could find accurate and reliable information about disasters more easily so they

will have more advantages in getting psychological support before and after disasters, and will thus be less psychologically affected by disasters.

According to results, it was found that the level of psychological resilience does not show a statistical and significant difference with respect to the age group, but those who are 40 years old and over are less resilient. According to the study conducted on individuals between the ages of 13-17 after the earthquake in China, psychological resilience shows a significant difference according to age and it has been determined that the young ones have a higher level of psychological resilience (Yu et al., 2011). In another study conducted in individuals aged 20 and over, it was stated that the most resilient group was the ones who were between 20-39 years old and the least resilient group was the ones who were 65 and over (Ni et al., 2016). In a study conducted on university students between the ages of 18 and 30, it was found that the level of psychological resilience has a statistically significant difference compared to age, and that individuals over 25 years of age had a lower level of psychological resilience (Notario-Pacheco et al., 2011). In another study, which was found that the level of psychological resilience did not show a statistical difference according to age, it was found that the resilience level academic staff who were more than 51 years old has the highest resilience level (Ülker Tümlü & Receptoğlu, 2013). In general, according to the literature, it can be said that young people are psychologically more resilient, so that these people will be less psychologically affected by disasters and will recover themselves more quickly.

It was found that psychological resilience showed a statistically significant difference according to marital status in this study. It has been determined that widows are the most psychologically resilient group and single people are more resilient than married people. In their studies, Ülker Tümlü and Receptoğlu (2013) stated that the psychological resilience level did not show a statistically significant difference compared to the marital status, however it was found that the single academic staff had higher psychological resilience level. According to the research conducted on teachers, psychological resilience does not show a statistically significant difference compared to marital status, however, it was determined that single teachers have higher psychological resilience level (Sezgin Nartgün & Mor, 2015). Related to this, Wade et al. (2013) reported that individuals whose spouses died had a lower level of anger, fear and anger than divorcees, singles, married people, and separates. In general, literature specifies that single people are more psychologically resilient than the married people. It can be said that singles will be less affected psychologically by disasters.

Results of this study showed that psychological resilience does not show a statistical difference according to the number of children owned, but the level of psychological resilience decreases with the increase in the number of children. It can be said that those who have more children will be more affected psychologically.

According to results, it was determined that the level of psychological resilience shows a statistically significant difference compared to monthly income and the group with the highest monthly income is more psychologically resilient. Similarly, Ni et al. (2016) reports that the groups with high monthly income are also psychologically resilient. Lowe et al. (2015), in their post-disaster study, stated that depression level is low in individuals with high income level who are not psychologically affected by the disaster. In the same study, it was reported that there was no relationship between the economic status of those who were psychologically affected by the disaster and the of depression level (Lowe et al., 2015). In another study conducted after an earthquake and tsunami, it was determined that the employees in a job are more psychologically resilient (Kukihara et al., 2014). In the study conducted on nursing students, it was determined that the level of psychological resilience shows a statistically significant difference according to the economic situation and the students with good economic status have higher psychological resilience (Güngörmüş et al., 2015). According to the literature, it can be said that income level has a positive effect on psychological resilience. It can be said that people with good financial conditions can easily tolerate economic damage caused by disasters than the others.

On the other hand, it has been determined that level of psychological resilience does not have a statistically significant difference compared to disaster exposure in this study, however those who have experienced a disaster are more psychologically resilient. In a study conducted on 34 people who experienced an earthquake in Van in 2011 and whose houses were damaged, it was found that psychological resilience plays a protective role against post-traumatic stress disorder symptoms (Sakarya & Güneş, 2013). It can be said that those who are previously experienced a disaster will be possibly less affected by disasters than the others.

Results of this study indicated that although those with natural disaster insurance were found to be more psychologically resilient, there was no statistically significant difference between those who had insurance and those who did not. In a study conducted 6 months after a terrorist attack, it was found that those who were not economically affected by this attack were more psychologically resilient (Bonanno et al., 2007). It can be said that those who have natural disaster insurance will face less issues on solving accommodation problems after a disaster so that they will be less affected psychologically.

Although the psychological resilience level of those who do not have chronic disease is high in this study, it was found that the level of psychological resilience does not show a statistically significant difference compared to the status of having chronic disease. In their study conducted on university students, Yurdakul and Üner (2015), reported that the individuals with a chronic disease have higher level of psychological resilience, however the level of psychological resilience did not found to be significantly different compared to ones who does not have any chronic diseases. In the

study conducted after the earthquake and tsunami in Japan, it was found that people with high healthy living standards had higher levels of psychological resilience (Kukihara et al., 2014). In their study conducted on individuals with psychological disorders, Jung et al. (2012) found that individuals with psychological disorders had a lower level of resilience.

In general, literature states that individuals without chronic disease are more psychologically resilient to disasters. It can be said that those with chronic disease will be more psychologically affected by disasters because they are more sensitive both physically and spiritually depending on the type and severity of the disease.

Results of this study indicated that the level of psychological resilience showed a statistically significant difference according to the status of enrollment in an organization to work voluntarily in a disaster situation. Those who enrolled in an organization to work in a disaster were more psychologically resilient. Similarly, Brown et al. (2012) stated that volunteers in any organization are more psychologically resilient. Brooks et al. (2015) reports that personnel working in disasters are adversely affected by difficulties and difficult living conditions before, during and after the disaster. In their study conducted on volunteers working during a disaster after a devastating earthquake in Haiti, Charlie et al. (2014) found that volunteering increases resilience. These volunteers were also reported a steady increase in their personal resilience, interpersonal relationships and social ties (Carlile et al., 2014). It can be said that those who feel psychologically strong are willing to work in disaster situations, so that volunteers can help other victims more because they will be less psychologically affected by disasters.

Although the level of psychological resilience of those who live alone at home is high in this study, it was found that the level of psychological resilience does not show a statistically significant difference compared to living conditions; living with family, housemate and alone.

A statistically significant difference was found between disaster education status and psychological resilience level in this study. Those who received disaster education had a higher level of psychological resilience. Similarly, in a study conducted in India, it was found that taking disaster education is effective in reducing the level of anxiety towards disasters (Mishra & Suar, 2012). It can be said that those who receive disaster education will be less psychologically affected by disasters because they will fight the effects of disasters better.

When evaluated in general, it can be said that psychological resilience level of the individuals participating in the research is above the average, but also could be better. In summary, results showed that the most psychologically resilient people are males, high school graduates, individuals between the ages of 29-39, divorcees, those who do not have children, those with monthly income of more than

3001 TL, those with natural disaster insurance, those who are previously experienced a disaster and those who took a disaster education.

This study has its own limitations like every other study. First, this study is based solely on quantitative data obtained through a self-report survey so that it may be expanded by conducting in-depth analysis via qualitative methods. Second limitation of this study is that sampling was used for data collection, so that, larger samples or actual population represent more accurate results. In general, this study extends our knowledge on psychological resilience against disasters.

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The Views of Instructors on Teaching Speaking Skills to the Syrian Students Learning Turkish as a Foreign Language

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Abstract

Having a significant role in communication, speaking skill is an inborn and improvable ability. Since their existence, human beings have consistently improved this ability in order to communicate with others. Besides, one of the most fundamental keystones of making a healthy contact and living in harmony with different societies are no doubt being a proficient speaker of this language. Therefore, the need of speaking Turkish for Syrian refugees forced them to migrate to Turkey, because some political reasons come out and Turkish instruction become vital. Evaluating the speaking skills of Syrian students learning Turkish as a foreign language, through the views of Turkish instructors, is aimed in the present study. The research data were obtained through semi-structured interview questions directed to 11 Turkish language instructors in Adana Turkish Language Education Centres. The gathered data were analysed by content analysis method. The findings of the study suggest that instructors have such difficulties in improving the speaking skill of Syrian students learning Turkish as a foreign language as having pronunciation problems during speaking activities and anxiety while speaking Turkish. Thus, instructors fail to assess Turkish speaking skill despite carrying out various speaking activities to overcome these problems.

Keywords: Speaking skill, Turkish instruction, Syrian students, content analysis

DOI: 10.29329/epasr.2020.236.11

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Introduction

Needs analysis is a vital issue in educational settings in the contemporary world (Ulum, 2015). In the era of globalisation, communicating with people from different cultures and languages with ease increases the need for learning other languages apart from the native languages of the individuals. Eventually, human as a social being has to communicate with the people around to express himself. (Temizyürek, Erdem, & Temizkan, 2007, p. 266). There are several ways of communication such as verbal, non-verbal and written. People mostly use the verbal one, speaking in other words, among the other ways of communication to be able to contact with other people around them, and express their feelings, thoughts, views, dreams etc. As understood from this statement, speaking skill is a basic language skill that helps individuals to communicate with other people in their daily life.

According to Sever (1997, p. 20), speaking has had an important place in maintainin the relationship amongst peoples and affecting one another for ages. While improving one's Turkish speaking skill, it must be taken into consideration that meaning of the words can change depending on pronunciation, rhythm, setting, occasions or persons. Comprised of components like those, speaking skill necessitates that this education must be given by experts. First of all, instructor has to have a fluent diction himself, stress the right syllable and word, and use gestures properly to improve this skill. Likewise, Turkish teacher has to have knowledge of voice and breathe control. No matter how perfect the pronunciation of a teacher is, if he can not control his breath, the sentences he forms do not count for much. Hence, teachers have to practise breath control frequently before the lessons (Erem & Sevin, 1947). Consequently, the teacher above all has to be a good sample for students with his own eloquence in teaching speaking (Kavcar, Oğuzkan, & Sever, 1999, p. 58).

Foreign language speaking skill should not be seen as a simple ability in language instruction. Many language functions such as what, when and where a person having a full command of a language can speak; how his parlance towards people in same and different positions and status should be; what kind of body language is suitable for different contexts, what behaviors like keeping quiet and taking turn methods and techniques during conversations are expected; how to apologize and request someone; how to convey an assistance and collaboration demands, and how to abstain from these politely; to whom and how one can order, all can be achieved thanks to this skill (as cited in Bayraktar, 2014, p. 117).

Millions of Syrian refugees' entering and living for a long period in our country as a result of political problems and battles in their country enhances the importance of teaching Turkish as a foreign language (Eryaman & Evran, 2019; Ulum & Kara, 2016). After all, knowing the language of the society one lives in is significant for the individual to adapt to the society and be informed about the cultures of the speakers of this language because the whole characteristics of the culture and

historical, social background are found in the language (Bölükbaş & Keskin, 2010). Accordingly, Turkish instruction is given both in public schools and Turkish Education Centers and Temporary Education Centers. A big number of research studies on the importance of foreign language speaking instruction (Temizyürek, 2004), and speech anxiety (Sevim, 2014; Sallabaş, 2012; Tunçel, 2014, Özdemir, 2012) of students learning Turkish as a foreign language exist in the related literature. Moreover, there are researches mentioning the place of teaching Turkish to Arabs in history (Akkuş, 1999; Baskın, 2012) and studies dealing with coursebooks used while teaching Turkish to Arabs (Şeref & Yılmaz, 2013; Yılmaz & Şeref, 2013), basic language skills improved (Bölükbaş, 2011; Subaşı, 2010), grammar teaching (Doğan, 2007), researches for problems encountered (Polat, 1998) and Syrian refugees' educational problems and perceptions of Turkish. As for this study, our purpose is to state instructors' views on teaching speaking Turkish to the Syrian students. Thus, the opinions of instructors teaching Turkish to the Syrian students about the Syrian refugees' educational problems and their perception of Turkish were taken via interview forms and analysed.

Purpose of the Study

The purpose of this study is to determine the views of the instructors on Syrian students' gaining and improving Turkish speaking skill. The following questions were accordingly formed:

1. Do the instructors have difficulty in improving the speaking skill of Syrian students learning Turkish as a foreign language?
2. What are the mistakes that instructors encounter while improving the speaking skill of Syrian students learning Turkish as a foreign language?
3. What are the methods and techniques instructors use while improving the speaking skill of Syrian students learning Turkish as a foreign language?

Method

Based on a qualitative research design, this study evaluates the views of instructors teaching Turkish as a foreign language in a Turkish Language Education Centre. A qualitative research uses qualitative data collection methods such as observation, interview and document analysis, and follows a qualitative process towards revealing perceptions and incidents in an integrative and realist way in the natural environment (Yıldırım & Şimşek, 2008, p. 39). Interview forms were used as data collection tools in this research study. Further, the data acquired in this study were analysed through content analysis technique, which is a systematic technique and repeatable way of data collection (Büyüköztürk, 2009, p. 269). Semi-structured interview questions were developed by experts from the related field. Moreover, for the coding reliability of the interview, Kappa Coefficient for Inter-coder Reliability was calculated and it was seen that the coding process was reliable ($K = .886, p < .001$).

Participants

11 Turkish language instructors working in the Turkish Language Education Centers of Çukurova University and Adana Science and Technology University form the study group in this study. 5 of the informants are male while 6 of them are female. All the instructors have a master's degree in foreign language education.

Data Collection and Analysis

In the research, the instructors working in Turkish Language Education Centers were asked to answer eight semi-structured questions to collect data. Codes and themes were defined examining the data collected. During the process of reporting, the views stated by instructors were cited directly. Each instructor was named as the letter “K”, and instructors are lined up as “K1, K2, K3, K4...” and so on.

Results

The quotes from the instructors' answers for the question “*What are the opinions of your students about speaking Turkish?*”, categories and frequencies are shown in the Table 1.

Table 1. Findings related to the opinions of students towards speaking Turkish according to the instructors

Categories	F	Sample Statements
Regarding speaking Turkish as difficult	5	<i>They generally state that they find speaking skill more difficult than other skills. (K-2)</i>
Abstaining from speaking Turkish	3	<i>Students abstain from speaking Turkish as they avoid making mistakes. (K-4)</i>
Enthusiasm about speaking Turkish	2	<i>In general sense, they are enthusiastic about speaking Turkish; however, it must be said that this skill is improved by the student's personality, will and study. (K-6)</i>
Love of speaking Turkish	2	<i>They like and join in speaking activities. (K-5)</i>
Rush for learning speaking Turkish	2	<i>Students dreaming themselves as native speakers learn faster and become more successful. (K-1)</i>
Prejudice against Turkish	1	<i>Students are seriously prejudiced as Arabic and Turkish are completely different languages. (K-3)</i>
Getting tired of speaking Turkish	1	<i>While Turkish is the favourite lesson of some students, some of them are bored as they abstain from making mistakes. (K-1)</i>

As for the Table 1, most of the instructors state that students think that speaking Turkish is difficult. They also point out that students avoid making mistakes, feel like an outsider and thus refrain from speaking Turkish. This result shows that Syrian students have difficulty in feeling confident about speaking Turkish. The quotes from the instructors' answers for the question “*Can your students explain the difference between spoken and written Turkish? Please explain.*”, categories and frequencies are shown in the Table 2.

Table 2. Findings related to students' distinction of spoken and written language

Categories	f	Sample Statements
Distinction through improvement in Turkish language level	8	<i>Though at first they can not internalize the distinction; as they have a good knowledge of Turkish in the upcoming periods, this problem vanishes. (K-2)</i>
Distinguishability	3	<i>They understand that there is a difference but they do not understand what is said in spoken language yet. (K-1)</i>
Indistinguishability	1	<i>No. They can not distinguish. (K-11)</i>

As for the Table 2, most of the instructors state that students have difficulty in distinguishing spoken language from written language at first; however, they can recognize this difference as they have a good knowledge of Turkish. Furthermore, it is explained that though beginner students understand the written language, they have difficulty in understanding speeches. The quotes from the instructors' answers for the question "Do you have difficulty in improving Turkish speaking skill? Why?" categories and frequencies are shown in the Table 3.

Table 3. Findings related to whether instructors have difficulty in improving speaking Turkish skills

Categories	f	Causes	f	Sample Statements
The Ones Having Difficulty	10	Having difference between their native language and Turkish.	2	<i>I have difficulty from time to time. I have some problems with students in course A because Turkish and their native language are different.(pronunciation-syntax etc.)It may take time to resolve these problems. (K-9)</i>
		Not being able to transfer the things students learned to the conversations.	2	<i>The students successful in verbal expression may unfortunately fail in dual conversations. For instance, the students using words with proper affixes and paying attention to grammar while introducing themselves have difficulty in communicating. (K-7)</i>
		Having difficulty in pronunciation of some letters.	2	<i>They have difficulty in articulation of umlaut vowels. (K-5)</i>
		The fear of students	2	<i>Of course. Because there are lots of things to say in their minds. Yet, along with the fear, they may prefer speaking with only one sentence or not speaking at all when they do not have enough vocabulary. (K-10)</i>
		Having a strong pronunciation of Arabic	1	<i>Compared with the other languages, it takes a quite time to soften the strong pronunciation of Arabic. (K-3)</i>
		Not knowing where to use case suffixes.	1	<i>They are not able to understand exactly where to use case suffixes while constructing sentences. (K-3)</i>
		Referring English when students have difficulty in speaking Turkish.	1	<i>Referring English especially when they have difficulty in improving speaking Turkish causes them to delay the improvement of speaking Turkish. (K-4)</i>
		Not being able to distinguish the similar sounds.	1	<i>They have difficulty in understanding the difference between similar sounds. (K-1)</i>
The ones not having difficulty	1	Enthusiastic behaviors of students	1	<i>I try to encourage students to feel confident. After a while, I do not have much difficulty as they are enthusiastic when they feel confident. (K-6)</i>

As for the Table 3, most of the instructors state that students have difficulty in improvement of speaking Turkish. As fundamental reasons for this, they give vocal and structural differences between Turkish and their native languages, not being able to transfer the information they learned to the conversations and having difficulty in pronunciation of some words. The quotes from the instructors' answers for the question "What are the most common pronunciation mistakes of your students while speaking Turkish?" categories and frequencies are shown in the Table 3.

Table 4. Findings related to the most common pronunciation mistakes of students according to the instructors

Categories	f	Sample Statements
Having difficulty in the pronunciation of vocal sounds	6	<i>I-i/u-ü/o-ö are the voices they find most difficult to pronounce. (K-9)</i>
Confusing the pronunciation of similar sounds	3	<i>They also confuse the voices Ç-ş/s-z/c-j/c-ç and mispronounce them. (K-9)</i>
Having difficulty in the pronunciation of voices not found in their native languages.	2	<i>They have difficulty in pronunciations of both vowels and consonants not found in their native languages.(K-5)</i>
Confusing the voices found in their native language but not in Turkish.	1	<i>Confusing the pronunciations of letters found in Arabic but not in Turkish such as k/g/h is one of the most common problems. (K-2)</i>
Using the voices found in their native language while speaking Turkish.	1	<i>They often use the letter "ayın" in Arabic while speaking Turkish. We make them utter the correct voice repeating frequently. (K-3)</i>
Mispronunciation of the words consisting similar sounds.	1	<i>As there are lots of vowels in Turkish, they may have pronunciation mistakes while uttering similar words. Like iş, eş, aş etc. (K-6)</i>
Uttering the common words as they are in their native language.	1	<i>They pronounce Arabic words in Turkish as they are in their native languages.E.g. : instead of "yani" a long and rough "yeeđanii" (K-2)</i>

As for Table 4, most of the instructors state that students mostly have difficulty in the pronunciations of vocal sounds. Moreover, they state that students confuse the voices and words having similar pronunciations in Turkish, have difficulty in the pronunciations of words not found in their native languages, referring English when they have difficulty in speaking.

The quotes from the instructors' answers for the question "What kind of exercises do you do to eliminate the mistakes your students do while speaking Turkish? Please explain." categories and frequencies are shown in the Table 5.

Table 5. Findings related to the exercises instructors do to eliminate students' pronunciation mistakes

Categories	f	Sample Statements
Making voice and words repetitions	3	<i>I write them as a list and want them to read the words including these sounds again and again and practise at home. (K-1)</i>
Using words in sentences	2	<i>In order to eliminate these mistakes, we want them to pronounce the words correctly and use these words in a sentence giving a word list including these sounds. (K-4)</i>
Reinforcing the speaking with other skills	1	<i>I do pronunciation exercises.I reinforce them with listening activities. (K-5)</i>
Making drama activities	1	<i>We prefer the teaching of correct pronunciation with sample usage,especially using drama, in classroom.(K-7)</i>

Using “Minimal Pairs” technique	1	<i>In order to eliminate these mistakes, we especially prepare minimal pairs activities and implement them in the class. Students both have fun and learn. (K-9)</i>
Making Dictation practices	1	<i>Dictation practice is the most common method we use. (K-10)</i>

As for Table 5, it is seen that instructors make exercises like repetitions of the sounds and words students have difficulty in pronunciation, using the words including the sounds they have difficulty in a sentence, organizing drama activities. The quotes from the instructors’ answers for the question “*What are the methods and techniques you use to improve your students’ Turkish speaking skills?*” categories and frequencies are shown in the Table 6.

Table 6. Findings related to the methods and techniques instructors use to improve students’ Turkish speaking skills

Categories	f	Sample Statements
Dialogue Technique	7	<i>Grounding on a “specific theme” for verbal expression and dual conversation, we do activities turning this skill from being secondary skill. (K-7)</i>
Question and Answer Technique	5	<i>Question and Answer is one of the most common methods we use to improve this skill. However, the student may give short answers to these questions. (K-3)</i>
Verbal Expression	4	<i>Speaking activities are done via verbal expression and dialogues. (K-4)</i>
Picture Reading and Interpreting	2	<i>Dialogue activities are done including a context and speech with reference to a photograph. (K-4)</i>
Educational Games	2	<i>I try to improve speaking skills with games and various activities. (K-9)</i>
Communicative Method	2	<i>They have the opportunity to practice speaking Turkish by socializing with Turkish students at university. (K-4)</i>
Case Study Technique	1	<i>We practice especially with case study and dialogue techniques. (K-2)</i>
Presentation	1	<i>We can lead them to prepare presentations according to their levels to improve their expression skills. (K-6)</i>
Drama and Animation	1	<i>We also adopt the methods like animation, drama, and ask their impressions showing them pictures. (K-7)</i>
Reading Aloud	1	<i>We make text and newspaper reading aloud both to hear their own pronunciations and to realize their intonations. (K-2)</i>
Audio-Lingual Method	1	<i>Question and Answer, Dialogue Memorisation along with Communicative and Audiolingual Methods are the methods and techniques I use most. (K-1)</i>

As for Table 6, it is seen that the techniques instructors’ use to improve Syrian students’ speaking skill are as follows in order of priorities; dialogue technique, question and answer technique, verbal expression, picture reading and interpreting, educational games, communicative method, case study technique, presentation, drama and animation, reading aloud and Audio-Lingual method. The quotes from the instructors’ answers for the question “*What are the assessment and evaluation techniques you use to determine the levels of improvement and language acquisition skill?*” categories and frequencies are shown in the Table 7.

Table 7. Findings related to the techniques instructors use to determine the students' Turkish speaking levels

Categories	f	Sample Statements
Evaluation of their verbal expressions and dialogues	7	<i>We divide this skill into two parts as verbal expression and dual conversation. We evaluate it with a scale improved proper to each level. A student speaks alone first, then makes a dialogue with a friend. (K-1)</i>
Evaluation with pilot tests	2	<i>We make pilot tests. We prepare activities proper to levels and implement them in class. (K-5)</i>
Evaluation via observation	1	<i>I make my evaluation through observation in the class. I choose different topics. I assess whether they understand the grammar I teach. (K-8)</i>
Not making an assessment	1	<i>I do not make a particular assessment and evaluation. (K-9)</i>

As for table 7, instructors divide speaking skills into two techniques. Thus, they evaluate students' speaking skills considering dialogues and verbal expressions they use while narrating an event or a case. Even though some instructors state that they consider criteria such as "interaction, consistency, accuracy, fluency" in evaluation, it is seen that most of the instructors do not have enough knowledge of assessment and evaluation techniques. It is also seen that speaking, one of the ways of verbal communication, is evaluated by instructors with pilot tests. The quotes from the instructors' answers for the question "Do you find instructors teaching Turkish to the foreigners efficient as for the improvement of basic language skills?" categories and frequencies are shown in the Table 8.

Table 8. Findings related to the instructors' views on efficiency of themselves and other instructors teaching Turkish in improvement of basic skills

Categories	f	Sample Statements
I find instructors inefficient.	7	<i>I think that we are lacking in following the studies, especially comparative studies, and publications in different cities and countries as instructors. I also think that we should follow publications more closely to achieve new ideas in improvement of basic language skills. (K-7)</i>
I find myself inefficient.	6	<i>I do not find myself efficient in this respect; however, I think that I am gaining ground in my career path to become an expert. (K-4)</i>
I find myself efficient.	3	<i>I find myself efficient in improvement of speaking skill. I give weight to improving this skill in my lessons. (K-9)</i>
I find instructors efficient.	2	<i>Yes, I find them efficient in general. (K-2)</i>
I find instructors and myself efficient up to a point.	2	<i>Partially, because there are two different aspects. Instructors are efficient to a certain extent as they are appointed after being selected. Yet, as this area is quite new, we need to update ourselves as there are lots of things to do and to teach. (K-6)</i>

As for the Table 8, it is understood that the majority of the instructors find both themselves and the other instructors inefficient. Inadequate criteria for the selection of instructors, the area of teaching Turkish as a foreign language being new, and insufficient studies on this area are shown as the reason for this.

Discussion and Conclusions

This study lays emphasis on the views of instructors teaching Turkish as a foreign language on acquiring and improving Turkish speaking skills to Syrian students. Accordingly, the instructors'

opinions on the perception of students about speaking Turkish, the mistakes students make while speaking Turkish (Öztürk & Gürbüz, 2014), the activities instructors do to correct pronunciation mistakes, the techniques to assess speaking skill and proficiency of instructors in improving speaking skill are taken and analysed. The findings obtained from the study are as follows:

According to the instructors, Syrian students are anxious as they are afraid of being criticised when they make a mistake. In order to decrease this anxiety, speaking activities should be increased and students should be encouraged to participate voluntarily. Because when the students are forced to participate in speaking activities in a foreign language learning environment, they feel anxious just as they are scared of height, elevators or snakes etc. (as cited in Baş, 2014, p. 11). Furthermore, it is stated that students think that speaking Turkish is difficult. So as to change this perception, it is necessary to enhance students' perception of their self-competence in learning a foreign language (Köksal & Ulum, 2016). To achieve this, it is required to shed light on what students are going to do with this foreign language rather than what they cannot do (Şahin & Koçer, 2014, p. 43).

Although students have difficulty in recognizing the difference between spoken and written languages when they are beginners, this difficulty begins to vanish as their language levels improve because each vowel is represented by a letter in Turkish and this property of Turkish facilitates the transition from written language to spoken language for the students (Güneş, 2007). Almost all of the instructors show reasons for their students' difficulty in improving speaking skills such as the vocal differences between their native tongue and Turkish, their being unable to transfer the grammar rules and patterns to dialogues, their being worried or anxious about speaking Turkish, their Arabic accent being strong (Ulum, 2020), and their tendency to resort to English whenever they have difficulty in expressing themselves in Turkish. It is remarkable that although most of the instructors find themselves incompetent to improve this skill, they base their opinion about having difficulty during learning process solely on students.

Instructors, indicating Syrian students make several pronunciation mistakes, state that pronunciation of vowels are the most common mistakes. Besides, having differences between students' native language and Turkish creates an ill effect on the correct pronunciation of Turkish sounds. Also, confusing similar sounds in Turkish and mispronunciations are an issue. In order to eliminate these mispronunciations, instructors frequently want them to repeat especially the sounds mispronounced and words including these sounds (Üredi & Ulum, 2018). Furthermore, they state that they have used dialogue and verbal expression activities during the process of improving speaking skills.

Assessment and evaluation is crucial in language instruction. Because feedbacks taken from the assessment and evaluation done parallel to the speaking, writing, reading and listening activities implemented during study period will enable the elimination of deficiencies in education (Yıldız & Tuncel, 2014, p. 201). However, it is seen that some instructors are incompetent in assessment and

evaluation of speaking skills of Syrian students. Some of the instructors state that they evaluate speaking skills in two forms of speaking ability; verbal expression and dialogue using while others say that they do a pilot test and observe or do no assessment at all. Finally, it is understood that instructors see both themselves and others incompetent for further development of this skill.

Consequently, instructors have difficulty in improving speaking skills of Syrian students. Even though they do not find themselves competent enough to improve this skill, they see the most of the difficulties they have are student-based. They also state that students make pronunciation mistakes for several reasons; some of the students have a negative perception of speaking Turkish and abstain from speaking. With reference to these results, the following recommendations on improvement of students' speaking skill should be taken into consideration:

1. Researches on Syrian students' anxiety of speaking Turkish are needed to be done and their anxiety levels should be decreased to a minimum level.
2. Instructors are supposed to encourage their students to speak Turkish and encourage them to gain self-confidence. Besides, they should provide volunteer participation in speaking activities and should state that they do not need to be afraid of making mistakes.
3. Instructors' competence in improvement of speaking skill should be taken into consideration and people giving this education should be chosen with a specific criterion.
4. Researches on Syrian students' pronunciation mistakes while speaking Turkish are needed to be done and studies for elimination of these mistakes should be carried on.
5. Instructors should provide their students the opportunity of communication with native speakers of Turkish by organizing tours and activities outside the school without confining the education within the walls of a school while improving students' speaking skills.
6. Studies to fulfill the lack of instructors in assessment and evaluation are needed to be done.
7. Instructors should continuously improve themselves and should search and use the new methods and techniques to make their students gain and improve this skill.

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A Management Factor at Sick Building Syndrome: Are Old or New School Buildings Sick?

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Abstract

The training and learning activities for students are primarily conducted in closed environments. The symptoms resulting from living environments in occupied buildings are referred to as “sick building syndrome (SBS).” The aim of this study is to evaluate the SBS associated with the age of a school building. In this research, grounded research design, which is a type of mixed-method approach, was preferred because qualitative and quantitative methods were used to support each other. Four different schools were selected based on the ages of the school buildings by criterion sampling method. These schools were identified to be 1-, 5-, 10-, and 40-year old buildings. Thus, the research sample comprised a total of 423 students. The students were provided with a questionnaire and the data obtained were analyzed with IBM SPSS 25 software. At the end of the research, it was observed that 329 students experience symptoms in the school, and the most commonly experienced physical symptoms are headache (188 students), physical and mental fatigue (175 students), and concentration disorder (142 students). Moreover, a significant relationship was observed between the symptoms experienced by the students during their time in the school and the symptoms they experienced after school. It was revealed that the most uncomfortable places are corridors and washrooms. In general, it can be concluded that the SBS symptoms are observed in four different buildings, and they vary depending on comfort conditions such as hygiene, ventilation, and heating instead of the age of the school building. Furthermore, it was noted that school principals responsible for the administration of school buildings have an important role in the improving or deteriorating of SBS symptoms.

Keywords: Sick Building Syndrome, School Building, Sick Building Symptoms, Students.

DOI: 10.29329/epasr.2020.236.12

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Introduction

Generally, the causes of symptoms related to indoor spaces in schools are subjectively evaluated, and it is difficult to concretize these symptoms in a clinical environment. Although sick building syndrome (SBS) is a widely used term, it is defined in diverse ways in the literature and among researchers. Moreover, there are continued discussions regarding chemical, physical, and psychological conditions associated with the health of individuals in indoor spaces and ways in which these conditions interact. The pollutant concentrations can be low in non-industrial closed environments and thus, require versatile and expensive observation methods for the measurement. The level of sensitivity of an individual, when exposed to low-concentration, plays a crucial role in getting ill. Although psychological parameters are also considered to affect the illness symptoms, existing methods used to evaluate the psychological parameters are very limited. Hence, the symptoms of illnesses experienced in such environments are a complex issue because various unknown factors affecting are the health and their intensities and even the results of the most advanced research are still questionable (Brightman and Moss, 2000). Despite these complexities, researchers have identified the symptoms associated with buildings to characterize SBS and then examine SBS, which is more complex.

Most researchers assert that SBS includes a set of symptoms that does not possess a clear cause and are associated with exposure to certain building environments. In addition to this uncertainty, researchers have tried to elucidate the SBS using various definitions or certain terms like “building-related illness,” “office eye syndrome,” and “tight-building syndrome” as additional information was gathered. Although objective measures have been developed, the diagnosis of SBS is primarily based on personal reports (Brightman and Moss, 2000).

“Sick building syndrome” is a term commonly used when occupiers of a building are affected by illnesses caused because of the building itself. Diseases are generally transmitted by natural respiration. Patients usually feel well or display no symptoms outside of the building (Boards SAlAoS, 1996; Awbi, 2003). SBS comprises a set of symptoms observed among indoor occupants. Runny eyes and nose and sore throat, headache and dizziness, nausea, fatigue and weakness, concentration disorder, and skin irritation and redness are the frequently observed symptoms (Takigawa, 2012). These symptoms start appearing after a certain period of time is spent inside a building and tend to alleviate outside the indoor environment. When the causes of SBS were investigated, it was observed that this is a highly complex issue and associated with physical environmental conditions, chemical and biological indoor environmental contaminants, and personal factors (Redlich et al, 1997; Salvaggio, 1996). In a two-year prospective study by Zhang, et al. (2014) they investigated associations between environmental parameters such as room temperature, relative air humidity (RH), carbon dioxide (CO₂), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), ozone (O₃), particulate matter (PM₁₀), and health outcomes including prevalence, incidence and remission of SBS symptoms in

junior high schools in Taiyuan, China and found that the environmental pollution, including PM10, SO₂ and NO₂, could increase the prevalence and incidence of SBS and decrease the remission rate.

Because the insulation in school buildings is increasingly enhanced, toxicants from cigarette smoke, chalk powder, and art rooms and facilities cannot be discharged and thus, are being continuously circulated indoors via the ventilation system. Moreover, inlet of an air duct system usually contains dust or mold, thereby spreading germs throughout the building. Piping systems of school buildings are rarely cleaned and hence, the germs generated from these systems cause several diseases (Lunenburg and Ornstein, 2008). Excessive humidity in locked rooms, indoor pool areas, and basement of school building can cause mold and fungi growth, which can propagate to dangerous levels (typically, school managements are not aware of this situation) (Baechler et al. 1991). Besides the several indoor air pollutants, outdoor air pollution also significantly affects the indoor environment (Çobanoğlu and Kiper, 2006).

Administrators usually assume that the ventilation quality in their school is good unless any symptom of illness appears. However, several air pollutants, such as radon gas, carbon monoxide, asbestos particles, and dust, cannot be detected by smell or observation. Other pollutants are perceptible only at higher concentrations. For example, formaldehyde, paint, liquid cleaning detergents, mold, and fungi have an odor at harmful levels (Lunenburg and Ornstein, 2008; Baechler et al. 1991). SBS symptoms are mainly triggered by one or combination of more than one factors, like flammable materials, damp, airborne epidemic disease agents, formaldehyde, in new carpets and building furniture along with the presence of dust particles, insecticides, rat poisons, and pesticides (Bosher, 2004; Environmental Protection Agency [EPA]).

However, in the 1971 Clean Air Act, established in the USA, six common air pollutant criteria, i.e., ozone, particle matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, lead as well as 189 toxic or hazardous air pollutants were identified (Suh et al. 2000). These air pollutants cause acute illnesses, such as vomiting, and chronic diseases, such as cancer, as well as immunological, neurological, reproductive, developmental, and respiratory diseases. In general, the factors affecting SBS can be summarized as follows (Redlich et al, 1997; Burge, 2004, Norbäck, 2009): Air contaminants, ventilation, school organization (job satisfaction, stress, social structures), host factors (sex, atopy and allergy, airway hyper-reactivity, pre-existing disease), poor building service maintenance. It can be summarized the common contaminants in indoor air as such: Volatile organic compounds (formaldehyde, solvents, printer and photocopier emission, paints and resins, printed materials), dust/fibres (asbestos, man-made mineral fibres (fibreglass), dirt, construction, and paper dust), Bioaerosols (bacteria, moulds, viruses, pollen, fungi, dust mites, animal dander and excreta), Entrapped outdoor sources (vehicle exhaust, industrial exhaust), physical factors (temperature, noise, humidity, lighting), contaminants generated by human activity (carbon dioxide, perfume) and others

(fuel combustion products, environmental tobacco smoke, pesticides, radon, cleaning agents, building materials).

In a study, it was revealed that installations of twenty- or thirty-year-old school buildings need to be replaced. It was reported that a school building begins to rapidly deteriorate after forty years, and most of the school buildings are abandoned after sixty years. School buildings over thirty years of age are considered old. However, today, many schools pose an environmental threat, and certain building renovation products, substances, and procedures may harm the environment. Cleaning agents, floor covering, radon and asbestos, classroom illuminations, electromagnetic fields, insecticides, poisons, molds, formaldehyde, and several other substances, as well as environmental conditions, may negatively affect the health and behavior of building occupants. In addition to their effect on learning, it is considered that most of these factors cause illnesses in susceptible students and personnel (Bluestein, 2001).

Therefore, the reconsideration of school buildings from the health perspective becomes crucial because children spend most of their time inside school buildings for education and training activities. Hence, the necessity of investigation of school buildings for SBS arises. It was observed that many previous studies on SBS were conducted in offices, while the studies for school buildings were conducted in pre-school institutions or primary schools with the participation of parents. Moreover, it was observed that many studies were performed with quantitative methods. With this research, it is believed that quantitative analyses of school building environments will provide a significant contribution to the literature, in association with the students' views along with the determination of symptoms that alleviate after leaving the school premises or the symptoms that worsen inside the building. As stated in the literature, evaluation of the age of a school building will be a significant contribution of this study to determine whether the age of a school building is an important determinant of SBS. However, it is also expected that the identification of the conditions that cause unhealthy environments and the most uncomfortable physical areas inside the school building based on the views of the students will fill an important research gap.

Aim of the Research

This study aims to investigate school buildings for SBS. For this purpose, answers to the following questions were sought:

1. Do students have any symptoms in schools? If so, which symptoms do they have?
2. How do experienced symptoms in schools differ in terms of gender and age?
3. Do the experienced symptoms alleviate after school? If so, which symptoms alleviate?
4. Which of the experienced symptoms in question worsen further at school?

5. Do experienced symptoms differ in terms of the age of the school building? In other words, is there any difference in SBS among various schools?
6. Do students think that there are unhealthy places in the school building? What are they?

Methods

While determining the research model, efforts were made to use different methods for different components of the research and to extend the scope of the research; hence, the aim of the study was to determine the relation between the results obtained from different methods and designs or to evaluate the cases from different perspectives and thereby obtain extensive and detailed results. This approach is referred to as the mixed-method approach that provides a holistic process for exhibiting the different aspects of the investigated event. Creswell (2017) defines the mixed-method approach as the combination of qualitative and quantitative methods and approaches and concepts in research or subsequent researches.

In this research, grounded research design, which is a type of mixed-method approach, was preferred because qualitative and quantitative methods were used to support each other. In grounded design, quantitative and qualitative data are simultaneously or subsequently collected. Herein, quantitative and qualitative data were simultaneously obtained.

The quantitative side of the research was realized by a descriptive survey model. The presence of any differentiation by gender, age, and age of the school building was investigated. The views of the students obtained constituted the qualitative aspect of the research.

Herein, the study group comprises students who were selected by criterion sampling from a high school located in the center of the Muş Province. In the selection of the study group, the age of the school building was defined as the criterion, and the school buildings were selected accordingly. As the criterion of the research, third-grade high school students studying in 1-, 5-, 10-, and 40-year-old school buildings constituted the study group of the research. The schools were randomly selected based on this criterion. There were no reports of health complaints or environmental problems from any of the schools before the investigation. Available students were approached for the efficient performance of the questionnaire. However, to conform to the aim of the research, students who have spent at least 1 year inside the school building were voluntarily included in the research. Hence, a total of 423 students participated in the research. The questionnaire comprising qualitative and quantitative questions was applied to the entire study group (N = 423).

A questionnaire form was prepared by the researcher at the end of a literature review. This questionnaire form consisted of two parts. The first part includes demographic information, while the second part includes structured and semi-structured questions. The experienced symptoms associated with SBS obtained by literature review were listed, and the participants were asked to state the illness symptoms experienced by them except the listed symptoms.

The symptoms experienced as a result of SBS constituting the subject of the research were listed. The students were asked to select the options applicable to them to determine the illnesses that alleviate after leaving the building and the illnesses that worsen inside the building. The students were also asked to list the areas that they assume to be unhealthy along with their reasons. Hence, the research data were obtained by the application of the questionnaire form previously prepared by the researcher.

The data obtained from the qualitative side of the research were analyzed with the descriptive analysis technique. The obtained data were summarized in the table with frequency and percentages and direct quotations were included. The selected students were coded as follows from each school: First female student (F1) and male student (M1).

Statistical Method

Research data were uploaded in a computer environment and evaluated with IBM SPSS 25 (IBM Statistical Package for Social Sciences) software. The descriptive statistics for categorical variables (gender, school ages, symptoms, etc.) were numerically presented and as a percentage. The comparisons of the symptoms with respect to the categorical variables were analyzed using the “Pearson Chi-Square,” “Yates’s correction for continuity,” and “Fisher exact” tests. The results were compared based on confidence levels of 95% and 99%, and the significance levels were assumed as $p < 0.001$ and $p < 0.05$. Ratio tests were performed for significant results when comparing the symptoms by school ages. In addition, the symptoms stated were compared with alleviating and worsening illnesses using the “Mc Nemar” test. The descriptive statistics of the age variable were given as the mean (\pm) standard deviation. Because it was found that the age variable did not comply with the normality assumption when comparing the individuals who have or do not have symptoms using “Kolmogorov–Smirnov/Shapiro–Wilk tests,” analysis was performed in comparisons with “Mann–Whitney U” test. The significance level was considered as $p < 0.005$ and $p < 0.001$.

Results

Of the 423 participated students in the research, 266 (62.9%) were female and 157 (37%) were male. The ages of the students varied between 14–19-years range, and the average age of the students was 16.13 ± 1.05 years. The ages of the female students varied between 14–18-years range, and the average age of female students was 16.20 ± 0.94 years, while the ages of the male students varied between 14–19-years range, and the average age of male students was 16.03 ± 1.22 years.

Students from four different schools were included in the research. 128 (30.3%) of the students studied in the forty-year-old school building, 105 (24.8%) were in the one-year-old school building, 92 (21.5%) were in the five-year-old school building, and 98 (23.2%) were in the ten-years-old school building.

329 (77.8%) of the students stated that they have symptoms, 93 (22%) stated that they do not experience any symptoms, and 1 student (2%) did not provide any answer.

The distribution of 422 students who stated whether they experienced any symptoms is given in Table 1. The symptoms frequently experienced by the students were found to be headache (188 students), physical and mental fatigue (175 students), and concentration disorder (142 students), while the least common symptoms were included in the other group and they were (insomnia (n = 3), psychological (n = 5), stress (n = 1), acne (n = 1), fainting (n = 2), diabetes (n = 2), abdominal pain (n = 1), chest pain (n = 1), heart ache (n = 1), stomach ache (n = 1), distraction (n = 1)), and nasal bleeding (experienced by 10 students).

Table 1. Distribution of the students by experienced symptoms

Experienced symptoms	Yes*	No*
Nausea	56 (13,3)	366 (86,7)
Concentration disorder	142 (33,6)	288 (66,4)
Odor sensitivity	72 (17,1)	350 (82,9)
Headache	188 (44,5)	234 (55,5)
Eye discomfort	92 (21,8)	330 (78,2)
Runny nose	62 (14,7)	360 (85,3)
Throat ache	50 (11,8)	372 (88,2)
Cough	90 (21,3)	332 (78,7)
Dry and itchy skin	40 (9,5)	382 (90,5)
Dizziness	67 (15,9)	355 (84,1)
Nosebleeds	10 (2,4)	412 (97,6)
Physical and mental fatigue	175 (41,5)	214 (58,5)
Loss of memory	19 (4,5)	403 (95,5)
Erythema	12 (2,8)	410 (97,2)
Eye watering	72 (17,1)	350 (82,9)
Nasal congestion	54 (12,8)	368 (87,2)
Shortness of breath	49 (11,6)	373 (88,4)
Eye itching	44 (10,4)	378 (89,6)
Cold	71 (16,8)	351 (83,2)
Shivering	53 (12,6)	369 (87,4)
Palpitation	53 (12,6)	369 (87,4)
Fever	30 (7,1)	392 (92,3)
Other**		

The results of the comparison of the symptoms experienced by the students by gender are given in Table 2.

Firstly, it was tested whether each type of symptoms was related to gender, and it was found that females experience more headaches ($p < 0.001$), eye problems ($p < 0.05$), and physical and mental fatigue conditions ($p < 0.001$) than males. Also, a significant relationship ($p < 0.05$) was found between gender and nasal congestion, although the number of females and males having nasal congestion was equal, and it was observed that the reason of this relationship is that the number of the females who do not have any symptoms is very high (238 students).

Table 2. Comparison of symptoms by gender variable

Experienced Symptoms	Experienced symptoms by gender variable
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	Female*	Male*	p value
Nausea	38 (67,9)	18 (32,1)	,400
Concentration disorder	90 (63,4)	52 (36,6)	,860
Odor sensitivity	50 (69,4)	22 (30,6)	,200
Headache	137 (72,9)	51 (27,1)	<,001**
Eye discomfort	71 (77,2)	21 (22,8)	,001***
Runny nose	34 (54,8)	28 (45,2)	,160
Throat ache	33 (66,0)	17 (34,0)	,618
Cough	61 (67,8)	29 (32,2)	,270
Dry and itchy skin	26 (65,0)	14 (35,0)	,896
Dizziness	46 (68,7)	21 (31,3)	,345
Nosebleeds	7 (70,0)	3 (30,0)	,453
Physical and mental fatigue	127 (72,6)	48 (27,4)	<,001**
Loss of memory	14 (73,7)	5 (26,3)	,446
Erythema	9 (75,0)	3 (25,0)	,286
Eye watering	49 (68,1)	23 (31,9)	,311
Nasal congestion	27 (50)	27 (50)	,037***
Shortness of breath	36 (73,5)	13 (26,5)	,137
Eye itching	33 (75,0)	11 (25,0)	,109
Cold	44 (62,0)	27 (38,0)	,875
Shivering	39 (73,6)	14 (26,4)	,113
Palpitation	38 (71,7)	15 (28,3)	,200
Fever	21 (70,0)	9 (30,0)	,515

* The data are represented numerically (column percentage) and the comparisons are calculated based on the column. **p < 0.001 ***p < 0.05

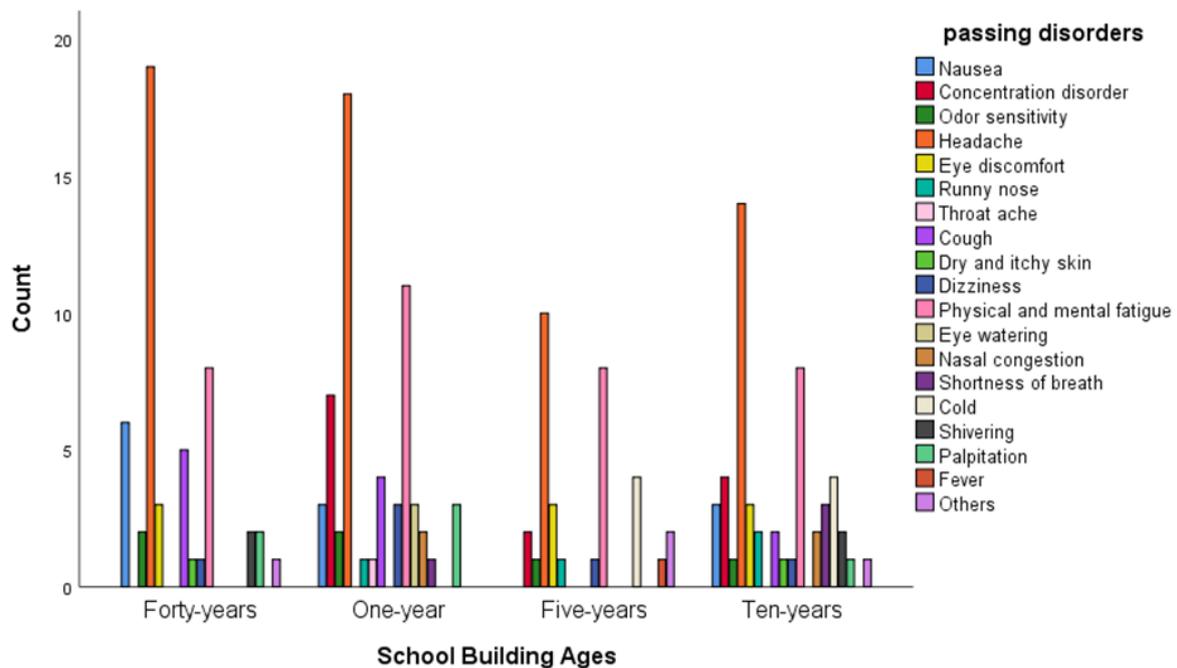
When it was tested whether there is a difference between the median ages of the individuals who have/do not have symptoms by age, a significant difference was observed only between the median ages of the students who have/do not have concentration disorder condition ($p = 0.018$), and it was found that this difference is because the mean rank of the ages of the students who have concentration disorder condition is higher than the mean rank of the ages of the students who do not have concentration disorder condition. A significant difference was not observed by age for other symptoms ($p < 0.05$).

The answers provided by the students to the question “Do your symptoms alleviate after school or on holidays?” demonstrated that the symptoms of 89.8% (379 students) of the students and 55.4% (210 students) of the students experienced alleviation. 194 of 210 students, whose symptoms were alleviated, stated the symptoms which were alleviated, and the distribution of the relieving symptoms is given in Table 3. The mostly alleviating symptoms of the students were headaches (61 students) and physical and mental fatigue (35 students).

Table 3. Distribution of symptoms of the students that relieve after school or on holiday

Alleviating symptoms	Frequency (n)	Percent (n)
Nausea	12	6,2
Concentration disorder	13	6,7
Odor sensitivity	6	3,1
Headache	61	31,4
Eye discomfort	9	4,6
Runny nose	4	2,1
Throat ache	1	,5
Cough	11	5,7
Dry and itchy skin	2	1,0
Dizziness	6	3,1
Physical and mental fatigue	35	18,0
Eye watering	3	1,5
Nasal congestion	4	2,1
Shortness of breath	4	2,1
Cold	8	4,1
Shivering	4	2,1
Palpitation	6	3,1
Fever	1	,5
Other	4	2,1
Total	194	100

In Figure 1, the alleviating symptoms of the students are shown by the age of the school building. The results indicate that headaches and physical and mental fatigue have high rates in all the school buildings. Headache was observed to occur at the highest rate in the forty-year-old school building, while mental and physical fatigue had a higher rate in the one-year-old school building. Given the alleviating symptoms, although it is expected that SBS symptoms will be experienced at a lower ratio in the one-year-old school building, it can be seen that SBS symptoms were observed at a higher rate than the five- and ten-year-old school buildings.

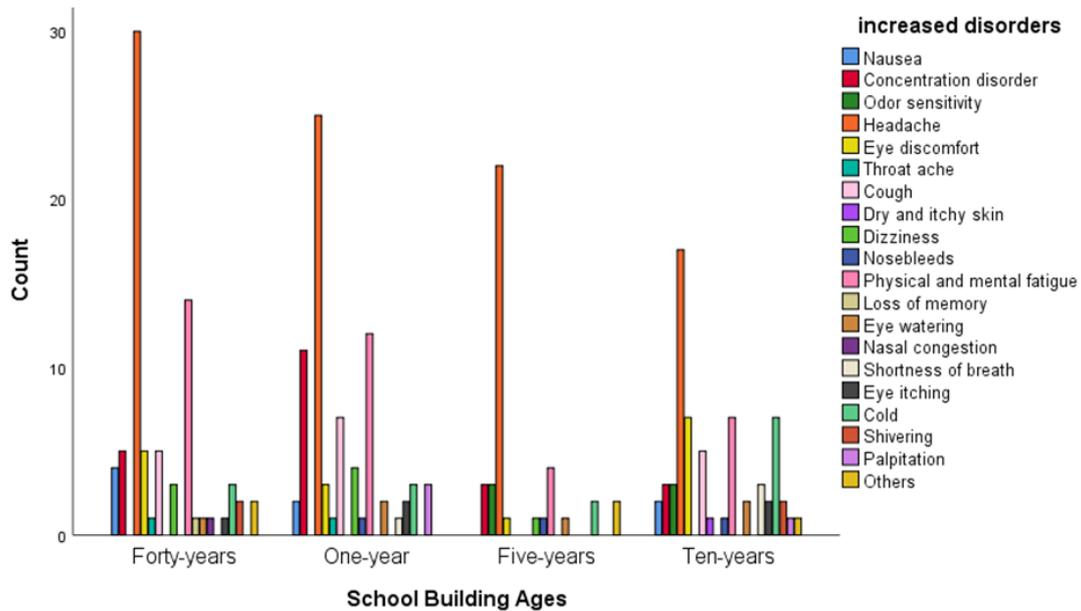


The answers provided by the students to the question “Which of the symptoms worsens at the school?” was examined; it was seen that 61.2% (259) of the students answered this question, and the distribution of the worsening symptoms is given in Table 4. It was observed that headache (94 students) and physical and mental fatigue (37 students) worsened.

Table 4. Distribution of the symptoms of the students that worsen at school

Worsening symptoms	Frequency (n)	Percent (n)
Nausea	8	3,1
Concentration disorder	22	8,5
Odor sensitivity	6	2,3
Headache	94	36,3
Eye discomfort	16	6,2
Throat ache	2	,8
Cough	17	6,6
Dry and itchy skin	1	,4
Dizziness	8	3,1
Physical and mental fatigue	37	14,3
Loss of memory	1	,4
Eye watering	6	2,3
Nasal congestion	1	,4
Shortness of breath	4	1,5
Eye itching	5	1,9
Cold	15	5,8
Shivering	4	1,5
Palpitation	4	1,5
Other	5	1,9
Total	259	100

The comparison of the worsening symptoms of the students by age of school buildings is shown in Figure 2. Considering the worsening symptoms by age of school buildings, it can be seen that headaches and physical fatigue are experienced at the highest rate in the forty-year-old school building but it is believed that this result was obtained due to the high number of participants. Accordingly, it is understood that the mostly worsening symptoms of the students in four-year-old school buildings are associated with headaches and physical fatigue. However, it was highlighted that none of the symptoms such as throat ache, cough, dry and itchy skin, loss of memory, nasal congestion, shortness of breath, eye itching, shivering, and palpitation was observed in the five-year-old school building.



A significant relation was found ($p < 0.001$) when it was tested whether the symptoms of the students and the symptoms that alleviate are related. However, a significant relation was not found ($p = 0.848$) when the relation between the symptoms of the students and the symptoms that worsen in the school were examined.

When the symptoms of the students were examined by schools, it was found out that 27.4% of the students experiencing symptoms were from the forty-year-old school building, 28.6% (94 students) were from the one-year-old school building, 19.1% (63 students) were from the five-year-old school building, and 24.9% (82 students) were from the ten-year-old school building. The students experiencing most symptoms were from the one- and forty-year-old school buildings. It was concluded that the symptoms state of the students (sick or not sick) varied based on school ages ($p < 0.001$), and the distribution of the students experiencing symptoms by school ages is given in Table 5. The statistical difference with a confidence level of 95% was found between the physical and mental fatigue, skin redness, and shivering conditions and the school ages ($p < 0.05$). The students experiencing physical and mental fatigue are from the ten- and forty-year-old school buildings, and each school has different percentages. The students who have redness on the skin are mostly from the forty- and ten-year-old school buildings but considering the percentages, it was found that the percentage of the skin redness in the forty-year-old school building differs from other buildings. The percentages of shivering are also higher in the ten- and forty-year-old school buildings, and the ratios are close to each other and differ from the other two schools.

Table 5. Comparison of the symptoms by school ages

SBS Symptoms	School Building Ages				p değeri
	Forty-years*	One-year *	Five-years*	Ten-years*	
Nausea	21 (37,5)	13 (23,2)	10 (17,9)	12 (21,4)	0,615
Concentration disorder	39 (27,5)	46 (32,4)	28 (19,7)	29 (20,4)	0,090
Odor sensitivity	25 (34,7)	13 (18,1)	17 (23,6)	17 (23,6)	0,497
Headache	64 (34,0)	46 (24,5)	39 (20,7)	39 (20,7)	0,415
Eye discomfort	35 (38,0)	20 (21,7)	15 (16,3)	22 (23,9)	0,204
Runny nose	19 (30,6)	14 (22,6)	12 (19,4)	17 (27,4)	0,822
Throat ache	15 (30,0)	12 (24,0)	9 (18,0)	14 (28,0)	0,813
Cough	33 (36,7)	21 (23,3)	15 (16,7)	21 (23,3)	0,371
Dry and itchy skin	11 (27,5)	8 (20,0)	10 (25,0)	11 (27,5)	0,782
Dizziness	22 (32,8)	15 (22,4)	17 (25,4)	13 (19,4)	0,715
Nosebleeds	4 (40,0)	0 (0)	4 (40,0)	2 (20,0)	0,214
Physical and mental fatigue	46 (26,3)	51 (29,1)	29 (16,6)	49 (28,0)	0,016**
Loss of memory	6 (31,6)	5 (26,3)	2 (10,5)	6 (31,6)	0,617
Erythema	7 (58,3)	1 (8,3)	0 (0)	4 (33,3)	0,049**
Eye watering	25 (35,7)	19 (26,4)	13 (18,1)	15 (20,8)	0,689
Nasal congestion	12 (22,2)	13 (24,1)	15 (27,8)	14 (25,9)	0,475
Shortness of breath	12 (24,5)	10 (20,4)	12 (24,5)	15 (30,6)	0,473
Eye itching	21 (47,7)	9 (20,5)	6 (13,6)	8 (18,2)	0,058
Cold	23 (32,4)	13 (18,3)	18 (25,4)	17 (23,9)	0,543
Shivering	18 (34,0)	5 (9,4)	11 (20,8)	19 (35,8)	0,016**
Palpitation	16 (30,2)	12 (22,6)	9 (17,0)	16 (30,2)	0,627
Fever	13 (43,3)	5 (16,7)	6 (20,0)	6 (20,0)	0,400

* The data are represented numerically (column percentage) and the comparisons are calculated based on the column. **p < 0.05

The distributions of the symptoms by school building ages are listed in Table 6. When it was tested whether the symptoms of the students that worsen at the school differ by school building age, no significant difference was found (p = 0.124). When it was tested whether the symptoms of the students that relieve after the school show difference by school building ages, no significant difference was found (p = 0.075).

However, from the answers provided by the students to the question “Do you have any symptoms you experience in the school?”, it is seen that the highest percentage of the students who have symptoms is in the one-year-old school building (Figure 3). Although the oldest school building was expected to have the highest percentage of SBS, it can be seen that the new school building has a higher (22.27%) sickness percentage.

Considering the distribution of the SBS symptoms by school age, skin redness has never been experienced in any school building.

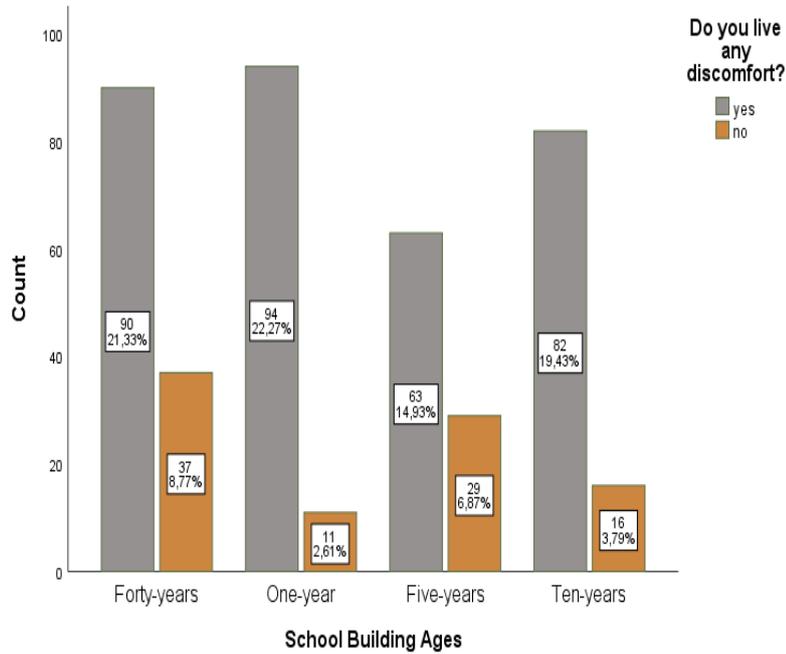


Table 6. Distribution of symptoms by school building ages

Symptoms	School Ages			
	Forty-years*	One-year *	Five-years*	Ten-years*
Nausea	4 (50)- 6(50)	2 (25)-3 (25)	0 (0)-0 (0)	2 (25)-3 (25)
Concentration disorder	5 (22,7)-0 (0)	11 (50)-7 (53,8)	3 (13,6)-2 (15,4)	3 (13,6)-4 (30,8)
Odor sensitivity	0 (0)- 2 (33,3)	0 (0)-2 (33,3)	3 (50)-1 (16,7)	3 (50)-1 (16,7)
Headache	30 (31,9)-19 (31,1)	25 (26,6)-18 (29,5)	22 (23,4)-10 (16,4)	17 (18,1)-14 (23)
Eye discomfort	5 (31,3)-3 (33,3)	3 (18,8)- 0(0)	1 (6,3)-3 (33,3)	7 (43,8)-3 (33,3)
Runny nose	0 (0)-0 (0)	0 (0)-1 (25)	0 (0)-1 (25)	0 (0)-2 (50)
Throat ache	1 (50)-0 (0)	1 (50)-1(100)	0 (0)-0(0)	0 (0)-0(0)
Cough	5 (29,4)-5 (45,5)	7 (41,2)-4 (36,4)	0 (0)-0 (0)	5 (29,4)-2 (18,2)
Dry and itchy skin	0 (0)-1 (50)	0(0)- 0(0)	0(0)- 0(0)	1 (100)-1 (50)
Dizziness	3 (37,5)-1 (16,7)	4 (50)-3 (50)	1 (12,5)-1 (16,7)	0 (0)-1 (16,7)
Nosebleeds	0 (0)-0 (0)	1 (33,3)-0(0)	1 (33,3)-0(0)	1 (33,3)-0(0)
Physical and mental fatigue	14 (37,8)-8 (22,9)	12 (32,4)-11 (31,4)	4 (10,8)-8 (22,9)	7 (18,9)-8 (22,9)
Loss of memory	1 (100)- 0 (0)	0 (0)- 0 (0)	0 (0)- 0 (0)	0 (0)- 0 (0)
Erythema	0 (0)- 0 (0)	0 (0)- 0 (0)	0 (0)- 0 (0)	0 (0)- 0 (0)
Eye watering	1 (16,7)- 0 (0)	2 (33,3)- 3 (100)	1 (16,7)- 0 (0)	2 (33,3)- 0 (0)
Nasal congestion	1 (100)- 0 (0)	0 (0)-2 (50)	0 (0)- 0 (0)	0 (0)-2 (50)
Shortness of breath	0 (0)- 0 (0)	1 (25)-1 (25)	0 (0)- 0 (0)	3 (75)- 3(75)
Eye itching	1 (20)- 0 (0)	2 (40)- 0 (0)	0 (0)- 0 (0)	2 (40)- 0 (0)
Cold	3 (20)- 0 (0)	3 (20)- 0 (0)	2 (13,3)-4 (50)	7 (46,7)-4 (50)
Shivering	2 (50)-2 (50)	0 (0)- 0 (0)	0 (0)- 0 (0)	2 (50)-2 (50)
Palpitation	0 (0)-2 (33,3)	3 (75)-3 (50)	0 (0)- 0 (0)	1 (25)-1 (16,7)
Fever	0 (0)- 0 (0)	0 (0)- 0 (0)	0 (0)-1 (100)	0 (0)- 0 (0)
Other**	2 (40)-1 (25)	0 (0)-0 (0)	2 (40)-2 (50)	1 (20)-1 (25)

* The data are represented numerically (column percentage) as worsening at school-relieving after school.

When the students were asked the question “Is there any unhealthy environment at the school?”, of the 405 students who answered the question, 175 (43.2%) stated that there was an unhealthy environment, while 230 students (56.8%) stated otherwise. The distribution of the students

regarding the uncomfortable places in the schools is given in Table 7. Accordingly, the students most feel uncomfortable in the corridors (188 students) and washrooms (130 students). It was understood that furniture, school garden, sports hall, basement, and cafeteria are usually the places where the students do not feel uncomfortable.

Table 7. Distribution of the places in the school building that are found uncomfortable by the students

Areas where students feel discomfort	Yes*	No*
Washrooms/toilets	130 (30,7)	293 (69,3)
Class	25 (5,9)	398 (94,1)
Dining hall	17 (4,0)	406 (96,0)
Corridors	188 (44,5)	234 (55,5)
Sports Hall	11 (2,6)	412 (97,4)
Schoolyard	5 (1,2)	418 (98,8)
Furniture	3 (,7)	420 (99,3)
Cafeteria	4 (,9)	419 (99,1)
Basement	6 (1,4)	417 (98,6)

* The data are represented numerically (percentage).

The comparison of the places found uncomfortable by the students by school types is given in Table 8. Accordingly, the number of students who found washrooms uncomfortable was the highest in the ten-year-old school building and lowest in the five-year-old school building; almost all of the students who found the cafeteria uncomfortable were from the one-year-old school building; almost all of the students who found the sports hall uncomfortable were from the forty-year-old school building, and it was found that there was a difference in ratios of the uncomfortable places by schools ($p < 0.05$).

Table 8. Comparison of the places found uncomfortable by the students by school building age

Uncomfortable places found by students	Forty-years*	One-year*	Five-years*	Ten-years*	p değeri
Washrooms/toilets	39 (30,0)	29 (22,3)	13 (10,0)	49 (37,7)	<0,001**
Class	6 (24,0)	10 (40,0)	3 (12,0)	6 (24,0)	,264
Dining hall	2 (11,8)	14 (82,4)	1 (5,9)	0 (0)	<0,001**
Corridors	4 (50,0)	1 (12,5)	1 (12,5)	2 (25,0)	,597
Sports Hall	9 (81,8)	2 (18,2)	0 (0)	0 (0)	,002***
Schoolyard	4 (80,0)	0 (0)	1 (20,0)	0 (0)	,087
Furniture	1 (33,3)	1 (33,3)	1 (33,3)	0 (0)	,805
Cafeteria	2 (50,0)	0 (0)	1 (25,0)	1 (25,0)	,671
Basement	2 (33,3)	0 (0)	3 (50,0)	1 (16,7)	,275

* The data are represented numerically (column percentage) and the comparisons are calculated based on the column. ** $p < 0.001$ *** $p < 0.05$

The students were asked to state the uncomfortable places in the school building that they found was also unhealthy (shown in Table 7) and their reasons. Accordingly, considerable answers from the students are provided below by school types:

The views of the students from the forty-year-old school building: “Students do not use the toilets hygienically” (F5). “The toilets need to be renewed, cleaned, and enlarged. Make our school a very clean place. The students should not litter the classrooms. If the students continue to litter the school grounds, our school will remain dirty all the time no matter how much it is cleaned. This may

cause illnesses around us. Food should be prepared more meticulously” (F28). “I have no idea whether the sports hall is cleaned or not but I see dust everywhere. I am a clean person and so I think that it will be better for health if cleanliness is maintained” (F42). “The toilets are unhealthy because they are dirty and narrow. We also want the students to keep them clean” (F46). “The sports hall is very cold and dusty” (F51). “Toilets smell very bad and the classrooms are stuffy” (F55). “People smoke in here” (F58). “There is only one smoking area in the cafeteria and it is for teachers. It is disturbing” (F62). “There are stains on the walls of the school building because it is not clean” (F63). “The corridors and the sports hall are not well cleaned; additionally, the students in the physical education class cause more pollution and this worsens our health” (F75). “The cafeteria itself and the supplies (forks, knives, plates, etc.) are not clean; contamination in the food, which threatens our health and increase of these contaminants, is extremely unhealthy for us” (F83). “Washroom is unhealthy. The management prioritizes the disciplinary issues and fails to impress when it comes to the assessment of unhealthy conditions” (F90). “Toilets are cleaned well but girls do not leave them clean so a hygienic environment cannot be maintained” (F91). “Toilets are cleaned properly but the students do not leave them clean. For this reason, the toilets smell very bad so we cannot enter and it is very disturbing” (F96). “The toilets are very dirty. I feel uncomfortable. I cannot use the washrooms. It smells very bad and this makes me sick” (F97). “The school toilets are not hygienic and none of the doors are intact” (F99, F100).

Accordingly, it is understood that most of the 39 students found the toilets unhealthy due to lack of hygiene and cleanliness. Considering the answers of the students, it can be seen that the toilets are cleaned but the students fail to use them hygienically and properly. Hence, it can be concluded that the education of the students on maintaining the environment clean is insufficient, and environmental awareness has not been sufficiently created. However, a group of students mentioned the disturbance due to the dust in the sports hall. In such places, the children breathe more frequently as a result of intense exercise and hence, inhale more dust particles, and the possibility of development of illnesses, such as asthma, cough and nasal discharge, increases. Similarly, care should be taken to clean the classrooms and school corridors, and necessary measures are essential to address the dust and provide appropriate ventilation for such places.

However, a lack of cleanliness of the cafeteria and supplies causes some illnesses. The priority of the schools should be to consider the health of the children entrusted to them and take the necessary precautions pertaining to this. Therefore, they are responsible for keeping all the places in the school clean and hygienic. It can be concluded from the fact that the illnesses appeared in some students at a young age, while other students are susceptible to them. Because students spend most of their time in school environments, it is vital to keep these environments hygienic and well-ventilated and to use healthy supplies. The establishment of healthy schools is a necessity for a healthy generation.

The views of the students from the one-year-old school building: *“I think that the unhealthy places are the classrooms because the diseases spread more quickly due to the crowd” (M17). “The poor lighting in the school cafeteria strains the eyes” (M18). “The toilets smell very bad and are very dirty” (F6). “The classrooms are unhealthy because they are stuffy. Oxygen remains insufficient because the classrooms are very crowded. The environment would be healthier if the number of the students decreased” (F17). “The toilets are very dirty and places like counters are not well cleaned. I feel uncomfortable while using them. I feel bad and the classrooms are also very dirty” (F19). “The classrooms are much polluted, poorly ventilated. I feel uncomfortable because of the smell” (F26). “Cafeteria is not clean and hygienic and the food is not tasty” (F31). “The cafeteria is unhealthy because it is not hygienic. The plates and spoons are mostly dirty” (F43). “We can catch infections because the smoking areas and toilets are very dirty” (F45). “The toilets are unhealthy because there is neither paper towel nor liquid soap and the door handles and tables are also dirty” (M77). “The toilets are not hygienic and we have difficulties when performing ablution” (M86). “There are cracks on the walls and water leaks in the winter although it is a new building and I think this is unhealthy. Particularly the cafeteria section smells very bad. I think that a place for dining should not be as bad as this!” (Female97).*

It can be concluded that the students complain about dusty environments in the classrooms, lack of cleanliness, and hygiene in the toilets and cafeteria. Other remarkable responses were regarding the smoking areas. It can be understood that there is either a smoking area in the school or the students use toilets for smoking. However, the presence of a smoking area in the school causes intoxication among the students. Hence, it can be concluded that the presence of such environments at schools leads to SBS. Most of the children expressed that there were no unhealthy environments at the school and they were satisfied with their schools. Some of the answers of the students are as follows:

“There is no unhealthy environment” (F7). “I would be very glad if the points I have stated are considered” (F67). “There is not (an unhealthy environment)” (M36).

The views of students from the five-years-old school building: *“Almost everywhere it is unhealthy” (M16). “Gloves are not used when preparing toasts. The toilet and cafeteria are unhealthy because of poor ventilation” (Female18). “The classrooms are unhealthy because our mates are fighting all the time and damaging all the desks and chairs, and there is so much dust in the classroom” (F21). “The basement smells damp” (F33). “The toilets are dirty and the plates are not cleaned well in the cafeteria” (F52).*

Considering the statements of the students, it can be said that they found the environments unhealthy mostly due to the dust. The students also stated that the damp and mold smell are disturbing. It should be considered that the damp is a health threatening factor for students and necessary actions should be taken to prevent the damp.

The views of the students from the ten-years-old school building: *“The classrooms and toilets are stuffy and cause illnesses”* (F1). *“The toilets are unhealthy places in the school because the doors are broken and don’t close. There is no liquid soap. Sometimes there is a little amount of soap. The windows in the toilets cannot be opened and the indoor is very stuffy”* (M3). *“The toilets and the backyard of the dormitory are unhealthy because the toilets are not cleaned, and the backyard of the dormitory is very dirty and full of garbage”* (M5). *“Students smoke in men’s room and there is a very bad smell”* (M9). *“The smell of the toilets is very strong and can be smelled near the corridors”* (M18). *“The toilets and classes are very unhealthy. The toilets are not cleaned and students smoke in the toilets and we have difficulty in breathing”* (M24). *“The toilets are extremely dirty and not hygienic. These places could be cleaner and more hygienic or soap could be supplied near the wash basins. We cannot use soap to wash our hands because soaps are not provided”* (M33). *“The toilets are very dirty. No matter how much they clean, there are still things that we do not like to see”* (F39). *“The toilets smell like cigarette smoke so much and this makes us passive smokers”* (F62). *“The toilets are not very clean and the smell does not go away even a little when we open the windows. My friends and I feel uncomfortable about this”* (F71). *“The toilets are unhealthy because there is a heavy smell when passing by the toilets in corridors and I really do not like this situation and believe that it is not good for my health”* (F75). *“The corridors are unhealthy because they are very crowded; the toilets are very dirty and smell like cigarette smoke, it smells so bad that you can’t enter”* (F79). *“The classrooms are not clean; the classrooms are cold and the painting of the school should be renewed because it looks very old”* (F86).

Considering the statements of the students, the students who complained about the washroom areas (37.7%) at the highest ratio by school building age were from the ten-year-old school building, and according to the views of these children poor ventilation and insufficient cleaning or unhygienic usage of these areas, lack of supplies, such as soap, and students smoking in these areas create a very unhealthy environment. It is highlighted that particularly male students expressed more opinions for these areas than female students. Accordingly, it can be said that the discomfort felt in men’s rooms inside the school buildings are prominent. This situation can also be associated with the directors and staff in charge of the cleanliness of the school.

Discussion

First, it was tested whether each type of symptoms is related to gender and it was found that female students experience more headaches ($p < 0.001$), eye discomfort ($p < 0.05$), and physical and mental fatigue conditions ($p < 0.001$) as compared to the male students. Most of the researches investigating the relationship between SBS and gender showed that females experience SBS more than males (Stenberg and Wall, 1995; Brasche, Bullinger, Morfeld, Gebhardt, and Bischof, 2001). However, age of participants was revealed to be an important factor in males (Brasche et al., 2001). However, in many studies conducted on age, a constant relationship between age and SBS was not

found (Norback, 2009). In another study, it was pointed out that age, gender, background of allergic disorders, and sense of smell may be associated with SBS (Wang, Li, Yang, Yu, Wang, et al. 2013). In this research, it was tested whether there is a difference between the median ages of the students who have/do not have illness by age, a significant difference was found between the median ages of the students who have and do not have concentration disorder ($p = 0.018$), and no significant difference was found for other illnesses. Hence, age can be considered as a determinant in some of the SBS symptoms.

When the SBS symptoms are assessed by school building age, it can be said that the findings support the views of Bluestein (2001). Indeed, SBS symptoms were observed even in the one-year-old school building, although more SBS symptoms were observed in the forty-year-old school building in this research. Hence, the age of a school building is not enough alone to claim that this building has SBS. It is understood that heating, lighting, ventilation, acoustic, and hygiene conditions in schools are more determinant in the occurrence of SBS symptoms. However, it can be said that poor comfort conditions inside school buildings (cold, stuffy, and dirty classrooms) threaten the health of students. According to similar researches, the pollution or garbage inside school buildings can lead to symptoms like allergy or asthma or absenteeism preventing learning or using medications that weaken the performance of the students. For example, it was revealed by researches that asthma is one of the primary chronic diseases causing absenteeism in primary schools and high schools at a ratio of 20% (Mendell and Heath, 2005).

According to the literature, it is seen that personal characteristics affect the likelihood of getting SBS. For example, tendency to somatization (Berglund and Gidlöf Gunnarsson, 2000) or neuroticism have been shown to be associated with SBS (Gomzi, Bobic, Radosevic-Vidacek, 2007). On the other side, anxiety and depression have also been associated to SBS positively. Moreover, stress affects people negatively when they expose to environmental stressor (VOC) according to experimental study results (Fiedler, Kelly-McNeil, Ohman-Strickland, Zhang, Ottenweller, Kipen, 2008). In fact, in this research, the symptoms included in the “other symptoms” group were reported by 10 students in total. This situation can arise because of several factors, such as the central examination system practice in Turkey, high school and exam anxieties, or family pressures. Hence, stress and psychological disorders reported other than certain SBS symptoms are considered to be associated with the pressure imposed by the educational system or practices rather than the building.

The findings of this research are parallel with the findings obtained from a research conducted in Hong Kong. In the research, the air conditioning and ceiling fans were examined for indoor air quality and according to the results of this study, CO₂ concentrations often exceeded 1000 µl/l in air-conditioning and ceiling fan classrooms, indicating inadequate ventilation. It was revealed that the most important indoor air quality issues in the classrooms are associated with carbon dioxide (CO₂) and respirable particulate matter (Lee and Chang, 2000).

An important characteristic of sustainable building designs is the energy efficiency. Hence, natural and hybrid ventilation systems have become an important part of the school designs in England. In several researches (Awbi and Pay, 1995; Coley, 2004), it was revealed that carbon dioxide levels reach extremely high levels during the occupancy of students (approximately 4000 ppm), and exposure to air containing this level of carbon dioxide negatively affects the learning performance of students (Clements-Croome, Awbi, Bako-Biro, Kochhar and Williams, 2008). Another study has indicated that the complaints about the poor air quality at schools are related to deficiencies in the indoor environment (Smedje, Norbäck and Edling, 1997). Moreover, indoor chemical air pollutants of mainly outdoor origin could be risk factors for pupils' respiratory symptoms at school (Zhao, Zhang, Wang, Ferm, Liang and Norback, 2008). Hence, the complaints of the students about the dust and stuffiness in the classrooms and sports halls support the results obtained from this research. However, it was seen in the five-year-old school building that the students feel uncomfortable due to the smell of damp and moisture in the basement floor. In a study about the moisture and damp observed in schools, it was reported that care must be taken to maintain the moisture level below 1000 spore/m³ because the level of moisture in a school building can cause skin disorders such as fungal skin in students (Santilli and Rockwell, 2003). Smedje and Norbäck (2000) revealed that the students showed less asthma symptoms in the schools having new ventilation systems. However, in another study, it was reported that the emissions formed the equipment in renovated or newly constructed school buildings, such as furnishings made of PB and MDF, negatively affect the indoor air quality and this may adversely impact the health of students ((Yang, Sohn, Kim, Son and Park, 2009).

In a study by Mizoue, Reijula and Andersson (2001), it is found that Environmental Tobacco Smoke (ETS) exposure is a determinant of SBS symptoms in workplaces with a high prevalence of smoking. Because some students reported their discomfort regarding smoking, it can be concluded that smoking in intensely occupied areas in the school, such as washrooms and cafeteria, may also lead to SBS. Therefore, prohibition of smoking in indoor spaces should be strictly audited and natural ventilation should be provided.

Conclusion

As a result of the literature review, it can be seen that old school buildings cause certain illnesses. However, this research showed that the age of a building is not a determinant for human health; cleanliness, proper ventilation, heating, lighting, and other comfort conditions of an environment are determinants for the SBS. Therefore, the necessity of hygiene, natural ventilation, and air conditioning inside a building are the factors affecting the health and safety of the students and all other occupants of a school building. However, in another study, it was shown that the agents used to clear the insects and dust in a building also pose risk for human health. Hence, appropriate care must be taken when using chemical poisons and cleaning agents. However, it is understood that air pollution and bad odor in the indoor environment of a school building can affect both the physical and

the psychological health of students. Furthermore, adverse environmental conditions in school buildings lead students to avoid eating in unhygienic cafeterias or using the toilets, thus awaiting till the end of the school day and hence, exhibit behaviors that are harmful for them. Hence, the school administrators can be recommended to consider following points:

- To prevent the occurrence of the symptoms associated with SBS, appropriate indoor air conditioning requirements should be met and the emissions of indoor air pollutants should be reduced. Chemical emissions from building materials should be reduced by selecting low emitting materials and products.
- Student absenteeism and failures may be prevented by maximizing the efforts for avoiding health issues, thus ensuring that the students are in a relaxed, comfortable, clean, and safe environment. For this purpose, school managers should ensure that the cleaning of the existing equipment in a school is performed regularly and periodically. It is important to ensure that not only floors but also all surfaces are cleaned to prevent SBS. Moreover, carpeting and other textile materials should be minimized; otherwise they should be properly cleaned.
- It can be recommended to remove the pests when students are not in the school building to reduce the toxic air particles emitted via natural ventilation. For example, this procedure can be performed on weekend right after students leave the school for weekend holiday, thereby utilizing this period for natural ventilation and cleaning.
- It can be recommended to constantly ventilate the areas where students intensely and actively inhabit (e.g., corridors, sports halls, etc.) and to periodically wipe the ceilings and other surfaces in the environment using water only.
- It can be recommended that intensely utilized areas in the school, such as cafeteria, toilets, and kitchen, are audited by school principals.
- It can be recommended to inform the principals and corresponding maintenance and repair personnel in schools regarding SBS. Hence, several seminars can be held.
- It can be recommended that design elements to relieve the discomfort due to stress, anxiety, pressure, and other psychological factors are utilized in the school buildings. For example, various colors, distinct decorations, and various arrangements to be used in the school building can create more comfortable and peaceful environments for students.
- These practices exercised for SBS in schools can also be recommended for home environments of students or hospitals.
- Further qualitative researchers can be recommended because the discomforts reported by individuals in SBS are important determinants.

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Examining the Relationship between Social Intelligence Levels and Communication Skills of Prospective Social Studies Teachers*

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Abstract

The purpose of this study is to examine the relationship between social intelligence levels and communication skills of pre-service social studies teachers. In the content of the study, the relational screening model, which is one of the descriptive survey models, has been used. The sample of the survey consists of the third- and fourth-year students who study Social Studies Teaching at Faculties of Education at Muğla, Uşak, Afyon and Aksaray Universities in the academic year of 2017-2018. The sample of the survey has been determined by means of convenience sampling. In this study, the unpaired t-test, the one-way analysis variance (ANOVA), the Scheffe and Games-Howell test have been used. In order to reveal the relationship between social intelligence levels and communication skills of pre-service social studies teachers, the Pearson product-moment correlation analysis has been used. As a result of the study, it has been found out that pre-service social studies teachers demonstrate “high” communication skills, but “moderate” social intelligence. It has also been determined that there is a moderate, linear, positive and meaningful correlation between the communication skills and social intelligence levels of pre-service social studies teachers. In addition to these, the results reveal that communication skills and social intelligence levels of pre-service teachers differ to a significant extent according to factors such as gender, universities they attend and the number of books they read per month. On the other hand, their age and grade did not cause significant difference in the communication skills and social intelligence levels of pre-service teachers.

Keywords: Social Studies, Social Intelligence, Communication Skills

DOI: 10.29329/epasr.2020.236.13

This study was produced from the master thesis of the second author under the supervision of the first author. Supported by UBAP 06 with number 2018/TP009. This study was presented as an oral presentation in the USBES 7th International Social Studies Education Symposium.

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Introduction

Although the concepts of social studies and social sciences are often used interchangeably, it is known that these concepts are different from each other. Social sciences such as history, geography, sociology, psychology and economics, such as the relationship between individuals in society and the social life can be defined as the name given to the general sciences (Oguzkan, 1993: as cited in Koken, 2002: 236). Social Studies, on the other hand, is a curriculum that aims to educate individuals who can produce solutions in the light of changing country and world conditions in many areas in the decision-making process by blending the information obtained from social sciences and humanities (Öztürk, 2012: 6). According to Moffatt (1957: 20); the aim of this course is to broaden the thoughts of the human communities about the people and the world in which they live and to gain knowledge about social life.

Communication is briefly the transfer of information from one person(s) to another person(s) (Batur, Basar, Sener and Uygun 2019). Communication is a process that involves producing, transferring and making sense of information (Karatekin, Sonmez and Kus, 2012: 1697). It is a bi-directional interaction that occurs mutually. This process means transmitting the message through a channel to the recipient to be transmitted by arranging the message which is called totality of icons. The communication process continues to be reciprocated with the feedback sent by the recipient to the source (Gürüz and Temel Eğinli, 2017: 8). Social Studies curriculum should aim to improve students' ability to express themselves correctly and effectively in written and oral form. In this context, students in social studies courses are aimed to get the skills such as listening, establishing relationships, perceiving the thoughts and feelings of others, being open-minded, expressing themselves in written or verbal form, explaining their opinions as reasoned, discussing and having different perspectives (Deveci, 2008: 196).

Social intelligence can be summarized as being informed about the environment, understanding both their and others' feelings and thoughts, carrying out relationships and being able to adapt to the environment (Dogan and Cetin, 2009: 694). Within our education system, the development of social intelligence is not a priority goal. However, social intelligence is one of the most important factors affecting success in life. IQ measurements alone are insufficient to explain success in life. Having an average intelligence or having superior intelligence does not affect the success in life too much (Selcuk, Kayili and Okut, 2004: 73). Communication skill is the most basic condition for the education to be done in a healthy way. In the recent curriculum of social studies, there are many references to communication and communication skills (Uygun, 2018).

When the relevant literature is examined, no study examining the relationship between social intelligence levels and communication skills of social studies teacher candidates was found. Within the scope of the research, the answers to the following questions were sought in order to examine the

relationship between social studies teacher candidates' social intelligence levels and communication skills according to various variables and to explain the relationship between them.

1. What is the level of communication skills and social intelligence levels of social studies teacher candidates?
2. Is there a significant difference between social studies teacher candidates' communication skills and social intelligence levels in terms of gender?
3. Is there a significant difference between social studies teacher candidates' communication skills and social intelligence levels in terms of age?
4. Is there a significant difference between social studies teacher candidates' communication skills and social intelligence levels in terms of university?
5. Is there a significant difference between social studies teacher candidates' communication skills and social intelligence levels in terms of grade?
6. Is there a significant difference between social studies teacher candidates' communication skills and social intelligence levels in terms of the number of the books read monthly?
7. What is the relationship between social studies teacher candidates' social intelligence levels and communication skills?

Method

This descriptive study was conducted by using quantitative research methods in order to determine the relationship between and social intelligence levels and communication skills of social studies teacher candidates. The design of the study was created by using the relational model, which is a descriptive model. Relational studies are the studies carried out in order to reveal the relationship between multiple variables and to reach clues about cause and effect (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2016: 15).

Study Group

The study group of the research consists of 3rd and 4th grade teacher candidates of Social Sciences Teacher Education department in the education faculties of Muğla Sıtkı Koçman University, Uşak University, Afyon Kocatepe University and Aksaray University in the 2017-2018 academic year. The study group was determined through convenience sampling. The convenience sampling is the identification of the persons or groups to be easily investigated. The researchers generally prefer people or groups with whom they can collect data easily (Sonmez and Alacapinar, 2016: 175).

The study group consisted of 331 students studying at related universities. Information on the demographic characteristics of the participants is shown in Table 1.

Table 1. Distribution of data in terms of the demographic characteristics of participants

Variables	Groups	N	%
Gender	Female	173	52,3
	Male	158	47,5
Age	17-20	24	7,3
	21-23	254	76,7
	24 and over	53	16,0
University	Muğla Sıtkı Koçman University	63	19,0
	Uşak University	106	32,0
	Afyon Kocatepe University	81	24,5
	Aksaray University	81	24,5
Grade	3rd grade	185	52,3
	4th grade	146	47,7
Total		331	100

Data Collection and Analysis

In order to measure the communication skills of social studies teacher candidates, communication skills scale developed by Korkut Owen and Bugay (2014) was used. Communication skills scale is at a level that can be used to measure the communication skills of university students. The internal consistency coefficient (Cronbach Alpha) of the overall scale was measured as .88. Internal consistency coefficients for the sub-dimensions of the scale were; .88 for communication principles and basic skills .72 for self-expression .64 for effective listening and non-verbal communication and .71 for willingness to communicate. In this study, Cronbach Alpha internal consistency coefficient was measured as .91.

Tromso Social Intelligence Scale (TSIS) was used to measure the social intelligence levels of the social studies teacher candidates. The scale was adapted to Turkish by Dogan and Cetin (2009), validity and reliability studies were conducted. The internal consistency coefficient of the scale was .83. In the sub-dimensions, reliability coefficients ranged from .71 to .83. In this study, the Cronbach Alpha internal consistency coefficient of the data obtained from TSIS was measured as .80.

The normality distribution of the data was examined. H0 hypothesis was developed on the supposition that the distribution was not normal. According to the statistical data obtained in the light of Jarque-Bera test results ($p < 0.05$, $p = 0.00$), H1 hypothesis was accepted and the data showed a normal distribution.

Table 2. Normality test

Jarque-Bera test of normality	F	df	Sig.
Social Intelligence level	39,399	331	,000
Communication skills	8,525	331	,000

While analyzing the research, percentage, arithmetic mean, standard deviation, t-test, ANOVA test, Scheffe test and Games-Howell test were used.

Results

Findings related to levels

The average values of prospective teachers' communication skills were examined and the findings are presented in table 3.

Table 3. Descriptive data of social studies teacher candidates' communication skills

Scale/ Sub-dimensions	N	\bar{x}	SD
Communication skills	331	3,87	,63
Principles of communication and basic skills	331	3,88	,68
To express yourself	331	3,91	,76
Effective listening and nonverbal communication	331	3,93	,70
Willingness to communicate	331	3,75	,71

When Table 3 is taken into consideration, the arithmetic mean of the total scores of the social studies teacher candidates obtained from the communication skills scale was measured as $\bar{x} = 3.87$. It was seen that the communication skills $\bar{x} = 3.87$ of the social studies teacher candidates were at “high” level.

The average values of prospective teachers' social intelligence levels were examined and the findings are presented in table 4.

Table 4. Descriptive data on social intelligence level of social studies teacher candidates

Scale/ Sub-dimensions	N	\bar{x}	SD
Social intelligence	331	3,38	,50
Social information process	331	3,58	,63
Social skill	331	3,40	,68
Social awareness	331	3,12	,72

When Table 4 is taken into consideration, the arithmetic mean of the total scores of the social studies teacher candidates received by TSIS was measured as $\bar{x} = 3.38$. It was seen that the social studies teacher candidates were “appropriate” with social intelligence levels $\bar{x} = 3.38$.

Findings related to gender

Independent samples t-test was conducted to determine whether there is a difference between the values related to communication skills on gender and the results are presented in Table 5.

Table 5. Social studies teacher candidates' communication skills according to gender variable

Scale/ Sub-dimensions	Gender	N	\bar{x}	SD	df	T	p
Communication skills	Female	173	3,96	,62	329	2,69	,007
	Male	158	3,77	,62			
Principles of communication and basic skills	Female	173	3,95	,65	329	1,90	,057
	Male	158	3,80	,71			
To express yourself	Female	173	4,01	,72	329	2,73	,007
	Male	158	3,79	,78			
Effective listening and nonverbal communication	Female	173	4,05	,72	329	3,34	,001
	Male	158	3,79	,67			
Willingness to communicate	Female	173	3,82	,73	329	1,93	0,54
	Male	158	3,67	,68			

When Table 5 is taken into consideration, it was seen that the mean score of the total scores of the social studies teacher candidates was $\bar{x} = 3.96$ for female teacher candidates and $\bar{x} = 3.77$ for male teacher candidates. When the mean scores were taken into consideration, it was found that the communication skills were at the “high” level in both groups. It was found that there was a significant difference between male and female teacher candidates according to the scores of the communication skills and this difference was in favor of female teacher candidates $t(329) = 2.69$ [$p = 0.007 < 0.05$]. In addition, there is a significant difference in favor of the female teacher candidates for self-expression $t(329) = 2.73$ [$p = 0.007 < 0.05$] and active listening and non-verbal communication $t(329) = 3.34$ [$p = 0.001 < 0.05$].

Independent samples t-test was conducted to determine whether there is a difference between the values related to social intelligence levels on gender and the results are presented in Table 6.

Table 6. Social studies teacher candidates' social intelligence levels according to gender variable

Scale/ Sub-dimensions	Gender	N	\bar{x}	SD	df	T	p
Social intelligence	Female	173	3,44	,49	328	2,32	,021
	Male	158	3,31	,50			
Social information process	Female	173	3,64	,61	328	1,69	,090
	Male	158	3,52	,64			
Social skill	Female	173	3,47	,66	328	1,90	,057
	Male	158	3,33	,69			
Social awareness	Female	173	3,18	,70	328	1,57	,116
	Male	158	3,06	,75			

When Table 6 is taken into consideration, the average score of the scores of social studies teacher candidates received from TSIS were; $\bar{x} = 3.44$ for female teacher candidates and $\bar{x} = 3.31$ for male teacher candidates. When the arithmetic means were considered, it was found that both groups were at the “appropriate” level of social intelligence levels. According to this comparison, pre-service teachers showed a significant difference in favor of female pre-service teachers according to gender variable $t(3,28) = 2,32$ [$p = 0.021 < 0.05$]. There is no significant difference in the subscales of TSIS.

Findings related to age

Anova t-test was conducted to determine whether there is a difference between the values related to communication skills on age and the results are presented in Table 7.

Table 7. Social studies teacher candidates' communication skills according to age variable

Scale/ Sub-dimensions	Age	N	\bar{x}	SD	df	F	p
Communication skills	17-20	24	3,85	,65	328	2,646	,072
	21-23	254	3,91	,62			
	24 and over	53	3,69	,62			
	Total	331	3,87	,63			
Principles of communication and basic skills	17-20	24	3,79	,74	328	4,056	,018
	21-23	254	3,93	,68			
	24 and over	53	3,65	,63			
	Total	331	3,88	,68			

To express yourself	17-20	24	3,91	,55	2	,634	,531
	21-23	254	3,93	,78			
	24 and over	53	3,80	,77			
	Total	331	3,91	,76			
Effective listening and nonverbal communication	17-20	24	3,88	,68	2	2,319	,100
	21-23	254	3,97	,86			
	24 and over	53	3,74	,80			
	Total	331	3,93	,70			
Willingness to communicate	17-20	24	3,90	,80	2	1,414	,243
	21-23	254	3,76	,71			
	24 and over	53	3,62	,62			
	Total	331	3,75	,71			

The mean values received from the communication skills of the social studies teacher candidates show that it is between 17-20 years old $\bar{x} = 3.85$, 21-23 years old $\bar{x} = 3.91$ and 24 years and older $\bar{x} = 3.69$. The mean scores of the communication skills are $\bar{x} = 3.87$. The highest score $\bar{x} = 3.91$ of the pre-service teachers' communication skills according to age variable is between 21 and 23 age. The lowest score $\bar{x} = 3.69$ obtained by teacher trainees is 24 age. Whether there was a significant difference in the results obtained was measured using variance analysis. When Table 7 was examined, it was found that the communication skills of prospective teachers did not show a significant difference according to age variable $F(2,328) = 2,646$ [$p = 0.72 > 0.05$]. According to Table 7, self-expression $F(2,328) = 0.634$ [$p = 0.53 > 0.05$], effective listening and non-verbal communication $F(2,328) = 2,319$ [$p = 0.10 > 0.05$] and willingness to communicate $F(2,328) = 1,419$ [$p = 0.24 > 0.05$].

There is a significant difference in communication principles and basic skills sub-dimension. Scheffe test was performed to determine which age range caused this difference and the test results are given in Table 8.

Table 8. Scheffe analysis of principles of communication and basic skills of social studies teacher candidates according to age variable

Age		\bar{x}	Difference Between Means	p
17-20	21-23	3,93	-,143	,615
	24 and over	3,65	,141	,700
21-23	17-20	3,79	,143	,615
	24 and over	3,65	,284	,022*
24 and over	17-20	3,79	-,141	,700
	21-23	3,93	-,284	,022*

As a result of Scheffe analysis in Table 8, it was determined that there is a significant difference between the 21-23 age group and 24 and over age group in the communication principles basic skills sub-dimension of social studies teacher candidates. The significant difference is in favor of the 21-23 age group.

Anova t-test was conducted to determine whether there is a difference between the values related to social intelligence levels on age and the results are presented in Table 9.

Table 9. Social studies teacher candidates' social intelligence levels according to age variable

Scale / Sub-dimensions	Age	N	\bar{x}	SD	df	F	p
Social intelligence level	17-20	24	3,33	,44	2 327	,655	,520
	21-23	254	3,39	,50			
	24 and over	53	3,91	,50			
	Total	331	3,38	,50			
Social information process	17-20	24	3,51	,57	2 327	,168	,846
	21-23	254	3,58	,62			
	24 and over	53	3,60	,69			
	Total	331	3,58	,63			
Social skill	17-20	24	3,35	,62	2 327	,114	,892
	21-23	254	3,41	,70			
	24 and over	53	3,38	,60			
	Total	331	3,40	,68			
Social awareness	17-20	24	3,12	,59	2 327	2,361	,096
	21-23	254	3,17	,71			
	24 and over	53	2,93	,80			
	Total	331	3,12	,72			

The average of the scores received by the social studies teacher candidates were found $\bar{x} = 3.33$ for the ages 17-20, $\bar{x} = 3.39$ for the ages 21-23 and $\bar{x} = 3.91$ for the age 24.

The mean of the total scores obtained from TSIS is $\bar{x} = 3.38$. The highest score $\bar{x} = 3.91$ of teacher trainees according to social intelligence levels age variable is between 21-23 ages. The lowest score is $\bar{x} = 3.33$ and the prospective teachers who are at the age of 24 or older. Whether there was a significant difference in the results obtained was measured using variance analysis. When Table 9 was examined, there is no significant difference according to social intelligence levels age variable of teacher trainees $F(2,327) = 0,655$ [$p = 0.52 > 0.05$].

In addition, there is no significant difference in the sub-dimensions according to the age variable. Social information process $F(2,327) = 0.168$ [$p = 0.84 > 0.05$], social skill $F(2,327) = 0.111$ [$p = 0.89 > 0.05$] and social awareness $F(2,327) = 2.361$ [$p = 0.09 > 0.05$].

Findings related to university

Anova t-test was carried out to determine whether there is a difference between the values related to communication skills on university and the results are presented in Table 10.

Table 10. Social studies teacher candidates' communication skills according to university variable

Scale / sub-	University	N	\bar{x}	SD	df	F	p
Communication Skills	Muğla SK University	63	4,11	,59	3 327	9,207	,00
	Uşak University	106	3,63	,67			
	Afyon Kocatepe University	81	3,93	,57			
	Aksaray University	81	3,94	,55			
	Total	331	3,87	,63			
Principles of communication and basic skills	Muğla SK University	63	4,12	,58	3 327	6,937	,00
	Uşak University	106	3,66	,79			
	Afyon Kocatepe University	81	3,92	,59			
	Aksaray University	81	3,94	,60			
	Total	331	3,88	,68			

To express yourself	Muğla SK University	63	4,13	,73	3 327	5,284	,001
	Uşak University	106	3,68	,80			
	Afyon Kocatepe University	81	3,97	,70			
	Aksaray University	81	3,95	,72			
	<i>Total</i>	331	3,91	,76			
Effective listening and nonverbal communication	Muğla SK University	63	4,18	,65	3 327	9,262	,00
	Uşak University	106	3,65	,74			
	Afyon Kocatepe University	81	4,00	,68			
	Aksaray University	81	4,02	,61			
	<i>Total</i>	331	3,93	,70			
Willingness to communicate	Muğla SK University	63	3,98	,72	3 327	7,181	,00
	Uşak University	106	3,51	,71			
	Afyon Kocatepe University	81	3,82	,66			
	Aksaray University	81	3,82	,66			
	<i>Total</i>	331	3,75	,71			

The mean scores of the social studies teacher candidates received from the communication skills are \bar{x} = 4.11 for Muğla Sıtkı Koçman University, \bar{x} = 3.94 for Aksaray University, \bar{x} = 3.93 for Afyon Kocatepe University and \bar{x} = 3.63 for Uşak University. The mean score of communication skills is \bar{x} = 3.87. According to the university variable, the highest score \bar{x} = 4.11 was obtained by the prospective teachers studying at Muğla Sıtkı Koçman University. The lowest score \bar{x} = 3.63 was obtained by prospective teachers studying at Uşak University. Whether there was a significant difference in the results obtained was measured using variance analysis.

Table 10 showed that the communication skills of the prospective teachers showed a significant difference compared to the universities they studied in. $F(3,327) = 9.207$ [$p = 0.00 > 0.05$]. Scheffe analysis was used to determine which university or universities this difference is between and the results of the analysis are shown in Table 11.

Table 11. Scheffe analysis of communication skills of social studies teacher candidates according to university variable

University		\bar{x}	Difference	Between	p
Muğla SK University	Uşak University	3,63	,477		,00*
	Afyon Kocatepe University	3,93	,181		,368
	Aksaray University	3,94	,173		,412
Uşak University	Muğla SK University	4,11	-,477		,00*
	Afyon Kocatepe University	3,93	-,295		,014*
	Aksaray University	3,94	-,303		,010*
Afyon Kocatepe University	SMuğla SK University	4,11	-,181		,368
	Uşak University	3,63	,295		,014*
	Aksaray University	3,94	-,008		1,00
Aksaray University	Muğla Sıtkı Koçman University	4,11	-,173		,412
	Uşak University	3,63	,303		,10*
	Afyon Kocatepe University	3,93	,008		1,00

According to the Scheffe test results in Table 11, a significant difference was found between the social studies teacher candidates studying at Muğla Sıtkı Koçman University, Afyon Kocatepe University and Aksaray University and the participants who studied at Uşak University. Significant difference is against the candidates teachers of Uşak University. As a result of the analysis of variance regarding the scores of the pre-service teachers from the communication skills sub-dimensions, a

significant difference was found in all sub-dimensions compared to the university variable. According to the results of Scheffe test to determine the direction of this difference, the scores of other universities were found to be significantly higher in all dimensions than Uşak University.

It was determined that there was a significant difference between Muğla Sıtkı Koçman University and Uşak University in the sub-dimension of self-expression. The significant difference is in favor of Muğla Sıtkı Koçman University.

Anova t-test was carried out to determine whether there is a difference between the values related to social intelligence levels on university and the results are presented in Table 12.

Table 12. Social studies teacher candidates' social intelligence levels according to university variable

Scale / Sub-dimensions	University	N	\bar{x}	SD	df	F	P
Social intelligence level	Muğla SK University	63	3,47	3,49	3 326	3,659	,013
	Uşak University	106	3,25	3,49			
	Afyon Kocatepe University	81	3,44	3,48			
	Aksaray University	81	3,41	3,51			
	<i>Total</i>	331	3,38	3,50			
Social information process	Muğla SK University	63	3,73	3,62	3 326	4,539	,004
	Uşak University	106	3,41	3,66			
	Afyon Kocatepe University	81	3,59	3,59			
	Aksaray University	81	3,67	3,59			
	<i>Total</i>	331	3,58	3,63			
Social skill	Muğla SK University	63	3,48	3,71	3 326	3,581	,014
	Uşak University	106	3,24	3,60			
	Afyon Kocatepe University	81	3,55	3,72			
	Aksaray University	81	3,41	3,68			
	<i>Total</i>	331	3,40	3,68			
Social awareness	Muğla SK University	63	3,16	3,69	3 326	3,345	,79
	Uşak University	106	3,07	3,72			
	Afyon Kocatepe University	81	3,17	3,69			
	Aksaray University	81	3,12	3,79			
	<i>Total</i>	331	3,12	3,72			

The mean of the social studies teacher candidates' TSIS scores are as follows: Muğla Sıtkı Koçman University $\bar{x} = 3.47$, Afyon Kocatepe University $\bar{x} = 3.44$, Aksaray University $\bar{x} = 3.41$ and Uşak University $\bar{x} = 3.25$.

The mean of the total scores obtained from TSIS is $\bar{x} = 3.38$. Muğla Sıtkı Koçman University has the highest score $\bar{x} = 4.47$ of the teacher candidates according to social intelligence levels university variable. Uşak University has the lowest score $\bar{x} = 3.25$. Whether there was a significant difference in the results obtained was measured using variance analysis.

When Table 11 was examined, it was found that teacher candidates showed a significant difference compared to the universities $F(3,326) = 3,659$ [$p = 0.013 < 0.05$]. Games-Howell test was used to determine the difference between universities. The results of the analysis are shown in Table 13.

Table 13. Games Howel analysis of social intelligence levels of social studies teacher candidates according to university variable

University		\bar{x}	Difference between Means (I-J)	p	Games-Howel
Muğla SK University	Uşak University	3,47	,219		,030*
	Afyon Kocatepe University	3,44	,026		,938
	Aksaray University	3,41	,053		,919
Uşak University	Muğla SK University	4,11	-,219		,030*
	Afyon Kocatepe University	3,44	-,192		,043*
	Aksaray University	3,41	-,165		,124
Afyon Kocatepe University	Muğla SK University	4,11	-,026		,988
	Uşak University	3,47	,192		,043*
	Aksaray University	3,41	,027		,986
Aksaray University	Muğla SK University	3,47	-,059		,919
	Uşak University	3,25	,165		,124
	Afyon Kocatepe University	3,44	-,027		,989

According to the results of Games-Howell test in Table 13, social intelligence levels scores of Muğla Sıtkı Koçman and Afyon Kocatepe University social studies teacher candidates showed a significant difference compared to teacher candidates studying at Uşak University. This difference is against the prospective teachers studying at Uşak University. In addition, the scores of in the social information process sub-dimension of Muğla Sıtkı Koçman University and Afyon Kocatepe Universities were significantly higher than the Uşak University scores. In the Social Skills sub-dimension, a significant difference was found between Afyon Kocatepe University and Uşak University in favor of Afyon Kocatepe University.

Findings related to grade

Independent samples t-test was conducted to determine whether there is a difference between the values related to communication skills on grade and the results are presented in Table 14.

Table 14. Social studies teacher candidates' communication skills according to grade variable

Scale / Sub-dimensions	Grade	N	\bar{x}	SD	df	T	p
Communication Skills	3rd Grade	185	3,84	,63	329		
	4th Grade	146	3,90	,61			
Principles of communication and basic skills	3rd Grade	185	3,84	,66	329	1,126	
	4th Grade	146	3,93	,70			
To express yourself	3rd Grade	185	3,86	,77	329	1,103	
	4th Grade	146	3,96	,75			
Effective listening and nonverbal communication	3rd Grade	185	3,90	,69	329		
	4th Grade	146	3,96	,72			
Willingness to communicate	3rd Grade	185	3,76	,74	329		
	4th Grade	146	3,74	,66			

When Table 14 is taken into consideration, the average of the scores obtained by the social studies teacher candidates from the communication skills scale are $\bar{x} = 3.84$ for 3rd grade teacher candidates and $\bar{x} = 3.90$ for 4th grade teacher candidates. When the mean values were taken into consideration, communication skills were found to be “high” in both groups. It was found that

communication skills of social studies teacher candidates did not show a significant difference according to grade level $t(329) = 0.836, [p = 0.40 > 0.05]$.

Independent samples t-test was conducted to determine whether there is a difference between the values related to social intelligence levels on grade and the results are presented in Table 15.

Table 15. Social studies teacher candidates' social intelligence levels according to grade variable

Scale / Sub-dimensions	Grade	N	\bar{x}	SD	df	T	p
Social intelligence level	3rd Grade	185	3,38	,53	328	,303	,762
	4th Grade	146	3,37	,46			
Social information process	3rd Grade	185	3,57	,63	328	,175	,861
	4th Grade	146	3,59	,63			
Social skill	3rd Grade	185	3,39	,68	328	,269	,788
	4th Grade	146	3,41	,67			
Social awareness	3rd Grade	185	3,16	,73	328	1,022	,308
	4th Grade	146	3,08	,71			

When Table 15 is examined, it is seen that the mean scores of social studies teacher candidates for TSIS are for $\bar{x}= 3.38$ 3rd grade teacher candidates and $\bar{x}= 3.37$ for 4th grade teacher candidates. When the arithmetic means were taken into consideration, social intelligence levels were found to be “appropriate” in both groups. It was determined that the social studies teacher candidates did not show a significant difference according to the grade level they studied in social intelligence levels $t(328)=0,303 [p=0.76 > 0.05]$.

Findings related to the number of the books read monthly

Anova t-test was conducted to determine whether there is a difference between the values related to communication skills to the number of monthly book reading and the results are presented in Table 16.

Table 16. Social teacher candidates' communication skills according to the number of the books read monthly variable

Scale / Sub-dimensions	Book reading	N	\bar{x}	SD	df	F	p
Communication Skills	0- 1	144	3,77	,64	328	4,591	,011
	2 -4	155	3,91	,62			
	5 and over	32	4,12	,53			
	<i>Total</i>	331	3,87	,63			
Principles of communication and basic skills	0- 1	144	3,82	,65	328	2,022	,134
	2 -4	155	3,89	,72			
	5 and over	32	4,08	,57			
	<i>Total</i>	331	3,88	,68			
To express yourself	0- 1	144	3,79	,73	328	5,222	,006
	2 -4	155	3,95	,73			
	5 and over	32	4,25	,64			
	<i>Total</i>	331	3,91	,76			
Effective listening and nonverbal communication	0- 1	144	3,82	,73	328	4,814	,009
	2 -4	155	3,97	,66			
	5 and over	32	4,22	,72			
	<i>Total</i>	331	3,93	,70			
Willingness to communicate	0- 1	144	3,62	,72	2	5,177	,006

2 -4	155	3,83	,70	328
5 and over	32	3,98	,59	
<i>Total</i>	331	3,75	,71	

The mean scores of the social studies teacher candidates received from the communication skills are $\bar{x} = 3.77$ for 0-1 books, $\bar{x} = 3.91$ for 2-4 books and $\bar{x} = 4.12$ for 5 or more books. The mean score of the communication skills is $\bar{x} = 3.87$. The highest score $\bar{x} = 4.12$ of teacher candidates' communication skills according to the monthly book reading variable was obtained by those who read 5 or more books. The lowest score $\bar{x} = 3.77$ was obtained by 0-1 book readers. Whether there was a significant difference in the results obtained was measured using variance analysis. When Table 16 was examined, it was found that the communication skills of prospective teachers showed a significant difference according to the number of books they read monthly $F(2.328) = 4,591$ [$p = 0.011 < 0.05$]. Scheffe analysis was applied to determine among which group or groups this difference was and the results of the analysis are shown in Table 17.

Table 17. Scheffe analysis of social skills teacher candidates' communication skills and sub-dimensions according to the number of books read monthly

The number of monthly book reading		Difference between means (I-J)	p
0-1	2-4	-,132	0,185
	5 and over	-,348*	0,018
2-4	0-1	,132	0,185
	5 and over	-,215	0,208
5 and over	0-1	,348*	0,018
	2-4	,215	0,208

According to the results of Scheffe test in Table 17, there is a significant difference between the social studies teacher candidates who read 5 or more books monthly and the prospective teachers who read 0-1 books ($p = 0.018 < 0.050$). There are significant differences in favor of those who read 5 or more books. There is a significant difference between the scores obtained by reading 5 books and over from the self-expression $F(2.328)=5,222$ [$p=0.006<0.05$] and active listening $F(2.328)=4,814$ [$p=0.009<0.05$] sub-dimensions and those obtained from 0-1 book readers. The difference was found to be in favor of those who read books 5 and over. In addition, according to the results of Scheffe analysis, there is a significant difference in the willingness to communicate sub-dimension between the prospective teachers who read 5 or more books and the prospective teachers who read 0-1 book ($p=0.031<0.05$). There are significant differences in favor of those who read 5 or more books. In addition, a significant difference was found between 2-4 books and 0-1 books in favor of 2-4 books ($p=0.040<0.05$).

Anova t-test was conducted to determine whether there is a difference between the values related to social intelligence levels to the number of books read monthly and the results are presented in Table 18.

Table 18. Social studies teacher candidates' social intelligence levels according to the number of books read monthly

Scale / Sub-dimensions	Monthly book reading	N	\bar{x}	SD	df	F	p
Social intelligence level	0- 1	144	3,52	,50	2 327	,775	,462
	2 -4	155	3,38	,48			
	5 and over	32	3,47	,60			
	<i>Total</i>	331	3,38	,50			
Social information process	0- 1	144	3,57	,67	2 327	2,613	,075
	2 -4	155	3,54	,56			
	5 and over	32	3,82	,69			
	<i>Total</i>	331	3,58	,63			
Social skill	0- 1	144	3,36	,69	2 327	,449	,639
	2 -4	155	3,43	,66			
	5 and over	32	3,46	,72			
	<i>Total</i>	331	3,40	,68			
Social awareness	0- 1	144	3,08	,70	2 327	,583	,559
	2 -4	155	3,17	,71			
	5 and over	32	3,08	,85			
	<i>Total</i>	331	3,12	,72			

The mean scores of social studies teacher candidates were found as; $\bar{x} = 3.35$ for monthly 0-1 books, $\bar{x} = 3.38$ for 2-4 books and $\bar{x} = 3.47$ for 5 or more books. The mean of the total scores obtained from TSIS is $\bar{x} = 3.38$. It was observed that the highest score $\bar{x} = 4.47$ was obtained by those who read 5 books or more, and the lowest score $\bar{x} = 3.35$ was obtained by those who read 0-1 books. Whether there was a significant difference in the results obtained was measured using variance analysis. When Table 18 was examined, it was found that there was no significant difference between the pre-service teachers' monthly book reading variable $F(2.327)=0,775$ [$p=0.462<0.05$].

Findings about the relationship between social studies teacher candidates' social intelligence levels and communication skills

Pearson correlation analysis was conducted to reveal the relationship between social studies teacher candidates' communication skills and social intelligence levels, and the results are shown in Table 19.

Table 19. The relationship between social skills teacher candidates' communication skills and social intelligence levels

		Communication	Social intelligence
Communication Skills	Pearson R	1	,512*
	P		,000
	N	331	331
Principles of communication and basic skills	Pearson R	,922*	,417*
	P	,000	,000
	N	331	,331
To express yourself	Pearson R	,858*	503*
	P	,000	,000
	N	331	331

Effective listening and nonverbal communication	Pearson R	,905*	,479*
	P	,000	,000
	N	331	331
Willingness to communicate	Pearson R	,837*	,462*
	P	,000	,000
	N	331	331
Social intelligence level	Pearson R	,512*	1
	P	,000	
	N	331	331
Social information process	Pearson R	,483*	,750*
	P	000	,000
	N	331	331
Social skill	Pearson R	,425*	,818*
	P	,000	
	N	331	331
Social awareness	Pearson R	,241*	,671*
	P	,000	,003
	N	331	331

According to Table 19, it is determined that there is a moderate, linear and positive relationship between the communication skills of social studies teacher candidates and social intelligence levels [Pearson R=0,512; p=0.000<0.001]. According to these results; it is seen that social intelligence levels of social studies teacher candidates increase as social communication skills increase and social intelligence levels decrease as communication skills decrease.

It has been determined that there is a moderate, linear and positive relationship between communication principles and basic skills of social studies teacher candidates and social intelligence levels [Pearson R=0,417; p=0.000<0.001]. According to these results; it is seen that social intelligence levels of social studies teacher candidates increase as communication principles and basic skills increase, and social intelligence levels decrease as communication principles and basic skills decrease.

When the results are examined, it is determined that there is a moderate, linear and positive relationship between self-expression which is the communication skills sub-dimension of social studies teacher candidates and social intelligence levels [Pearson R=0,503; p=0.000<0.001]. According to these results; it is seen that social intelligence levels of social studies teacher candidates increase as self-expression skills increase and social intelligence levels decrease as self-expression skills decrease.

Table 19 shows that there is a moderate, linear and positive relationship between the candidates' effective listening and non-verbal communication skills and social intelligence levels [Pearson R=0,479; p=0.000<0.001]. According to these results; it was found that social intelligence levels of social studies teacher candidates increased as active listening and non-verbal communication skills increased and social intelligence levels decreased as effective listening and non-verbal communication skills decreased.

When the results are taken into consideration, it is determined that there is a moderate, linear and positive relationship between teacher candidates' willingness to communicate and social intelligence levels [Pearson $R=0,462$; $p=0.000<0.001$]. According to these results; it was seen that social intelligence levels of social studies teacher candidates increased as willingness to communicate increased and social intelligence levels decreased as willingness to communicate decreased.

According to Table 19, it is determined that there is a moderate, linear and positive relationship between social studies teacher candidates' social knowledge process levels and communication skills [Pearson $R=0,483$; $p=0.000<0.001$]. According to these results; it is seen that the communication skills of social studies teacher candidates increase as their social knowledge process levels increase, and their communication skills decrease as social science process levels decrease.

In table 19, it is seen that there is a moderate, linear and positive relationship between the social skills levels of the prospective teachers and communication skills [Pearson $R=0,425$; $p=0.000<0.001$]. According to these results; it is seen that social studies teacher candidates' communication skills increased as social skills levels increased and their communication skills decreased as social skills levels decreased.

According to these results, it is determined that there is a moderate, positive and linear relationship between the social awareness level and communication skills of the pre-service teachers [Pearson $R=0,241$; $p=0.000<0.001$]. According to these results; it is seen that the communication skills of social studies teacher candidates increase as social awareness levels increase, and their communication skills decrease as social awareness levels decrease.

Discussion and Conclusion

In the scope of this study, it can be concluded that the communication skills of social studies teacher candidates were high. This result is similar to the previous studies on the communication skills of prospective teachers (Tan and Tan, 2015; Milli and Yağcı, 2017). In another study, it was determined that teacher candidates defined themselves as proficient enough according to their communication skills (Çuhadar, Özgür, Akgün and Gündüz, 2014; Riedler and Eryaman, 2016). However, it is seen that the literature is inconsistent with some studies. In Yeşil's (2010) study, it is concluded that teacher candidates are not fully competent in communication skills. Teacher candidates' having high communication skills of the social studies is a desirable and important situation in terms of transferring communication skills and being taught in primary education which covers the teaching of an interdisciplinary field due to the content of Social Studies course. (Kılıçoğlu, Gedik and Akhan, 2011; Kılıç, 2013).

It is seen that social intelligence levels of candidates are at the "appropriate" level. This result is similar to the result obtained by Ülker (2016) but contradicts with Kozağaç (2015).

According to the results of the study, 'self-expression' sub-dimension, 'listening and non-verbal communication' sub-dimension and communication skills total score differed according to gender. This difference is in favor of female teacher candidates. When the relevant literature is

examined, it is seen that many studies support these results (Bozkurt Bulut, 2004; Kılıçoğlu et al., 2011; Çuhadar et al., 2014; Ocak and Erşen, 2015; Milli and Yağcı, 2017; Uygun and Arıkan, 2019).

As a reason for the higher communication skills of female teacher candidates compared to male teacher candidates; social roles change and women's participation in social life and success in many areas can be considered. In addition, it is thought that such a result may have come out since the perception that teaching profession is primarily a profession specific to women and can trigger the desire of female teacher candidates to realize their basic teaching skills (Ocak and Erşen, 2015).

On the other hand, when the previous studies are examined, there are also studies which found that the communication skills of the pre-service teachers did not show a significant difference according to gender variable (Acar, 2009; Dilekman, Başcı and Bektaş, 2008; Tunçeli, 2013; Yeşil, 2010).

According to the findings of the study, it was concluded that social studies teacher candidates differed according to gender. It was found that female teacher candidates had significantly higher social intelligence levels than male teacher candidates. This result is similar to some studies in the literature (Ermış, İmamoğlu and Erilli, 2012; Silvera, Martinussen and Dahl, 2001) it also differs with some studies (Doğan, Totan and Sapmaz, 2009; Saxena and Jain, 2013). Ülker (2016) concluded that social information process, social skills and social intelligence levels did not show a significant difference according to gender variable, but social awareness sub-dimension showed a significant difference in favor of females.

The communication skills of teacher trainees do not show a significant difference according to age. The reason for this is that the data were collected from the 3rd and 4th grade prospective teachers and these class levels are generally in similar age groups. This result is similar to previous studies (Acar, 2009; Kılıçoğlu et al., 2011; Tepeköylü, Soytürk and Çamlıyer, 2009).

Communication skills of social studies teacher candidates showed a significant difference compared to universities. The communication skills of prospective teachers at Muğla Sıtkı Koçman University, Afyon Kocatepe University and Aksaray University are significantly higher than those of Uşak University. As a reason for this difference; the human relations and communication skills given in the faculties of education and other field courses, ease of access to social activities in cities, individual differences and the academic score obtained at entrance to universities are thought to be effective. This result is in parallel with the work of Kılıcığıl, Bilir, Özdiñ, Erođlu and Erođlu (2009), while it is in contrast with Saraçođlu, Yenice and Karasakalođlu (2009).

It was concluded that social intelligence levels of teacher candidates studying at Uşak University are significantly lower than those who were studying at Muğla Sıtkı Koçman, Afyon Kocatepe and Aksaray University. This situation may be due to the socio-cultural characteristics of the city where the teacher candidates live, the importance given to social activities by universities and the scores in the university entrance exams. The results obtained from this study are similar to those obtained by Yazıcı and Yıldırım (2017).

According to the results, there is no significant difference between social studies teacher candidates and their communication skills. It is seen that the results obtained from previous studies are also similar (Dilekman et al., 2008; Tepeköylü et al., 2009; Ülker, 2016; Tunçeli, 2013; Milli and Yağcı, 2017).

It is thought that this result has been obtained because the prospective teachers participating in this study have been studying in 3rd and 4th grade and both groups have taken human relations and communication lessons.

It was concluded that the communication skills of the teacher candidates differed significantly according to the number of books they read monthly. It was found that the teacher candidates who read 5 and more books per month are significantly higher in terms of communication skills and self-expression, willingness to communicate, effective listening and non-verbal communication skills than those who read 0-1 book.

This result supports the findings previously obtained by Saraçoğlu, Yenice and Karasakaloğlu (2009). In addition, it was found that there was no significant difference between the social studies teacher candidates' according to the number of the books they read. When the previous studies were examined, no studies were available in this area. It was seen that the reading levels of the teacher candidates caused a significant difference in communication skills but did not lead to a significant difference in social intelligence levels. In order to interpret the reason for this situation, it can be indicated that communication skills can improve by reading books but social intelligence cannot be developed in this way. On the other hand, it can be said that social intelligence can be developed by being more present in social environments, doing more practice and having experiential learning.

According to the results of the study, it is seen that there is a moderate, positive and positive relationship between communication skills and social intelligence levels of social studies teacher candidates. According to these results; as the communication skills of teacher trainees increased, their social intelligence levels increased and as communication skills decreased, their social intelligence levels decreased as well. This situation is similar to previous studies (Kaya et al., 2016; Ülker, 2016).

According to the results of the research, the following recommendations can be given. Social intelligence levels and communication skills of teachers, prospective teachers and students can be measured and compared. Later research on social intelligence and communication skills can be expanded according to different samples, branches and faculties. As it is seen in the research results, the communication skills of the teacher candidates who read 5 or more books monthly are significantly higher than the other groups. For this reason, prospective teachers should acquire reading habits. Courses such as human relations, communication and drama should be taught practically.

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Investigation of the Opinions of Teachers Who Received In-Service Training for Arduino-Assisted Robotic Coding Applications

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Abstract:

The aim of this study is to determine the opinions of primary school teachers who received in-service training on robotic coding applications. For this purpose, descriptive study model, which is one of the qualitative research methods, was utilized. The study group of the research consisted of six primary school teachers who voluntarily gave opinions out of 30 teachers who participated in in-service robotic coding training in the first semester of 2018-2019 academic year. "Semi-structured interview form" was used as data collection tool. The data obtained from the participants were transferred to NVivo 12 program and analyzed by content analysis method and classified under certain categories. Direct quotations were included to reflect the responses of the participants in a striking manner. As a result of the research, participants stated that the in-service training period was inadequate and limited, and that a limited number of examples of robotic coding applications were covered. In addition, it was found that the participants generally did not incorporate such practices in their own classes after the training. They made various explanations about the reasons of this situation. In line with the results of this research, it is suggested that more time should be devoted to the applications related to robotic coding provided to teachers during in-service training, and that activities related to how to integrate them into classroom teaching practices should be organized.

Keywords: Robotics coding, in-service training, primary school teachers

DOI: 10.29329/epasr.2020.236.14

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Introduction

Technological and scientific changes in the world have been reflected in the education process and brought digitalization of education to the agenda. Especially in educational environments, the use of technology comes to the forefront in helping students gain the 21st century skills, adapting easily to the developing technology, increasing the quality of education and creating effective learning and teaching environments. The reflections of the use of technology in education are seen in many different forms such as augmented reality, simulation, digital storytelling, digital games, three-dimensional printing, social network-based learning, QR code applications and mobile applications. These applications are some of the educational technologies currently being developed and proposed for use in educational settings (Adams Becker, Freeman, Giesinger Hall, Cummins, & Yuhnke, 2016; Johnson, Adams Becker, Estrada, & Freeman, 2015). Robotic coding applications are among the most important technologies in addition to these technologies (Benitti, 2012; Johnson, et.al., 2015).

Coding can be defined as the whole or part of a set of commands written to have a mechanism made up of mechanical systems or a computer or an electronic circuit do something, or to achieve a specific purpose. Text-based or block-based programs are used in the coding process. In text-based coding, codes and commands are generated by the students in the form of text in compliance with some certain procedures by using the keyboard. This allows students to create commands without difficulty. As the text-based coding includes its own syntactic rules, has an abstract structure and is considered to be difficult for new beginners, coding education is perceived to be difficult by students (Baser & Ozden, 2015; Gomes & Mendes, 2007). As the block based coding can be performed without writing any code, the use of platforms or tools such as game lab, code.org, scratch, App Inventor, Greenfoot and mBlock have come to the fore in coding education. In addition, as these platforms or tools have an easy and convenient interface, work in a language close to the daily language instead of syntax and allow combining the code blocks with drag-and-drop method instead of writing codes and as the code blocks can be combined in only one single correct way just like jigsaw pieces, they are recommended to be used in educational environments. In the existing research, it was found that the use of block-based coding as a teaching tool was effective in developing students' problem solving, creativity, questioning, algorithmic thinking and cognitive skills (Czerkawski & Lyman, 2015; Lau & Yuen, 2011; Psycharis & Kallia, 2017; Strawhacker & Bers, 2015; Wang, Li, Feng, Jiang, & Liu, 2012). In this context, learning of block-based coding allows the emergence of various robotic structures.

Robotic refers to the functional tools that can be programmed to do a task. Reactions are generated in robots by interpreting the data obtained by means of the sensors that can sense the environment as programmed by the microcontroller or processor. Such educational robots enable students to work with concrete objects, enabling them to deal with real-life problems. In educational

robotic applications, students work with engineering materials such as gears, motors and sensors, make coding by using their own imagination and algorithmic thinking, collect data by interacting with their environment and create their own projects in the light of these data. In other words, in a simple robotic activity, students use the computational thinking sub-dimensions of logical inquiry, algorithmic thinking, parsing, evaluation, debugging, abstraction and generalization (Cetin & Toluk Ucar, 2017). This allows students to acquire many skills such as solving daily problems, critical thinking, discovering their own abilities, learning by experiencing, being more willing to use technology and increasing their level of technology use (Costa & Fernandes, 2005). Alimisis and Kynigos (2009) define that the use of robotics activities in education as a new way opening to constructivist learning. In this context, the use of various tools such as robots that can do coding in educational environments, smart objects, self-build kits, virtual robot coding platforms and robot programming languages has become widespread. Examples of such robotic tools are; Lego Mindstorms Kits (NXT, EV3), VEX IQ Platform Kits (Starter Kits), Fischertechnik Kits (Fischertechnik Introduction to STEM I and II), Makeblock Kits (mBot - STEM Educational Robot Kit), Dash and Dot, Primo and Robo Mind (Numanoglu & Keser, 2017). In addition, microcontroller arduino sets which are easy to use and understand in learning environments, supported by programs running with drag-and-drop system, enabling the production of different creative projects with various sensors and enabling interaction and communication with the environment are recommended in education.

Arduino-assisted robotic coding applications consist of arduino microcontroller, related basic components, sensors and coding platforms. Firstly, students code in a block-based program that works with a drag and drop system, and they load these codes into robotic tools in order for them to become functional. For example, students can code in mBlock platform which has a compiler and converter that can convert code blocks into C ++ language and can perform coding with drag-and-drop system without writing code. Afterwards, they can load the code blocks they have created to the arduino microprocessor and run them independently of the computer and manage the workings of the robotic devices (Sahin, 2018). Thus, students are provided with rich learning environments that enable them to acquire engineering design skills as well as building, algorithmic thinking, collaborative work, creativity and problem-solving gains (Zengin, 2016). In addition, in the literature, such robotic coding applications are suggested to improve students' many cognitive functions such as academic achievement, creativity, multi-faceted thinking, critical and analytical thinking, computational thinking, high-level thinking, product creation and problem-solving (Petre & Price, 2004; Sullivan, 2017; Williams, Ma, Prejean, Ford, & Lai, 2007); affective functions such as motivation, interest towards the course, perception of their own learning and attitude towards the course (Prensky, 2010; Roblyer & Edwards, 2005); and psycho-motor characteristics (Roblyer & Edwards, 2005) such as ability development (Benitti, 2012; Gura, 2012). In this context, the necessity of bringing the robotic

coding applications into the learning environments and integrating them into the courses comes to the forefront.

We see that especially robotic coding applications support STEM education which has become an important element in the science curriculum whose content was arranged in 2018 (MoNE, 2018) and they constitute an application example for STEM applications (Sullivan, 2017). In addition, such practices have become important in educational environments in terms of the use of tools and equipment that form the basis of STEM education, the determination of how the mechanisms work and the easy integration of technology (Bybee, 2010). When all these are taken into consideration, integrating technology into teaching programs using student-centered and constructivist theory emerges as an indispensable element. In addition, the integration of technology into teaching has enabled constructivist approach applications to become more applicable (Karagiorgi & Symeou, 2005). In Turkey, robotic coding applications have been put into practice only within the scope of Information Technologies and Software course since 2012, and their integration into any curriculum for the implementation of other courses has not been established directly. However, the Ministry of National Education has been organizing in-service training programs for teachers working in different branches in order to ensure the effective use of robotic coding practices in other courses. Similarly, such trainings are given to teachers in various countries in Europe, and various training platforms are established in this direction. In addition, feedback is received from teachers on the effectiveness of such trainings, and arrangements are made accordingly (Kim, Yuan, Kim, Doshi, Thai, Hill, & Melias, 2017). In this context, the extent to which the in-service trainings for robotic coding practices in Turkey contributed to the teachers, who provided them, whether the teachers included such practices in their own classes after the trainings, and the feedback received from teachers about the problems encountered during the practices should be determined, and recommendations regarding content and example implementations should be put forward. It is important to determine what the status of teachers (knowledge, usage skills, ability to integrate into courses) is and what they think about robotic coding applications in terms of eliminating the deficiencies of teachers regarding these applications. When the studies carried out on this subject are examined, we see that the situation assessment has not been made about the extent to which the primary school teachers who have received in-service training and working in public schools have knowledge about this subject and how much they can perform after the training. Thus, the aim of this study is to determine the opinions of primary school teachers who have received in-service training on robotic coding applications. Accordingly, the following research questions were examined.

(1) What are the opinions of the teachers participating in in-service robotic coding training about the training provided?

(2) What are the reasons for teachers participating in in-service robotics coding training to include or not to include such practices in their classrooms?

(3) What do teachers attending in-service robotic coding training think about the applicability of such practices in the classroom environment?

(4) What do the teachers participating in in-service robotic coding training think about what needs to be done in order to further implement such applications in the classroom environment?

Methodology

In this study, which aimed to reveal the opinions of primary school teachers who participated in in-service-robotic-coding training about robotic coding applications, of the qualitative research designs descriptive method is utilized. Descriptive method focuses on the phenomenon under scrutiny with the purpose of describing the nature of the phenomenon without focusing on the reasons of that phenomenon (Creswell, 2013).

Study Group

The study group of the research consisted of six primary school teachers (4 females, 2 males) who voluntarily gave opinions out of 30 teachers who participated in in-service robotic coding training in the first semester of 2018-2019 academic year. In the in-service training, robotic coding applications lasted a total of 15 hours, both theoretical and practical. Within the scope of this training, the importance of robotic coding, computational thinking, algorithmic operations, teaching of algorithms through games, introduction to coding environments, introduction to code.org and scratch programs, giving general information about arduino and its basic components, various sensor connections and sample applications were covered. As the in-service training given in this direction aimed to give basic information about robotic coding to the teachers and to get them to experience the applications at a simple level, primary school teachers were preferred as the study group in the research. This is because primary school teachers are expected to be the first ones to give basic level knowledge and awareness about robotic coding to primary school students. In this context, the study group was selected using purposeful sampling method. Demographic information about the participants is given in Table 1.

Table 1. Demographic Information about Participating Primary School Teachers

Participants	Gender	Professional experience	Grade level	Class size	Graduate education
Participant 1	Male	24 years	2nd grade	20	Yes
Participant 2	Female	20 years	2nd grade	17	No
Participant 3	Male	8 years	1st grade	17	Yes
Participant 4	Female	23 years	3rd grade	16	No
Participant 5	Female	22 years	2nd grade	16	No
Participant 6	Female	15 years	4th grade	18	No

Data Collection Tools

"Semi-structured interview form" was used as data collection tool. The questions in the interview form consist of 4 open-ended questions prepared by the researchers. The purpose of these

questions is bringing out the teachers' thoughts about the duration, content, competence of the instructor, the suitability of the environment, the adequacy of the applications, find out whether they have included such applications in their own classes after the training, the applicability of the robotic coding applications in the classroom environment and what should be done to ensure the implementation of these applications in the classroom environment. In order to ensure the construct validity of the prepared questions, expert opinions (a field expert in science education, two field experts who have conducted studies on robotic coding and a measurement and evaluation expert) were sought. On the basis of the feedbacks received from the experts, some corrections were made and final form of the interview form was given. In this context, six months after the end of the training, 30-minute semi-structured interviews were conducted with each of the classroom teachers. The interviews were tape-recorded. The questions in the interview form are given below; (1) What are the opinions of the teachers participating in in-service robotic coding training about the training provided? (2) What are the reasons for teachers participating in in-service robotics coding training to include or not to include such practices in their classrooms? (3) What do teachers attending in-service robotic coding training think about the applicability of such practices in the classroom environment? (4) What do the teachers who participated in in-service robotic coding training think about what needs to be done in order to further implement such practices in the classroom environment?

Analyzing of Data

The responses of the participants were analyzed by content analysis method. Content analysis can be defined as an analysis technique to determine and make sense of the main consistencies and meanings by taking qualitative material with a certain volume. The basic meanings found through content analysis can be called general patterns or themes (Patton, 2014). In this respect, the data obtained from the interviews were analyzed and transferred to NVivo 12 and classified under certain categories. Similar data were brought together in the framework of certain concepts and themes, and models were created.

Some operations were performed in relation to reliability and validity of the data collected in the current study on the basis of the concepts of credibility, transferability, dependability and confirmability. Yildirim and Simsek (2018) emphasize that in the qualitative research, the concepts of credibility, transferability, dependability and confirmability are important in establishing the validity and reliability, and that necessary actions and explanations regarding these situations should be made. In this direction, expert analysis and participant confirmation methods were used to ensure the credibility of the research. In the expert examination method, two experts who have general knowledge about robotic coding training and specialized in qualitative research methods examined this research from its different dimensions and made various suggestions. In this expert review, the experts made suggestions about the design of the research, data collection and analysis, reaching the results and interpretation stages. Within the context of the participant confirmation method, the data obtained

from the study were analyzed and the findings, results and evaluations were sent to the participants in a report. Participants gave feedback on whether their views were correctly reflected in this report. In the current study, the detailed description method was applied to enhance the transferability of the results of the research. Within the context of the description method, direct quotations were made from the statements of the teachers. In the current study, consistency analysis and confirmation analysis method was used within the concept of “dependability” regarding the reliability of qualitative data. In line with these methods, an expert in qualitative research looked at the research as an outsider and conducted an examination of the consistency of the researchers in the process of the construction of data collection tools, data collection, analysis and coding. The required arrangements were made for these analyses by the researchers.

Findings

In this study, the opinions of primary school teachers who participated in in-service training about robotic coding applications were examined for each research question by identifying sub-themes and codes related to these sub-themes. In addition, direct quotations were included to reflect the responses of the participants in a striking manner.

Teachers’ opinions about in-service robotics coding education

Within the scope of the study, themes about robotic coding training and related to this theme, sub-themes of duration of training, content, competence of the instructor, suitability of the training environment and adequacy of the applications were determined. In line with these sub-themes, participants' opinions were examined and related codes were formed. In this context, according to the data obtained from the participants' views, the model in Figure 1 was created for the theme, sub-theme and related codes of the first research question.

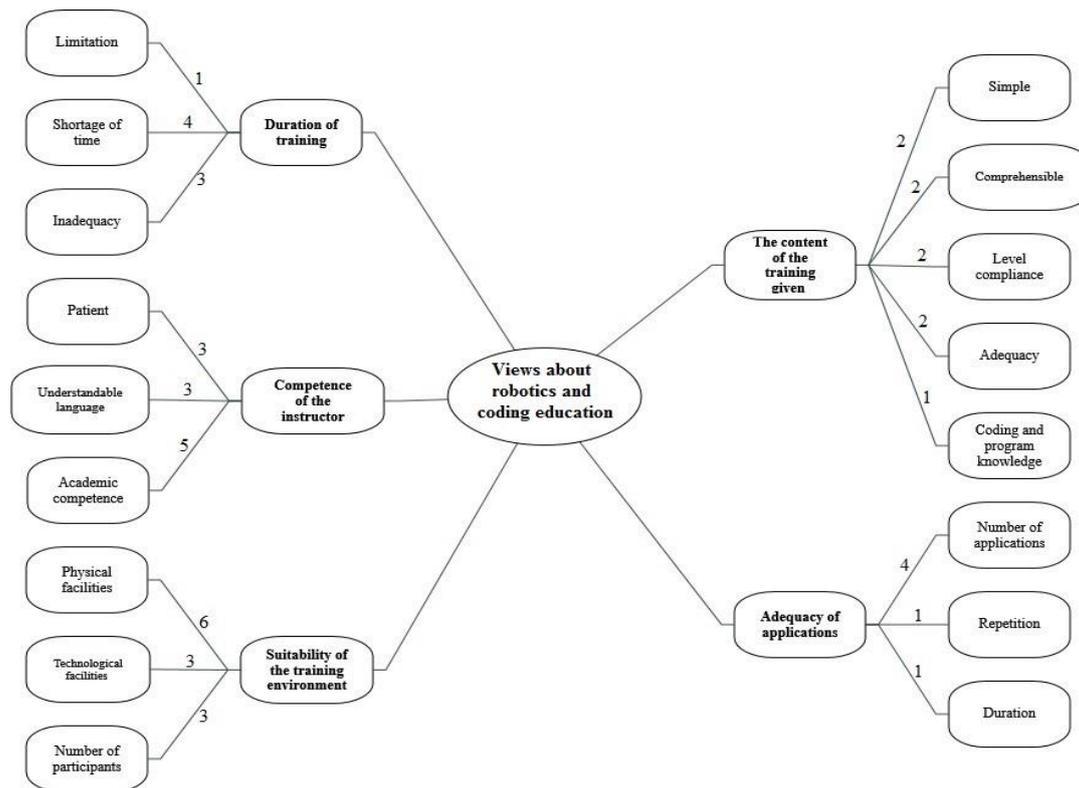


Figure 1. Model for views on robotic coding training

When the model in Figure 1 is examined, we see that various codes have been formed according to the sub-themes relating to the views of primary school teachers about robotic coding training and we see the number of participants who emphasized those codes. In this context, the participants stated that the duration of the training was limited (n = 1), insufficient (n = 3), and the duration was short (n = 4). The participants emphasized simple (n = 2), comprehensible (n = 2), level-appropriate (n = 2), adequate (n = 2) and comprehensive coding and program knowledge (n = 1) codes for the sub-theme of the content of the training. In addition, participants mentioned codes such as number of applications (n = 4), gaining experience by applying them repeatedly (n = 1) and time allocated for application (n = 1) about the sub-theme of adequacy of applications performed in robotic coding training. Moreover, participants gave statements about the physical facilities (n = 6), technological facilities (n = 3) and number of participants (n = 3) codes for the sub-theme of the suitability of the environment in which this training was given. Finally, the participants stated that the instructor was patient (n = 3), using comprehensible language (n = 3) and academically competent (n = 5) for the sub-theme of the instructor's competence.

In this context, the codes created for the answers of primary school teachers about the robotic coding training given in-service training in line with sub-themes are examined in detail below.

When the responses to the sub-theme of the duration of the training given were examined;

Three of the six teachers who participated in the training emphasized that there wasn't enough time for the training and therefore the matter could not be fully understood. In this regard, Participant 5 (P5) stated that the training was inadequate in terms of time by saying, *"For a better comprehension of the training, we need it to be longer."*

When the responses to the sub-theme of the content of the training were examined;

The teachers who participated in the training stated that the content of the training was simple, understandable and appropriate for their level. However, the participants stated that the training was not comprehensive enough for them to be able to fully develop themselves. On this issue, P2 stated that the training should cover a broader range and said, *"The training should have been more practical and should have included detailed instructions."*

When the responses to the sub-theme of competence of the instructor were examined;

The three teachers who participated in the training stated that the instructor used understandable language to inform them about robotic coding and always showed patience to them even when they had difficulty understanding the subject matter and structuring it in their minds and thus failed in application. One participant (P3) said, *"The instructor was very good in terms of communication. She was friendly and patient and had a desire to teach. She was competent in her field,"* and supported the general consensus.

When the responses to the sub-theme of suitability of the training environment were examined;

The six teachers who participated in the training stated that the physical environment of the educational environment such as table, chair and classroom size was suitable for conducting both theoretical and practical instruction about robotic coding. However, three of the participants stated that the training environment was not suitable in terms of internet connection, smart board and sufficient number of computers and put emphasis on technological opportunities. On this issue, P6 stated that, *"Internet connection could have been better in the educational environment. Training could have been carried out with well-equipped computers with internet connection."*

When the responses regarding the sub-theme of the adequacy of applications were examined;

Four of the teachers who participated in the training stated that there was a limited number of applications regarding robotic coding. The participants stated that the low number of applications was due to lack of time, the crowded groups and the low number of application examples. In addition, one of the participants emphasized that the activities related to robotic coding in the training included only one application, that it was not repeated and that it was done in a short time. Regarding these issues, the statement made by P1 seems to support that finding; *"The number of applications about coding and robotic applications needed to be increased and the application needed to be repeated frequently."*

We should have practiced on our own to gain experience, but it was only limited to the level of teaching.”

Classroom applications after in-service robotics coding training

Within the scope of the study, the theme of classroom practices after training and the sub-themes of economic, self-sufficiency, physical facilities and student qualification related to this theme were determined. In line with these sub-themes, participants' opinions were examined and related codes were formed. In this context, according to the data obtained from the participants' views, the model in Figure 2 was created for the theme, sub-theme and related codes of the second research question.

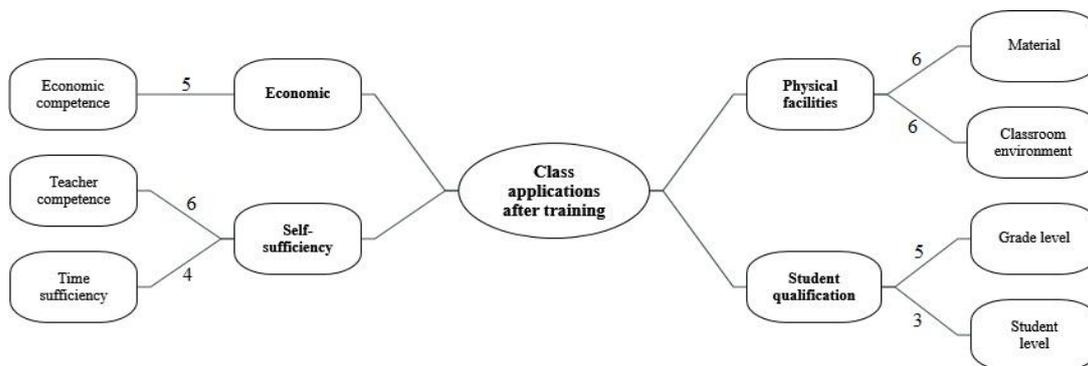


Figure 2. Model for post-training classroom applications

When the model in Figure 2 is examined, we see that various codes have been formed according to the sub-themes relating to the views of primary school teachers about post-training classroom applications and we see the number of participants who emphasized those codes. In this context, the participants mentioned the importance of economic competence (n = 5) related to the economic sub-theme in the implementation of the activity related to robotic coding in post-training classroom applications. The participants emphasized teacher competence (n = 6) and time sufficiency (n = 4) regarding their own competence sub-theme in doing such applications. In addition, the participants made statements about materials (n = 6) and classroom environment (n = 6) in the sub-theme of physical facilities. Finally, the participants emphasized the importance of grade level (n = 5) and student level (n = 3) in student competence sub-theme related to the implementation of robotic coding activities.

In this context, the codes created according to the answers of primary school teachers about the post-training classroom applications in line with sub-themes are examined in detail below.

When the responses to the economic sub-theme were examined;

It was observed that five of the six teachers participating in the training stated that robotic sets could not be procured by each student due to economic reasons and that the applications could not be

performed due to the low socioeconomic status of the students. The statement made by P4, "*Economically, not all of our students may be able to obtain those sets,*" supports that finding.

When the responses regarding self-sufficiency sub-theme were examined;

It was found that four of the teachers who participated in the training performed such practices in their classrooms after the training and included robotic coding practices in their classes. In addition, these participants stated that they carried out example practices based on simple activities at a basic level. Only one participant (P6) stated that he/she considered himself/herself to be competent to carry out activities for robotic coding applications in the classroom environment. Three of the participants (P1, P2 and P5) stated that they considered themselves partially competent to perform simple robotic coding activities. However, two of the participants (P3 and P4) emphasized that they could not perform such practices in their own classrooms because they did not consider themselves and their education to be adequate. P6 said, "*Financial support is required for the implementation of such practices. I was able to buy only two sets. It would be better if there was a practice room at school, I feel competent enough to teach such classes,*" on the issue of self-sufficiency. In addition, four of the participants stated that time is important in the implementation of robotic coding applications in the classroom environment because such applications take a long time. On this subject, P3 said, "*It takes a long time to do robotic coding activities in my classroom. Because it is not easy for students to do coding and to set up robotic devices,*" and pointed out that doing such applications in the classroom environment takes up a lot of time.

When the responses to the physical facilities sub-theme were examined;

Six of the teachers who participated in the training stated that the lack of the necessary sets, computer laboratories and the physical facilities of the school for the implementation of robotic coding constitute an obstacle to the realization of such applications. In his/her statement, P2 emphasized the necessity for materials, "*Even if we want to do robotic coding applications in the classroom, we do not have enough robotic materials and we do not have a computer laboratory.*" The participants stated that the classes were not suitable for such applications in terms of layout of the desks, technological equipment and class size.

When the responses regarding student competency were examined;

Five of the teachers who participated in the training stated that the grade level is important in the implementation of robotic coding applications and that it can be given to students starting from the fifth grade of primary school. Participants P3, P4 and P5 emphasized the importance of grade level by saying, "*Robotic coding applications should be done starting from the fifth grade. However, as of the third grade, the training has to be given with the purpose of introducing them at a basic level.*" In addition, one of the participants (P1) stated that robotic coding applications could be done at the second grade of primary school. P1 said in his/her statement, "*When we consider the fact that students*

encounter reading and writing in the first grade for the first time and that it's all very challenging, this subject may not be suitable for them. But they will be able to do such activities in the second grade. "

In addition, three of the participants stated that besides the grade level, the student level was also important in the implementation of robotic coding applications. In other words, the participants emphasized that the cognitive, affective and psycho-motor levels of the students regarding coding and robotic mechanisms should be adequate. On this subject P6 said, *"Some students in my class can do this kind of practice, but some cannot. When I asked the students who couldn't why they couldn't, they said that they didn't have any information on the subject matter, that they had seen it for the first time and that they had difficulty connecting the robotic pins."*, and emphasized that the students' cognitive, affective and psycho-motor levels should be at a certain level.

Applicability of robotics coding activities in classroom environment

Within the scope of the study, the theme of applicability of robotic coding activities in the classroom environment and the sub-themes of gain, curriculum intensity, cognitive level of students and psycho-motor level of students were determined. In line with these sub-themes, participants' opinions were examined and related codes were formed. In this context, according to the data obtained from the participants' views, the model in Figure 3 was created for the theme, sub-theme and related codes of the third research question.

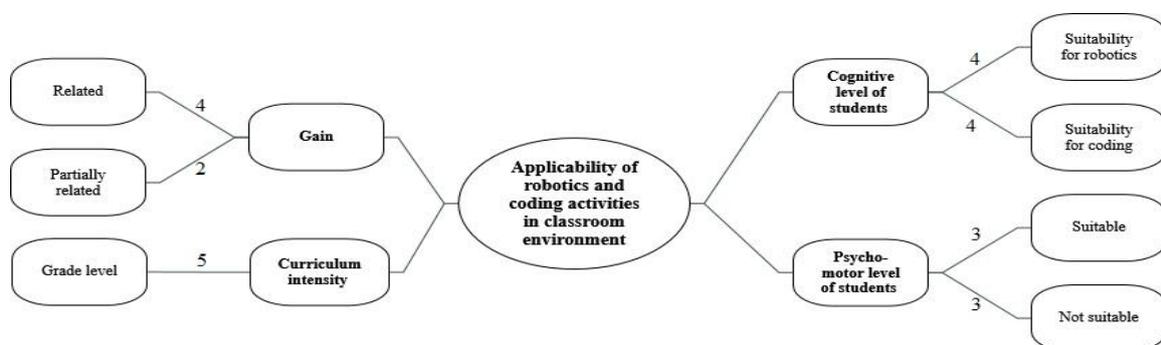


Figure 3. Model for the applicability of robotic coding activities in the classroom

When the model in Figure 3 is examined, we see that various codes have been formed according to the sub-themes relating to the views of primary school teachers about the applicability of robotic coding activities in the classroom and we see the number of participants who emphasized those codes. In this context, the participants made statements regarding the gains sub-theme about the grade level gains as being related to such practices (n = 4) or being partially related (n = 2). In addition, the participants mentioned the importance of the grade level (n = 5) regarding the curriculum intensity sub-theme in the implementation of such applications. In the sub-theme of the students' cognitive level, it was found that the participants made a distinction between suitability for robotics (n = 4) and suitability for coding (n = 4). Finally, it was observed that the participants made appropriate (n = 3) and not appropriate (n = 3) statements in the sub-theme of psycho-motor level of the students.

In this context, the codes created for primary school teachers' responses to the sub-themes about the applicability of robotic coding activities in the classroom environment are examined in detail below.

When responses to the sub-theme of gain were examined;

Six of the teachers who participated in the training stated that the gains of science and life science courses related to the applicability of the activities related to robotic coding and their relationship with the gains in the curriculum were more appropriate for such applications. The participants stated that robotic coding activities could be done on the subject of electrical circuits, traffic lights, direction and force. Two of the participants (P2 and P4) emphasized that such applications can be done partially in mathematics gains as well. P2 said, "*We can use them in mathematics lessons for teaching four operations, addition, subtraction or rhythmic counting or geometric shapes.*" And P4 said, "*When we look at our gains, we see that we can use these applications in many gains in the units. For example, I think we can do applications related to the gains of electricity and even many of the science subjects,*" and stated that the applications of robotic coding are related to the gains in science and mathematics courses.

When the responses to the curriculum intensity sub-theme were examined;

Five of the teachers who participated in the training expressed their opinions according to each grade level about whether such activities could be included in the classes according to the intensity of the content in the courses. In this context, the participants stated that since the first grade students did not yet learn to read and write, and because the curriculum was very loaded in the fourth grade and teachers were anxious to cover all the subjects, these levels were not suitable for robotic coding practices. However, the participants stated that second and third grade students could be given coding skills. About this P3 said, "*I want to teach my students robotic coding but they've only just learnt to read and write. So I plan to give them this training in second grade.*" And P6 said, "*While teaching robotic coding to my students, I think about how I'll be able to cover other curriculum subjects,*" and emphasized the importance of grade level and curriculum intensity in the implementation of robotic coding activities.

When the responses to the sub-theme of the cognitive level of the students were examined;

Teachers who participated in the training evaluated students' cognitive suitability for coding and for robotics in the application of robotic coding activities. Four of the participants stated that elementary school children are intertwined with technology and can do these things easily without difficulty. However, participants emphasized the necessity of the training for coding to begin in the second grade and the training for robotics to begin in the third grade. P3 said on the issue, "*The fact that very small materials are used in robotics activities may cause problems in the first and second*

grades. Because we sometimes have problems even with holding scissors in the first and second grades."

When the responses regarding the students' psycho-motor level sub-theme were examined;

The teachers who participated in the training emphasized the importance of psycho-motor skills in the easy implementation of robotic coding activities by the students. Three of the participants stated that fourth grade students could easily handle the connections of the pins and sensors to the arduino microprocessor in robotic devices. However, three of the participants stated that students could not be successful in these applications due to lack of development of fine muscle movements. P2 said, "At the developmental level, it's only possible to deal with small, detailed works, to bring them together, to form a circuit after the fourth and fifth grades. Drawing a straight line in the first and second grade can be a problem, even in the third grade," and emphasized that students' psycho-motor levels are important in robotic coding applications.

Expectations for robotics coding applications

Within the scope of the study, the theme of expectations for further implementation of robotic coding applications in the classroom environment and related to this theme, physical opportunities, education and training activities and family support sub-themes were determined. In line with these sub-themes, participants' opinions were examined and related codes were formed. In this context, according to the data obtained from the participants' views, the model in Figure 4 was created for the theme, sub-theme and related codes of the fourth research question.

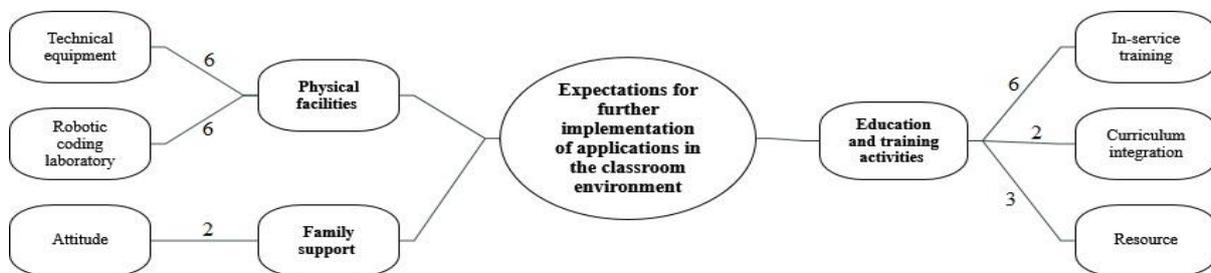


Figure 4. Model for expectations for further implementation of robotic coding applications in the classroom environment

When the model in Figure 4 is examined, we see that various codes have been formed according to the sub-themes relating to the views of primary school teachers about their expectations for further implementation of robotic coding applications in the classroom environment and we see the number of participants who emphasized those codes. In this context, the participants made explanations about the technical equipment (n = 6) and robotic coding laboratory (n = 6) related to the physical possibilities sub-theme. In addition, the participants expressed their opinions about in-service training (n = 6), curriculum integration (n = 2) and resources (n = 3) in the sub-theme of educational and training activities. Finally, the participants mentioned the importance of family attitude (n = 2) in

the sub-theme of family support in the implementation of robotic coding activities in the classroom environment.

In this context, the codes created for primary school teachers' responses to the sub-themes about the applicability of robotic coding activities in the classroom environment in relation to further implementation of robotic coding activities are examined in detail below.

When the responses to the physical facilities sub-theme were examined;

Six of the teachers who participated in the training stated that there was insufficient physical means to implement robotic coding in schools and that materials should be provided for effective implementation. P2 said, *"In order to integrate these applications into the courses, it is necessary to obtain the required technical materials and establish the required laboratory environment. In fact, parents should be encouraged to buy this material."* And P6 said, *"I bought two sets of robotic coding applications myself and did activities using my own computer. I saw that my students were very happy with the outcome,"* emphasizing the importance of technical equipment and laboratory supplies in such applications.

When the responses to the sub-theme of family support were examined;

Two of the six teachers who participated in the training expressed the importance of family support in the implementation of robotic coding practices in the classroom. One of the participants stated that they received support from parents for the provision of robotic coding materials and that the applications could be carried out at a basic level in the classroom environment. About this, P1 said, *"Parents support me in all matters for the education of students. They provide financial support by demonstrating positive attitudes in terms of robotic coding."*

When the responses to the sub-theme of education and training activities are examined;

The six teachers who participated in the training stated that the in-service training on robotic coding was not sufficient and that training opportunities like that should be available more frequently. In addition, two of the participants stated that it is important that the applications related to robotic coding be taught to them in the courses integrated to the classes. P3 said on the issue; *"During in-service trainings, it is best to directly teach which robotic coding activity can be used in which class. Because even though we learn robotic coding in training, we don't know which class and gain we will use it in."* Three of the teachers who participated in the training stated that they needed a resource manual at each grade level in order to remember or learn more about robotic coding. P5 said, *"There should be a manual on the basis of classes related to robotic coding. With such a guide, we can do effective applications in our classes,"* and emphasized the need for a reference book on robotic coding applications.

Discussion and Conclusion

In this research, opinions of primary school teachers who have received in-service training on robotic coding applications were examined. Within the scope of this training, the importance of robotic coding, computational thinking, algorithmic operations, teaching of algorithms with games, introduction to coding environments, introduction to code.org and scratch programs, giving general information about arduino and its basic components, various sensor connections and sample applications were covered. Six months after the in-service training, interviews were held with the primary school teachers and the following results were reached as a result of the interviews.

As the first result, in response to the first question of the study, primary school teachers who received in-service training for robotic coding applications stated that the duration of training was insufficient and limited, and that the duration of training should be longer in order to pass from cognitive comprehension level to application level by doing individual application examples. As the second result, primary school teachers stated that the content of the education was simple, comprehensible, appropriate for their own competency, and contained sufficient coding information. However, teachers emphasized that the training in developing robotic coding in general did not have a comprehensive content and included superficial and basic application examples. In addition, the primary school teachers stated that the examples given in the scope of the training were limited in number, that the applications were performed in a very short period of time and were not repeated for clarity. In this regard, Bers and Portsmore (2005) emphasized that one-term applications in teachers' in-service training would be insufficient for them to acquire the knowledge and skills to successfully integrate robotic technology into classes. In this direction, during in-service trainings and in the teaching of technology applications, it is necessary to carry out activities related to various sample applications within sufficient time (Flanagan & Jacobsen, 2003). As the third result, the primary school teachers stated that the instructor who gave the training had sufficient academic knowledge and competence and that he/she accompanied them as a good guide for learning related subjects. The role of educators who act as guides and are leading, especially in keeping up with constantly developing technology or producing new technologies, is of great importance. Educators are faced with the potential of students who use technology very well in line with the developing and renewed education approach (Reiner, 2009). In this context, educators should increase their potential to use technology in their classes. And finally, with regards to the first question of the research, primary school teachers emphasized that the environment in which education is provided should have better technical facilities in terms of internet connection, computers and robotic coding tools. When we consider the fact that one of the educational technologies is robotic coding applications, we see that it is necessary to equip the classroom environment with robotic technology tools for effective teaching (Alimisis & Kynigos, 2009).

Various results were obtained regarding whether the primary school teachers who received in-service training about robotic coding applications included such applications in their own classes after

the training or not and the reasons for their preferred proceedings. Regarding the first result of the second question, it was found that primary school teachers mostly did not use robotic coding practices in their own classes. Teachers explained this situation by stating that their schools could not afford robotic coding tools and technological equipment such as computers. In studies conducted on this situation, teachers stated that there was an inadequacy in accessing auxiliary materials related to robotic technologies in schools, providing technical and educational support, and providing relevant tools (Cinar, 2017). As a second reason, although the in-service training made them feel theoretically competent in the teaching of this subject, primary school teachers stated that they thought themselves to be inadequate in practice. In this regard, Cinar (2017) stated that teachers felt lack of knowledge and self-confidence in the use of robotic technologies in classroom applications. As the last reason, primary school teachers stated that the grade level is important in the implementation of robotic coding applications and that it can be given to students starting from the third grade of primary school. In studies carried out in this context, it was emphasized that activities and practices related to robotic coding should be given in schools starting from an early age (Elkin, Sullivan, & Bers, 2016; Sullivan & Bers, 2016). Barker and Ansorge (2007) carried out robot-supported trainings with third grade students in primary school and stated that students could successfully achieve the objectives given in these trainings. Berland and Wilensky (2015) also emphasized the necessity for students to experience teaching processes related to coding education and the use of robotic kits.

It was found out that primary school teachers make evaluations in terms of curriculum and students regarding the applicability of robotic coding applications in the classroom environment. As the first result of the third question of the research, primary school teachers stated that the gains of the courses such as Science, Mathematics, Turkish and Life Science are related to robotic coding applications and that such applications could be given to the students in relation to these gains. It was found in the literature that robotic coding applications were connected with gains in mathematics (Wei, Hung, Lee, & Chen, 2011), science subjects such as force and motion, matter and heat, electricity, light and sound (Hacker, 2003; Grubbs, 2013) and were taught accordingly. As the second result, primary school teachers emphasized that the content of coding knowledge and applications should be given to the students from the second year of primary school, and the content of robotic knowledge and applications should be given to the students beginning from the third year of primary school. As a reason for this situation, the teachers first stated that the students in the first grade of the primary school start receiving reading and writing education from scratch and that it was necessary to give the coding training before the robotics knowledge. As a second reason, teachers stated that second grade students could fail in activities requiring fine muscle movement such as the connection of pins and sensors to the arduino microprocessor in robotic devices as psycho-motor skills. In studies carried out on this issue, it was stated that it is important for students to learn coding logic even if they cannot do coding at an early age (Baz, 2018; Demirer & Sak, 2016; Karabak & Gunes, 2013). In

addition, Elkin, Sullivan and Bers (2016), Sullivan and Bers, (2016) emphasize that basic coding training should be given starting from the pre-school period. Thus, the first step will be taken towards developing the 21st century skills such as exchange of ideas, creative thinking, collaborative work and critical thinking as well as students' intuition and visual thoughts. Strawhacker and Bers (2015), on the other hand, stated that in block-based programs related to coding, young students successfully accomplished most of the tasks including algorithms and coding concepts. However, it is recommended to use ready-made robotic sets such as Lego Mindstorms, Bee-bot, Cubelets and Ozobot at an early age and primary school level. It is stated that the robotic setups created using Arduino microprocessor should generally be used in the education of students who are in Piaget's concrete operations period. (Beug, 2012).

As the first result of the fourth question, it was determined that primary school teachers stated various opinions about further implementation of robotic coding applications in the classroom environment. In this context, teachers stated that schools should have physical and technological equipment and students should have a robotic coding set and a computer to create their codes in order to teach such applications to students in a learning environment in various classes. Similar to this situation, in their study, Saglik and Aldan Karademir (2019) stated that there are deficiencies in the physical and technological equipment of the schools for the classes related to the use of technology, as stated by teachers. This lack of equipment prevents effective teaching of technology. As the second result, primary school teachers stated that it is important to include in the in-service trainings knowledge about how to integrate robotic coding practices into the classes and practice activities. Similarly, Bers and Portsmore (2005) emphasized that in-service training should include practices on how to integrate robotic technology into classes. As the third result, primary school teachers emphasized that in order to enrich the education and training activities, this issue should be integrated into the curriculum, and resource books showing the practice activities should be prepared and the families' financial and moral support should be obtained. In studies conducted on this issue, teachers stated that they needed relevant materials, guidance books, and school and family support in order to provide effective robotic coding practices in their classes (Cinar, 2017; Khanlari, 2015).

Suggestions

In line with the results of this research, it is suggested that more time should be devoted to the applications related to robotic coding provided to teachers during in-service training, and that activities related to how to integrate them into classroom teaching practices should be organized. In addition, resource books should be prepared in order for teachers to have guidance and be able to implement robotic coding in their own classes. Schools should be well-equipped in terms of physical, technological and technical equipment (computer laboratory, robotic tools and educational robotic sets, coding programs) for robotic coding applications. Finally, it is suggested that elective courses for

coding training and after that for robotic training should be included in the curriculum on the primary school level.

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An Explanatory Model of Academic Success

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Abstract

The aim of this study is to test the model which explains the academic success suggested by the researchers by considering the theoretical explanations and the results of the studies in the literature. The hypotheses tested in accordance with this general aim are: The number of social media accounts and the duration of internet usage positively and directly affect internet addiction, internet addiction negatively and directly affects academic motivation, academic motivation positively and directly affects school attachment and school attachment positively and directly affects academic success. In the model explaining academic success, measurement tools were applied to 235 high school adolescents. Internet Addiction Test-Short Version by Young, Academic Motivation Scale, School Attachment Scale for Children and Adolescents along with personal information form prepared by the researchers were used as data collection tools. Analyses were performed using SPSS 20 and AMOS software. In the test phase of the model, covariance matrix and maximum likelihood method were used. As a result of the analysis, the proposed hypotheses were confirmed and the proposed hypothetical showed compliance [$\chi^2=75.510$, $df=33$, $\chi^2/df=2.288$, $RMSEA=0.079$, $SRMR=0.078$, $GFI=0.93$, $AGFI=0.89$, $CFI=0.88$; $IFI=0.80$, $TLI (NNFI)=0.85$]. According to the results of the research it has been concluded that the higher number of social media accounts and the increase in the duration of internet usage leads to internet addiction, internet addiction negatively affects academic motivation, low level of academic motivation affects school attachment negatively and low level of school attachment does not negatively affect academic success.

Keywords: Academic Success, Academic Motivation, School Attachment, Internet Addiction

DOI: 10.29329/epasr.2020.236.15

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Introduction

Along with the developments in information communication technologies, internet has started to take its place in many areas of our lives. Internet users were initially seen only as consumers, but with web 2.0 technologies, they began to be defined as a society consuming while producing (Güçdemir, 2012, p. 29; O'Reily, 2005). With Web 2.0, internet users have interacted with people they do not know in real life using their social media accounts and started to spend time together on the internet. It can be said that people's habits have started to change with social media.

There are different definitions of social media in the literature. Social media is a technology-based application that enables people to share things with each other (Van Dijk, 2016, p. 251), create personal profiles and communicate and build relationships on certain issues (Khan, 2012), that allows sharing posts (Roy & Chakraborty, 2015) that enables cultural transfer between users through the gathering of users from different countries (Srivastava, 2012). Social media has become an indispensable element of the daily lives of a significant portion of people whether they are technologically literate or not due to its format that everyone can use (Çam & İşman, 2013).

Users devote a significant part of their time to social media applications, which are used extensively by young people and especially students (Küçükali, 2016). According to the data by wearesocial.com on the internet and social media usage in countries around the world in the first quarter of 2018, approximately 4.1 billion people use the internet and 3.3 billion people actively use social media worldwide. In the same report, it is stated that the number of social media users has increased by 13% compared to the previous 12 months (Wearesocial, 2018). These data show that the usage of social media involves a wide audience and the number of users increases on a daily basis. Depending on the development level of the countries, the internet usage duration of people increases with each passing day (TUIK, 2017). The increase in duration of internet usage has led to the emergence of internet addiction concept. The concept of internet addiction was first used by Goldberg in 1996, and the first tool for measuring internet addiction was developed by Kimberly S. Young (Goldberg, 1996; Kraut et al., 2002; Young, 1998). Although there is no consensus on internet addiction, internet addiction can be explained as excessive use of the internet, the state of being excessively frustrated and aggressive when unable to access the internet, intensive use of the internet at a level that will adversely affect basic daily work and functions (Chen, Chen, & Paul, 2001; Gonzalez, 2002; Kutlu, Savci, Demir, & Aysan, 2016; Simkova & Cincera, 2004: 5; Leung, 2004; Yellowlees & Marks, 2007). Individuals who are addicted to the internet neglect their basic duties (Ceyhan, 2008) and have problems in friendship and family relations (Cao & Su, 2007).

Researches have shown that as the number of individuals' social media accounts increases, the time they spend on the internet increases (Caplan, 2002; Çelik, 2018; Griffiths, 2000; Işık, 2007), and it has been determined that this situation triggers the risk of internet addiction in individuals

(Andreassen & Pallesen, 2014; Beard & Wolf, 2001; Davis, 2001; Karaiskos, 2010; Oktan, 2015). As for internet addiction, adolescents are potentially the risky groups (Bölükbaş, 2003). Internet addicts develop attention deficit disorder and these individuals skip classes as they spend too much time on the internet (Suhail & Bargees, 2006) and as a result, they cannot perform their academic tasks at the desired level (Becker, Alzahabi, & Hopwood, 2013).

Academic motivation can be defined as the energy (Bozanoğlu, 2014;) that motivates students to maintain their willingness to fulfill their academic responsibilities (Ryan & Connel, 1998). Students' academic responsibilities include such examples as school attendance, doing homework, obeying class and school rules, and preparation for exams. In this respect, it can be said that academic motivation is an important parameter that determines students' attendance and success in their classes (Clark & Schroth, 2010: 70). Academic motivation, which is vital for school effectiveness (Bedel, 2015; Erdil, 2010; Korkmaz, 2011; Maulana, Opdenakker, & Bosker, 2014; Skinner, Pitzer, & Steele, 2016), can be specified as students' efforts to fulfill their academic responsibilities, the continuity of this effort and their success (Schunk, Meece, & Pintrich, 2014). Students with high academic motivation tend to better understand the subject with all their energy (Balkıs, Duru, Buluş, & Duru, 2006), to spend more time in school (Sternberg & Williams, 2009), to participate in the class continuously and actively (Vallerand & Bissonnette, 1992), and to keep a positive attitude towards the lessons (Akandere, Özyalvaç, & Duman, 2010). In other words, academic motivation is an important parameter that directly affects student achievement. Since academic motivation has a decisive role in achieving the goals determined by education, it is considered important to pay attention to the factors that affect students' motivation levels. The first significant point in terms of academic motivation is the fulfilment of students' needs in autonomy, competence and social relations (Deci & Ryan, 1985; Deci, Vallerand, Pelletier, & Ryan, 1991). In this way, motivation levels of the students will increase (Karagüven, 2012). Students' satisfaction with the learning or discovery of new things and the pleasure they receive, their interest and attitudes to lessons, thus their love of books, their participation in lessons are indicators of the fact that the students are motivated by the goals of the school (Vallerand et al., 1992). It can be said that these students have high intrinsic motivation levels. In addition to intrinsic motivation sources, trying to be appreciated, rewarded, and avoid aggressive criticism are each examples of extrinsic motivation (Ryan & Deci, 2000; Vallerand et al., 1992). In terms of education systems, it is understood that students with high academic motivation pursue continuous success (Deci & Ryan, 2004; Elliot & Harackiewicz, 1996; Muraya, Elliot, & Freidman, 2012; Özder & Motorcan, 2013; Uyulgan & Akkuzu, 2014) and they have higher levels of commitment to school (Öncü, 2004; Ratelle, et al., 2007; Schunk, Meece, & Pintrich, 2014;). When literature is examined, the concept of school attachment is related to school bonding, school engagement and student engagement (Demir, 2017; Doğan, 2014; Libbey, 2004): the concept of school attachment is conceptualized as school bonding (Jenkins, 1997; Simons-Morton, & Crump, 1996), school engagement (Manlove, 1998; Ryan & Patrick, 2001) and student engagement (Doğan, 2014; Mazer, 2013; Özdemir, 2018). The concept

of school attachment was first introduced to literature by Hirschi (1969). School attachment is a concept that involves students' behavior and thoughts based on their experiences and feelings related to school (Fredricks, Blumenfeld, & Paris, 2004), which determines the students' participation in activities in schools (Audas & Willms, 2001), and it is associated with academic outcomes such as success and school completion (Dotterer & Lowe, 2011, p. 1651). Students' considering themselves as a member of the school they attend to, their relationships with other students and teachers as well as the support level that is provided by teachers are important factors for the development of school attachment (Demir, 2017). School attachment has been proven by researches to be an important variable in tolerating undesirable behaviors in schools (Can, 2008, p. 2-10, Hirschi 2009, p. 10;). In the light of these data, it can be said that students with high level of attachment to school will have high levels of compliance with school and classroom rules. Similarly, researches with high academic success of students with high levels of school attachment (Cemalcilar, 2010; Günüç; 2014; Mengi, 2011, p. 2; Simon-Morton, & Chen, 2009; Skinner, Wellborn, & Connell, 1990; Wang & Eccles, 2012) increase the importance of this concept. In addition, the concept of school attachment is positively related to variables such as school attendance (Connell, Spencer, & Abel, 1994) that is important in the realization of the manifest and latent functions of educational systems, and the students' view of themselves as a member of the school (Libbey, 2004; Ryan & Patrick, 2001). Similarly, school attachment is negatively and significantly related to dropping out, which is one of the major problems of education systems (Hirschfield & Gasper, 2011; Klem & Connell, 2004; McNeely & Falci, 2004). It is emphasized that there is a positive relationship between school attachment and academic success (Demir, 2017).

It is considered that this research will contribute to the literature in various ways. Firstly; one's choice of a profession is one of the important variables affecting their working conditions, choice of spouse and life style. In this context, high school years are more important for students to make appropriate professional choices compared to other periods of their lives. It is only possible for students to study in the programs/universities they want only if they are academically successful. Therefore, it is considered crucial to determine the factors that directly and indirectly affect the academic success of students. Secondly; researchers/ educators can benefit from the results of this research in intervention programs aimed at improving students' academic success. Finally, considering that social media and internet is used intensively among adolescents, it is believed that investigating the effects of the intensive usage on academic success within the framework of structural model will contribute to the literature as it is one of the first studies in the field. From these explanations, the structural model explaining academic success is shown in Figure 1 and the hypotheses (H) of the model are provided below:

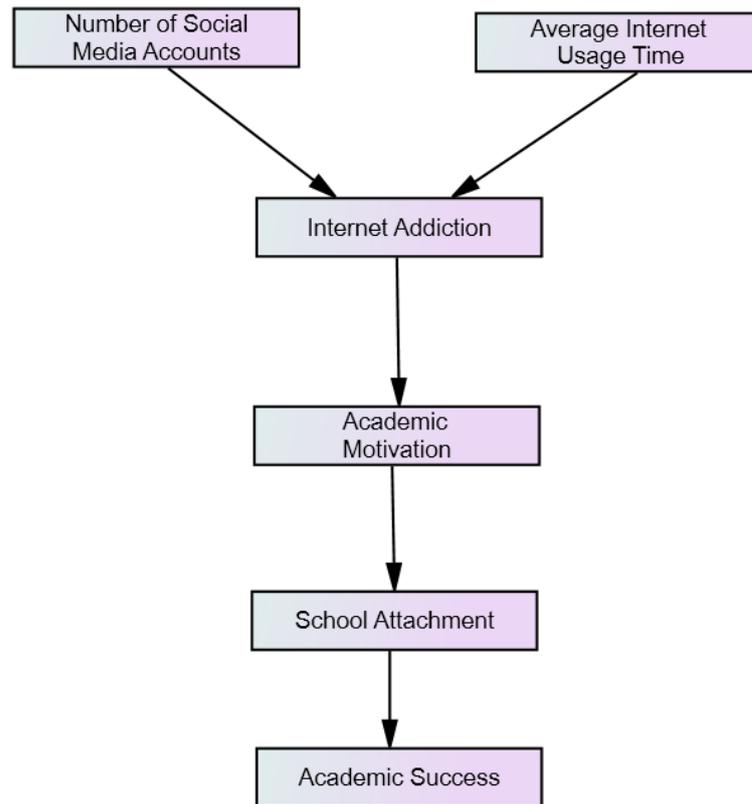


Figure 1: The Model That Explains Academic Success

H₁: The number of social media accounts and the duration of internet usage positively and directly affect internet addiction.

H₂: Internet addiction negatively and directly affects academic motivation.

H₃: Academic motivation positively and directly affects school attachment.

H₄: School attachment positively and directly affects academic success.

H₅: The number of social media accounts and duration of internet usage negatively and indirectly affect academic success.

Method

Research Model

This research is designed in relational model of research. The relationships between secondary school students' social media accounts, average duration of internet usage, internet addiction levels, academic motivation levels, school attachment levels and academic success levels are examined. For this purpose, in order to explain the predictive relationships between variables; Structural Equation Modeling (SEM), which is frequently preferred in relational research, is used as it allows simultaneous examination of the relationships between variables (Fraenkel, Wallen, & Hyun, 2012).

Study Group

The study group which was chosen with convenience sampling method by taking into account ease of accessibility, affordability and availability consists of 235 students, 93 (45.4%) female and 112 (54.60%) male who continue their education in a high school in Eastern Turkey. The ages of the

students who participated in the research ranged between 14 and 17 ($\bar{x} = 15.52$, $Ss = .86$). Other descriptive information about the participants of the research is available in Table 1.

Table 1. Socio-demographic information about the students participating in the research

Gender	Female	Male		
	93 (%45.4)	112 (%54.6)		
Age	14	15	16	17
	16	100	55	34
Class Level	9	10	11	
	120	46	39	
Owning a Smart Phone	Yes	No		
	170	35		
Number of Social Media Accounts	1	2	3	4 and 4+
	70	61	66	38
Frequency of Social Media usage	Everyday	Several times a week	Several times a month	
	128	49	28	
Frequency of Internet Use	Everyday	Several times a week	Several times a month	
	151	43	11	
Total	235			

Data Collection Tools

Three scales and personal information form were used in order to collect the necessary data. Scales used are; Young Internet Addiction Test-Short Form (YIAT-SF), Academic Motivation Scale (AMS) and School Attachment Scale (SAS).

Personal Information Form: In this research, data on gender, age, class, number of social media accounts, smartphone ownership status, weekly average internet usage duration, social media and internet usage frequency and academic success were collected with personal information form. The academic success of the students was based on the end-of- term final success grades in their report cards.

Young Internet Addiction Test- Short Form (YIAT-SF): Young Internet Addiction Test-Short Form (YIAT-SF) is a scale developed by Pawlikowski, Altstötter-Gleich and Brand by converting Internet Addiction Test (IAT), which was developed by Young to measure the level of internet addiction, to a short form as a result of validity and reliability studies. The scale was adapted to Turkish by Kutlu, Savcı, Demir and Aysan (2016) and consists of 12 items. YIAT-SF is a 5-point Likert-type evaluation tool. The scale is one-dimensional, and scores vary between 12 and 60. Higher scores indicate high levels of internet addiction. As a result of exploratory factor analysis conducted in adolescents within the validity of the scale, it was found that the items of the scale were collected under a single factor with an eigenvalue greater than 1. The eigenvalue of this single-factor structure is 5.7 and explains 48.9% of the total variance. As a result of Confirmatory Factor Analysis (CFA) performed in adolescents as the second procedure in terms of validity, it was seen that the fit index values of the one-dimensional model were $\chi^2 = 141.934$, $df = 51$, $RMSEA = .080$, $GFI = .90$, $CFI = .90$ and $IFI = .90$. Cronbach's alpha coefficient in adolescents was calculated as .86. These results prove that the scale is a valid and reliable measurement tool.

Academic Motivation Scale (AMS): The Academic Motivation Scale (AMS) consists of 20 items and three factors developed by Bozanoğlu (2004) to determine the individual differences in students' academic motivation levels. It has a 5-point Likert rating scale. High scores from the scale indicate that there is a high level of academic motivation. As a result of the exploratory factor analysis conducted within the scope of the validity of the scale, it was found that it consisted of 3-factor structure and explained 42.2% of the total variance. Test-retest reliability was examined within the scope of reliability and it was seen correlation between the two measurements performed at 4-week intervals was .87. As a result, validity and reliability studies show that AMS is a valid and reliable measurement tool.

School Attachment Scale (SAS): The School Attachment Scale (SAS) for Children and Adolescents was developed by Hill (2006) to evaluate the level of attachment of children and adolescents to school. It consists of 13 items and three factors. The Turkish adaptation was made by Savi (2011). There are 4 items for attachment to school and friends and 5 items for attachment to teacher. In terms of validity, first Exploratory Factor Analysis (EFA) was carried out for adolescents and the scale was found to have a three-factor structure explaining 58.69% of the total variance. Within the scope of reliability examination, Cronbach's alpha reliability coefficients were first examined and calculated as .84 for the whole scale. In order to examine the consistency of the scale in terms of time, test-retest was applied to the participants at an interval of 20 days and it was found that test-retest coefficient was .85 for the whole scale. Consequently, validity and reliability studies show that SAS is a valid and reliable measurement tool.

Procedure

First of all, research permissions were obtained from the Ethics Committee and the Provincial Directorate of National Education and the school administrators were informed about the research. The researchers conducted face-to-face interviews with the students and applied measurement tools to 323 students in an average of 40 minutes. Afterwards, the data were transferred to digital media and 13 students whose opinions were filled in incomplete and incorrectly were removed from the data set. The distribution properties of the data set were examined, the extreme values were determined by the skewness and kurtosis coefficients and 12 data deviating from the normal distribution were excluded from the analysis. Mahalanobis distances were examined in order to examine the versatile extremes and three data above the critical value of 20.52 (Pallant, 2016) were excluded if the number of independent variables was five. The Kolmogorov-Smirnov normality test was used to evaluate the normal distribution assumption on the remaining data, and it was found that the data exhibited normal distribution. VIF and tolerance values were within acceptable limits.

In the analysis of the data, the relationship between the number of social media accounts, average duration of internet usage, internet addiction, academic motivation, school attachment and academic success were analyzed by Pearson Product-Moment Correlation, the direct and indirect effects of number of social media accounts, average duration of internet usage, internet addiction,

academic motivation and school attachment on academic success were investigated by path analysis. Internet addiction, academic motivation and school attachment variables were implicit variables in the model. Internet addiction and school attachment consist of one factor and academic motivation consists of three sub-factors. The values of χ^2 , df, χ^2 /df, GFI, CFI, NFI, TLI, SRMR and RMSEA fit indexes were taken into consideration in the evaluation of the model fit.

Findings

Correlation Values

Correlation results for the number of social media accounts, duration of internet usage, internet addiction level, academic motivation level, school attachment level and academic success variables are given in Table 2.

Table 2. Relationships between variables

	1.AMS	2.SM	3.IM	4.IA	5.AM	6.SAS
1.AMS	1.	-.11	-.04	-.23**	.16*	.31**
2.SM		1.	.23**	.30**	-.20**	-.13
3.IM			1.	.26**	-.22**	-.10
4.IA				1.	-.29**	-.18*
5.AM					1.	.32**
6.SAS						1.

AMS: Academic Motivation; SM: Number of Social Media Accounts; IM: Duration of Internet Usage; IA: Internet Addiction; AS: Academic Success; SAS: School Attachment.

When Table 2 is examined, it is found that there is a significant negative correlation between academic success and internet addiction ($r=-.23$, $p<.001$); and a significant positive correlation between academic motivation ($r=.16$, $p<.05$) and school attachment ($r=-.31$, $p<.001$). There is a significant positive correlation between duration of internet usage and internet addiction ($r=.26$, $p<.001$); a significant negative correlation between the former and academic motivation ($r=-.22$, $p<.001$). There is a significant negative correlation between internet addiction and academic motivation ($r=-.29$, $p<.001$) with academic success ($r=-.18$, $p<.05$). Finally, there is a significant positive correlation between academic motivation and school attachment ($r=.32$, $p<.001$). In general terms, the correlations between the variables vary between $-.29$ and $.32$. These values indicate that there is no multicollinearity.

Results

Results related to the measurement model

Before testing the model explaining academic success, the measurement models related to the measurement tools included in the proposed hypothetical model were tested separately. In this context, YIAT-SF was tested with first level and AMS and SAS with second level DFA. When the results of the analysis are examined it is calculated as; YIAT-SF [χ^2 /df = 1.686, RMSEA = 0.058, SRMR = 0.057; GFI = 0.93, CFI = 0.92, IFI = 0.92, TLI (NNFI) = 0.90], AMS [χ^2 /df = 2.257, RMSEA = 0.078, SRMR = 0.084; GFI = 0.85, CFI = 0.70, IFI = 0.70, TLI (NNFI) = 0.65] and SAS [χ^2 /df = 2.901, RMSEA = 0.066, SRMR = 0.066; GFI = 0.88, CFI = 0.93, IFI = 0.93, TLI (NNFI) = 0.90]. It

can be said that AMS has poor fit whereas other measurement tools have acceptable fit index values (Kline, 2011; Sümer, 2000; Tabachnick, & Fidell, 2015). These findings indicate that the scales are sufficient to be included in the structural model.

Results related to the proposed hypothetical model

The proposed hypothetical model for explaining academic success was tested with the Maximum Likelihood method considering that the model meets the prerequisite criteria such as multilinearity, multivariate normality, outliers and structural sample size. In this research, Covariance matrix which is one of the Maximum Likelihood methods was used.

According to the results of the analysis, t values for the proposed hypothetical model range from -3.899 and 6.413. All paths for t value are statistically significant at 0.01 level. When the fit index values of the proposed hypothetical model are examined; $\chi^2 = 75.510$, $df = 33$, $\chi^2 / df = 2.288$, RMSEA = 0.079, SRMR = 0.078, GFI = 0.93, AGFI = 0.89, CFI = 0.88; IFI = 0.80, TLI (NNFI) = 0.85. These findings suggest that the hypothetical model proposed to explain academic success in adolescents has generally acceptable fit index values (Kline, 2011; Sümer, 2000; Tabachnick & Fidell, 2015). The results of the path analysis for the proposed model are presented in Figure 2.

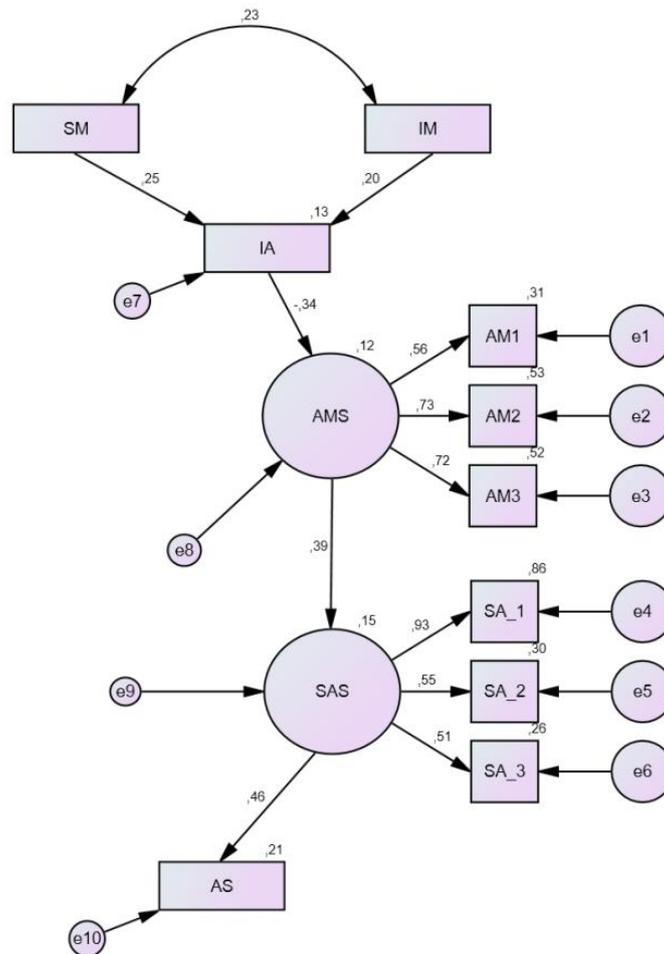


Figure 2. Path analysis of the model explaining academic success

SM: Number of Social Media Accounts; IM: Duration of Internet Usage; IA: Internet Addiction; AMS: Academic Motivation; SAS: School Attachment; AS: Academic Success.

Kline (2011) stated that an effect size of around .10 is small, an effect size of around .30 is medium and an effect size of around .50 is a large effect size. Considering the direct effects of variables explaining academic success the standardized regression coefficient of 0.25 between the use of social media and internet addiction shows that the number of social media accounts positively affects internet addiction and the effect size between the two variables is moderate. Similarly, increase in the duration of internet usage increases the level of internet addiction. The standardized regression coefficient of 0.20 between these two variables indicates a moderate effect size. Internet addiction negatively affects academic motivation. The standardized regression coefficient of -0.39 between internet addiction and academic motivation indicates a moderate negative effect size. Finally, school attachment positively affects academic success. The standardized regression coefficient of 0.46 between school attachment and academic success indicates a high level of effect size. In this model explaining academic success; the number of social media accounts and the average duration of internet usage together revealed 0.13 variance of internet addiction, internet addiction revealed 0.12 variance of academic motivation; academic motivation revealed 0.15 variance of school attachment; school attachment revealed 0.21 variance of academic success. The analysis results of the proposed hypothetical model are presented in Table 3.

Table 3. Proposed hypothetical model's standardized regression values, t values and explained variance.

		λ	t	R ²
Internet Addiction	← Number of Social Media Accounts	.254	3.775	.126
Internet Addiction	← Average Internet Usage Time	.198	2.946	.118
Academic Motivation	← Internet Addiction	-.344	-3.899	.148
School Attachment	← Academic Motivation	.385	4.019	.208
Academic Mot._1	← Academic Motivation	.556		.261
Academic Mot._2	← Academic Motivation	.728	6.198	.302
Academic Mot._3	← Academic Motivation	.719	6.196	.859
School Att._1	← School Attachment	.927		.517
School Att._2	← School Attachment	.549	6.413	.530
School Att._3	← School Attachment	.254	6.088	.309
Academic Success	← School Attachment	.198	5.579	.126

When Table 3 is examined, it is seen that all the paths in the model explaining academic success are statistically significant. These results show that the hypotheses of the model explaining academic success are confirmed.

Discussion, Conclusion and Suggestions

In this study, indirect and direct effects of social media account numbers, duration of internet usage, internet addiction, academic motivation and school attachment on academic success are investigated by structural equation modeling.

It was determined that the number of social media accounts and duration of internet usage had a positive effect on internet addiction. In the literature, it is emphasized that the high number of social media accounts and the increase in duration of internet usage are risk factors for the development of internet addiction (Balci & Gülnar, 2009; Savcı, Ercengiz, & Aysan, 2018). The contents of social media applications vary. There are applications in which the main purpose is to produce/share video content applications, as well as social media applications where only photo sharing or virtual social interaction groups exist (Miller, 2017; Khan, & Bhatti, 2012). Adolescents with a high number of social media accounts are likely to spend a significant amount of their time on the internet, considering that they need to spend time separately for the activities in each social media group. One of the criteria of internet addiction is the continuous increase in usage duration (Kutlu et al., 2016). In this context, it can be assumed that adolescents who have both higher duration of internet usage and social media accounts are among the risky groups in terms of addiction.

It is emphasized that internet addiction causes tolerance development in individuals as in other addictions. In other words, it can be said that the desire for internet use increases in individuals who develop addiction (Savcı et al, 2018). Researches emphasize that individuals with high internet addiction have low academic motivation and are more reluctant to perform academic tasks compared to other individuals (Demir, 2017; Demir & Kutlu, 2018; Muslu & Bolışık, 2009). This can be explained by the fact that the internet is attractive to adolescents. The Internet offers a number of opportunities for adolescents such as listening to music, watching movies, playing online games, communicating with distant friends, developing new virtual social relationships. These opportunities offered by the internet to adolescents may be more fun than studying. Individuals who develop Internet addiction and continuously spend time in such activities may develop reluctance for academic tasks (Demir, 2017; Mohammadi, & Torabi). Carrying out school assignments and responsibilities, learning new topics may no longer be desirable for the adolescent. Therefore, increasing internet addiction can be considered as a factor that reduces academic motivation.

According to another result of the study, academic motivation levels positively affect school attachment in adolescents. This result is similar to the results of the studies in the literature (Demir & Kutlu, 2018; Guay, Denault, & Renauld, 2017). In this context, it is stated that individuals with low academic motivation will have less desire to fulfill the tasks and responsibilities related to the school. (Eisele, Zand, & Thomson, 2009; Gillen-O'Neel, & Fuligni, 2013). In other words, low motivation will decrease the individual's willingness to school. Therefore, low motivation will negatively affect individuals' attachment to school.

It was determined that school attachment in adolescents had a positive effect on academic success. In other words, the high level of school attachment in adolescents positively affects their academic success. This result shows similarity to the research results in literature. (Engh, Jernbro, Lin, Bornehag, & Eriksson, 2018; Spilt, Hughes, Wu, & Kwok, 2012). School attachment is a broad concept involving attachment to friends, teachers and the school itself (Demir, & Kutlu, 2018; Hill, &

Werner, 2006). It is emphasized that individuals with high level of attachment to school have positive attitudes towards school, their relations with teachers are at the desired level, and they are more willing to fulfill their academic tasks and responsibilities (Demir, 2017). It can be said that individuals with high levels of attachment to school are more active in situations related to learning and pupilage and therefore are more successful.

Finally, it was determined that the number of social media accounts and duration of internet usage had an indirect and negative effect on academic success in adolescents. This result shows that the high number of social media accounts and the increase in the duration of internet usage in adolescents indirectly and negatively affect their academic success. Researches show that internet addiction is negatively related to academic success. (Cengizhan, 2005; Demir & Kutlu, 2017; Stavropoulos, Alexandraki, & Motti-Stefanidi, 2013).

As in every research, there are some limitations in this one as well. Some of these limitations are that the study was conducted with self-report scales and with adolescents only, and that the study was conducted without qualitative data. The use of mixed methods and subsequent studies in different sample groups may contribute to better evaluation and accurate generalizations.

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