Investigation of the Effect of Teacher Training Programs on Reflective Thinking: ALACT Model

Gökhan Kaya[i]
Kastamonu University

Servet Öz[i]
Kastamonu University

Abstract

The purpose of the current study is to investigate the contribution of teacher training programs to the development of reflective thinking in pre-service teachers and the state of their using reflective thinking skills according to the ALACT model. Although the study carried out is quantitatively-focused research, the methods of qualitative research were used to show how the participants used the examined variable. Therefore, the study was conducted using an exploratory mixed design. The study participants are 277 first-year and fourth-year pre-service teachers (211 females and 66 males) attending a state university. The participants of the qualitative dimension of the study are 20 fourth-year pre-service teachers selected through the convenience sampling method. As data collection tools, the "Reflective Thinking Tendency Scale (RTTS)", reflective thinking writings, and teacher training programs were used. According to the ANCOVA results, there is no significant difference between the pre-service teachers who are in the first year of their undergraduate education and the pre-service teachers who are in the last year of their undergraduate education. It was also concluded that the fourth-year pre-service teachers did not experience any reflective thinking process in the majority of their applications, and the ones who experienced such a process experienced it at the basic level (1st-3rd level). In light of the findings of the current study, it can be suggested that reflective thinking skills should be emphasized more clearly and that teacher training programs should be structured according to various reflective thinking models such as ALACT.

Keywords: Pre-Service Teacher, Reflective Thinking, ALACT Model, Teacher Training Programs

----

[i] **Gökhan Kaya,** Assist. Prof. Dr., Primary Education, Kastamonu University, ORCID: 0000-0003-4044-9243

Correspondence: gkaya@kastamonu.edu.tr

[ii] **Servet Öz,** Early Childhood Education, Kastamonu University, ORCID: 0000-0002-4883-1589

INTRODUCTION

Critical thinking, problem-solving and decision-making skills, which are among the 21st-century skills, are highly desired in both education and business today (Zengin, Kaya, Pektaş, 2020; OECD, 2015). These skills include assessment processes used by all individuals in the community and can be expressed as the interpretation of events using individuals' existing knowledge. Thinking about events and evaluating actions based on existing knowledge, skills, and beliefs are called "reflective thinking" (Moon, 2008). Korthagen (1999) defines reflective thinking as a mental process activated for reconstructing an experience, a problem, or existing knowledge or insights. Reflective thinking is a skill that enhances the quality of the activities performed to develop learning habits, critical thinking skills and problem-solving methods (Kızılkaya & Aşkar, 2009). In other words, reflective thinking plays a role in the development of 21st-century skills.

Reflective thinking is based on Dewey's works on lifelong learning (1993), and Schön's studies on the training of reflective practitioners (1983; 1987), and the importance of thinking in teaching and learning processes have been discussed in many studies to date (Köksal & Özdemir, 2008; Lee, 2000; 2005; Lee & Loughran, 2000; Rodgers, 2002). The distinction made by Schön (1983) between teaching as technical rationality, which has formed the basis of the specialization in university programs for years and teaching as problem-solving, accurately explains the concept of reflection. Reflection in problem-solving refers to a purposeful and systematic inquiry about one's individual theories about teaching and learning, and the practices guided by these theories (Abell, Bryan & Anderson, 1998). Teaching as a problem-solving has gradually gained importance in university programs aiming to train professional field experts. Reflection is critical in every teaching process, and the most considerable role and responsibility in the training and development of reflectively thinking individuals are on the shoulders of teachers. To train individuals with reflective thinking skills required by today's society, teachers must be able to think reflectively first (Tok, 2008).

In particular, teacher training programs since the 1980s have emphasized that reflective thinking skills are an important characteristic that should be acquired by pre-service teachers in their pre-service training process. Reflective thinking skill are considered to be important in terms of teachers' evaluating their practices (Rodgers, 2002), analyzing the problems they face with a critical perspective (Carter & Anders, 1996), adapting their current teaching skills to new situations (Doyle, 1990) and specializing in their professional lives without being dependent on others (Dewey, 1933). These skills are emphasized in many documents such as The National Board for Professional Teaching Standards in America (NBPTS) (Tok, 2008) and The Basic Support Project in Turkey (MoNE, 2005).

Those who advocate that teachers should have reflective thinking skills (e.g., Dewey, 1965; Lee, 2005; Rodgers, 2002) argue that individuals should be encouraged to think about the problems they encounter in training. They are also emphasized that teachers should be provided with opportunities to find their solutions because reflective thinking is an individual activity and requires constructing individual theory (McInytre, 1993). The main objective of reflection in teacher education is to enable teachers to better understand their practices to improve them. Experienced teachers have a wide range of experience, implicit knowledge and intuitive understanding that they can draw on to understand classroom activities (Abell, Bryan & Anderson, 1998). These skills refer to establishing connections with past practices and shaping future teaching practices, thus providing an active learning process (Eryaman, 2007; Wade & Yarbrough, 1996). Therefore, it is recommended that pre-service teachers carry out reflective activities not only to better learn new ideas in the program but also to continue their professional development after leaving it (Lee, 2005). Reflective thinking is defined as the thinking process to solve the problems that arise in individuals' learning processes or in the process of transferring information (Ünver, 2003). As observed in the definitions related to reflective thinking, the reflective teacher strives to develop his/her students in the most beneficial way: in other words, to train individuals who learn successfully for the community.

Results (e.g, Choy, Yim & Sedhu, 2019; Dervent; 2015; Halpern, 2007; Huang, 2001; Riedler & Eryaman, 2016; Töman, 2017) indicate the necessity of using reflective thinking in teacher education and that the teaching skill of the pre-service teachers using reflective thinking skills has been enhanced. For example, Huang (2001) states that reflective thinking is one of the best ways of supporting pre-service teachers to gain experience and learn from their experiences. Halpern (2007) argues that using these skills can also turn into a metacognitive reflective structure that helps students develop reflective thinking skills. Choy et al. (2019) explain that focusing on reflective thinking and practices provides practitioners' increasing teaching awareness. In another study Töman (2017) is also emphasized that pre-service teachers' experiences and reflecting on these experiences provide the development of reflective thinking skills to plan, implement, and evaluate a lesson. Dervent (2015) emphasizes that reflective practices reinforce their teaching skills and support the multimodal aspect, such as proper planning, time management, and school facilities. In their study, Köksal and Demirel (2008) revealed that the development of reflective thinking positively affected the design, implementation and evaluation of the teaching process. Reflective thinking, which provides a significant amount of help in solving the problems faced by teachers, primarily allows teachers to evaluate their performance. As a result, teachers have a realistic knowledge of their positive and negative sides. Teachers, who do not have reflective thinking techniques show a timid approach to the events happening around them. They exhibit an attitude that does not criticize the school's culture and values, abides by the established order, and is guided by authority.

The general competences of the teaching profession in Turkey, which were first published in 2006, were renewed in 2017, and both documents of competences emphasize (MoNE, 2017) that teachers should question their practices, conduct and self-evaluation and use the theoretical and methodological knowledge in their field for their personal development. Besides, the concept of "reflection" was emphasized in the course contents of the teaching practice courses in teacher training programs (YÖK, 2017). It can be seen that pre-service teachers who graduate from teacher training programs want to be reflective teachers. However, in many studies conducted in Turkey (Aşkın-Tekkol & Bozdemir, 2018; Aydın & Çelik, 2013; Duban & Yelken, 2010; Elmalı & Balkan-Kıyıcı, 2018), it has been emphasized that pre-service teachers are weak in terms of reflective thinking skills. Similar results can be seen in the international literature. For example, Rodgers (2002) stated that pre-service teachers have problems such as not being able to make a clear definition of their teaching processes and not being able to transfer reflective thinking skills to the activities they use in teaching processes. In this regard, it is essential to determine the state of teacher training programs in training pre-service teachers as individuals with these thinking skills.

The studies on reflective thinking in the literature can be classified as the studies focused on the contributions of reflective thinking skills to the profession of teaching (Korthagen & Kessel 1999; Şengül & Üstündağ, 2009; Wegner, Weber & Ohlberger; 2014), methods used to develop reflective thinking skills (Ayan & Seferoğlu, 2011; Ghanizadeh, 2017; Gipe & Richards, 1992; Wade & Yarbrough, 1996), effects on problem-solving and critical thinking (Aşkın-Tekkol & Bozdemir, 2018; Ng & Tan, 2006), developing reflective thinking models (Lee, 2000; Rodgers, 2002; Schon, 1987) and determining reflective thinking tendencies of teachers and pre-service teachers and investigating them in terms of some variables (Aydın & Çelik, 2013; Duban & Yanpar-Yelken, 2010; Gedik, Akhan & Kılıçoğlu, 2014; Keskinkılıç-Yumuşak, 2015). Within the existing research, multi-dimensional studies examining the extent to which teacher training programs support the development of these skills and reflective thinking tendencies of pre-service teachers within the frameworks of reflective thinking models are not found. In this connection, the current study aims to reveal the effect of teacher training programs on the development of reflective thinking tendencies of pre-service teachers attending these programs. At the same time, this study investigates how pre-service teachers use reflective thinking skills by following the ALACT model and provides an in-depth evaluation of the teacher training program as it tries to reveal the general structure.

The ALACT model is a cyclical model developed by Korthagen (1985) to assess and develop reflective thinking skills in teacher training processes. The model presents the steps of the reflective

process (Figure-1). This reflective model consists of five steps: action, looking back, awareness of essential aspects, creating alternative models of action and trial (Korthagen & Kessels, 1999). Action refers to the realization of the teacher that something is not correct in his/her teaching. During supervision, when it is decided to restart the action or when retrospection is performed, the step of looking back has been accomplished. Reconsidering one's action and evaluating its outcomes is a part of the step of awareness of essential aspects. In the penultimate step, the teacher thinks about the alternatives which would have been suitable in that situation and then puts one into practice. As the trial step refers to another action to then be reflected upon, trial and action are considered a stage and make up a self-coherent reflection cycle. Korthagen (1999) also emphasizes the opportunity to develop interpersonal skills through reflection. As a result, a teacher's reflection competence should be such that a supervisor is no longer needed for sufficient reflection.
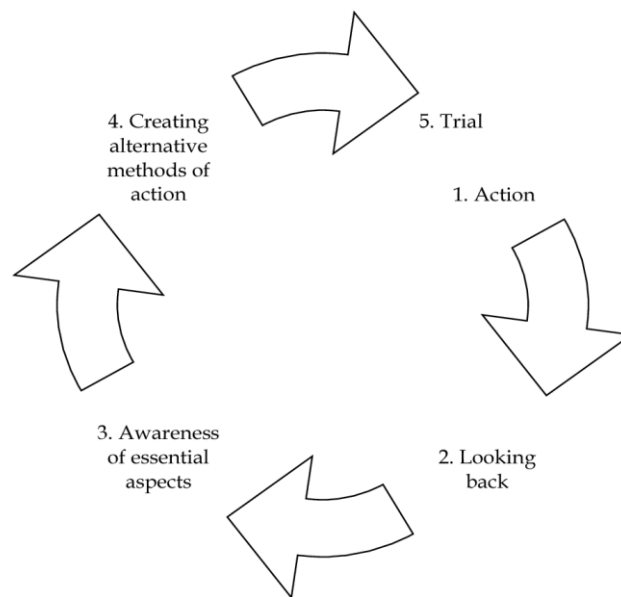

Figure 1. ALACT Model (Korthagen, 1995, 1998; Korthagen & Kessels, 1999)

The findings to be obtained to this end are believed to contribute to the literature on the teacher training programs in Turkey and the reflective thinking skills of pre-service teachers. As the current study aimed to investigate teacher training program contributions to the development of pre-service teachers' reflective thinking skills and how they are currently being used, answers to the following research questions were sought.

- What are the effects of teacher training programs on the development of pre-service teachers' reflective thinking tendencies?

- How are pre-service teachers using reflective thinking skills in their instructional practices?

- How do teacher training programs addressing to reflective thinking?

METHODOLOGY

In the current study, a mixed research method has been used. The mixed research method allows a detailed and comprehensive explanation of a phenomenon using qualitative and quantitative research methods (Mills & Gay, 2016). In other words, it is a method that helps analyze research problems more deeply (Creswell, 2014). The study was conducted based on the exploratory mixed design (Frankel, Wallen & Hyun, 2011). The research model is shown in Figure 2.
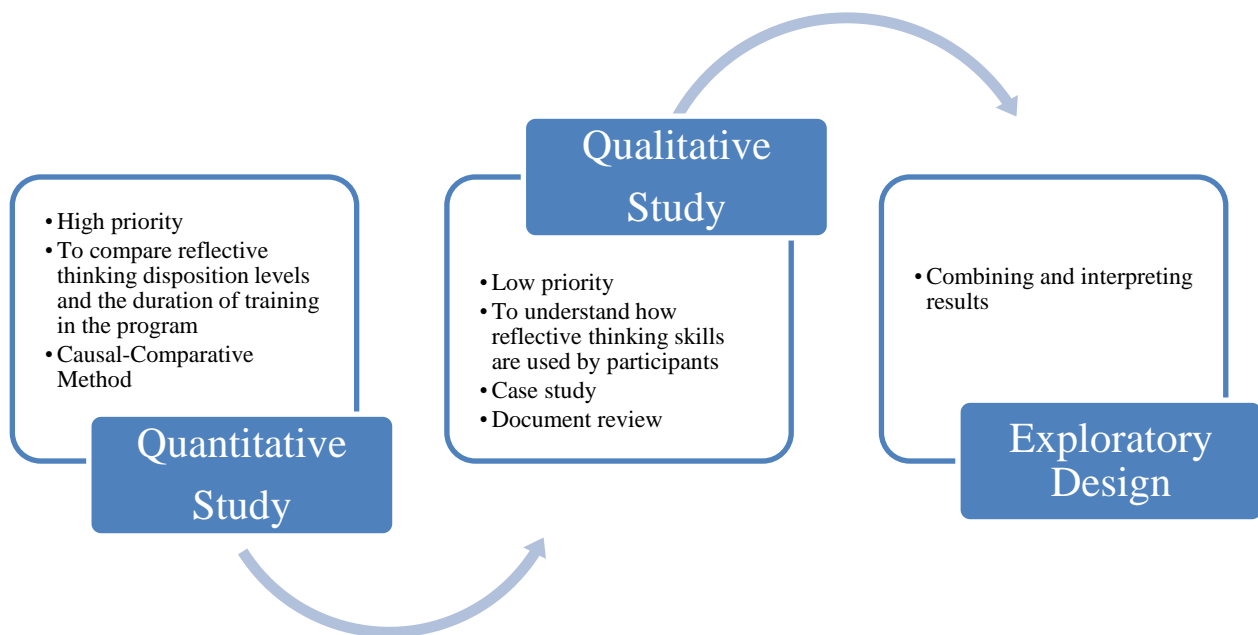
Figure 2. The research model

In studies using the exploratory mixed research design, the first data are collected by using the quantitative research method. The qualitative research method is then used to explain or clarify the quantitative data first obtained (Creswell, 2012). In the current study, to determine the effect of teacher training programs implemented in education faculties on pre-service teachers' reflective tendencies, the scores collected from the freshmen and senior students from the reflective thinking tendencies scale were compared. In this part, representing the quantitative dimension of the study, the state of teacher training programs implemented in universities in terms of training pre-service teachers in compliance with the model of teachers with developed reflective thinking skills was investigated. To this end, the causal-comparative method was used. Because many studies (e.g., Rodger, 2002; Wegner, Weber & Ohlberger; 2014) emphasize that teacher training programs should be trained with the reflective thinking skills of pre-service teachers in their professional experience processes. It reveals that their teacher education status may cause a difference between individuals' reflective thinking skills. In causal-comparative research, researchers try to determine the causes and results of the pre-existing differences between or within groups (Frankel, Wallen & Hyun, 2011). The current study includes the groups of pre-service teachers constructed as independent of the researcher's guidance.

In the qualitative dimension of the exploratory mixed design related to the second and third research questions, the case study method and document reviewing were used. The case study method is used to obtain detailed information about the phenomenon being investigated (Creswell, 2007). Analysis of the current context or environment in which the phenomenon being researched exists increases the importance of a case study (Yin, 2009). In this part, the reflective thinking writings of 20 senior students selected through the non-probability purposeful sampling method in which not all members of the population have an equal chance of participating in the study, unlike probability sampling (Showkat & Parveen, 2017), within the context of the "teaching practice" course were subjected to descriptive analysis according to the ALACT model. All participants were chosen senior students because they have a chance to implement and reflect on their teaching practice. The last part of the analysis is based on two teacher training programs: the new one and the previous one that still in effect. The programs were investigated in line with document reviewing aspects to determine how they

address reflective thinking. The last method also helps to understand the current status of the first and second research questions.

Participants

The participants of the current study are first-year and fourth-year pre-service teachers attending a state university. The participating pre-service teachers are from the math and science teaching department (math teacher training program, science teacher training program) and primary education department (primary teacher training program, pre-school teacher training program). A research total of 277 volunteers' pre-service teachers constitute the participants of the study from the students attending these departments among 1500 students. The distribution of the participating teachers by department, gender and grade level are given in Table 1.

Table 1. Distribution of the participants by gender, department and grade level

Variables	Gender		Department		Grade level	
	Female	Male	Primary Education	Math and Science Teaching	1st year	4th year
N	211	66	167	110	126	151
Total	277		277		277	

In the quantitative dimension of the current study, data were collected from all the volunteered participants. In the qualitative dimension, on the other hand, the data were collected from 20 senior students selected by using the non-probability purposeful sampling method. The qualitative data was collected from students who were in the last term of the teacher training program. There are no data from freshmen students because they had not been convened and they had had the opportunity to practice and write a reflective thought letter suitable for their own practice. All of these 20 senior students were from the department of pre-school teaching: 16 were females and four, males. These students were delivering lessons in five different pre-school institutions within the context of the teaching practice course. The department these students were attending is the department where the students with the highest scores from the university entrance exam, among all the students in the faculty, are educated, and it is the department that produces the second-highest number of graduates in this field (ÖSYM, 2018).

Data Collection Tools

In the current study, the Reflective Thinking Tendencies Scale (RTTS), developed by Semerci (2007) to reveal teachers and pre-service teacher' reflective thinking, was used as the data collection tool. The scale consists of 35 items and seven sub-dimensions and marked on a five-point Likert scale. In the reliability and validity studies conducted during the development of the scale, the reliability of the scale was calculated to be $\alpha= .91$, the item-total correlation coefficients were found to range from .31 to .61, the test-retest correlation coefficient was found to be $r= .74$ and the split-half correlation coefficient was found to be $r= .77$. The scale has the following response options: "Strongly Disagree", "Mostly Disagree", "Partially Agree", "Mostly Agree" and "Strongly Agree". In the quantitative dimension of the study, the total scores taken from this scale without considering the analysis of the sub-dimensions (Reflective Thinking Tendencies Scores, RTSS) were used to determine the pre-service teachers' reflective thinking tendencies.

In the qualitative dimension of the study, the pre-service teachers' reflective thinking texts about the practices they conducted within the context of the teaching practice course were used as the source of data. The pre-service teachers were asked to produce these texts weekly and to return them to the researcher. A total of 161 reflective thinking texts were analyzed in the study. There are eight reflective writing texts for each pre-service teacher, on average. Besides, the 2007 and 2018 curriculums were used as a data source to determine the status of the content of the lessons in teacher

education programs as "reflection, reflective thinking, reflective practice". The analysis conducted in the qualitative dimension is based on reflective writing texts by content analysis, and program analysis based on document analysis.

Validity, Reliability and Ethical Consideration of Study

Different techniques were used in the quantitative and qualitative methods to ensure the validity and reliability of the study. Firstly, the conditions that would affect the quality of the data connected to the data collector have been tried to be minimized. Another technique to strengthen validity of data was related to the application of this questionnaire (Fraenkel et al., 2012). The same researcher went to classroom where each students worked and asked them to complete it.

In the qualitative dimension of the study, instead of the validity and reliability, there are some concepts-credibility, transferability, dependability, confirmability- which are appropriate to the nature of the qualitative study. In the current study, some techniques were used to reach these concepts. Firstly, in order to provide credibility, the researchers adopted an objective approach by trying to critically approach every stage of the process. Another important concept is transferability (Yıldırım & Şimşek, 2011). The research process and findings were explained in detail to transfer qualitative study results to similar situations. Dependability concept stands out for the reliability of qualitative data (Lincoln & Guba, 1985). For the descriptive analysis, the five steps of the ALACT model were used as the themes and coding was performed based on these themes. To increase the reliability of the analyses conducted, the selected academic works of the pre-service teachers were also coded by another researcher. The inter-coder reliability coefficient was calculated to be 85% according to the formula proposed by Miles and Huberman (1994). The items on which coders did not agree upon were discussed again and a final agreement was reached. As a result of the analyses conducted, the lists of themes and codes were constructed and the summary of the general structure was made. For a better understanding of the themes and codes, examples were included. Based on the reflective writings produced by the pre-service teachers, an attempt was made to elicit how the fourth-year pre-service teachers used reflective thinking skills. Finally, the confirmability of the data is another important concept emphasized in qualitative studies (Erlandson, Harris, Skipper, & Allen, 1993). In this study, the use of the quotations of the participants in the disclosure of qualitative data helped to minimize the prejudices of the researchers and to strengthen the findings. This study was carried out by taking into account the ethics of research and publication.

FINDINGS

In this section, the quantitative and qualitative findings are organized under two different headings in such a way as to respond to the research questions. The quantitative findings are presented under the descriptive and predictive statistics section and the findings obtained from the reflective thinking writing texts used to investigate the pre-service teachers' reflective thinking skills are presented in the qualitative findings section.

Descriptive Statistics from RTTS

The descriptive statistics derived from the scores obtained from the Reflective Thinking Tendencies Scale (RTTS) administered to the pre-service teachers to reveal the effects of teacher training programs on the reflective thinking tendencies of pre-service teachers are given in Table 2. When the data given in Table 2 are examined, it can be seen that the mean scores of the first-year and fourth-year students are close to each other ($\bar{x}_{\text{1st-year}}$=89.09; $\bar{x}_{\text{4th-year}}$=89.58). From among the variables examined in the current study, the most important difference between the means of the groups was found for the gender variable in favor of the male pre-service teachers ($\bar{x}_{\text{female}}$=88.25; $\bar{x}_{\text{male}}$=92.89). The mean reflective thinking score of the pre-service teachers from the departments of math and

science teaching ($\bar{x}_{mathandscience}$=90.15) is higher than that of the pre-service teachers from the department of basic education ($\bar{x}_{primaryed}$=88.83).

Table 2. Descriptive statistics obtained for RTTS

Variables	Gender		Department		Grade Level	
	Female	Male	Primary Education	Math and Science	1st grade	4th grade
N	211	66	167	110	126	151
$\bar{x}$	88.25	92.89	88.83	90.15	89.09	89.58
SS	6.84	10.70	7.78	8.67	7.50	7.69
Skewness	0.02	1.45	1.06	1.10	0.08	1.61
Kurtosis	2.04	3.11	6.08	3.58	1.57	6.04

Other parts of the descriptive statistics about RTTS is related to the normality of the distribution of scores. As a result of the Shapiro-Wilk test conducted to determine whether the scores obtained show normal distribution, the difference in the normal distribution was not found significant (z=.714, p>.05). The descriptive analysis results show that parametric tests can be used for meaningful statistics on the study's data. After this section, findings of parametric tests are given.

Determination of Covariant

It was thought that, besides the grade-level independent variable, the gender and department variables could be related to the dependent variable and, thus, they would affect the variance explained by the independent variable in the dependent variable. The relationships of these variables with the dependent reflective thinking tendencies scale score were subjected to the correlation test. In Table 3, the correlation coefficients between these variables and significance levels are given. According to the table's values, there is a weak but significant correlation between the gender variable and the dependent variable. On the other hand, the department independent variable does not have a significant correlation with the dependent variable. Thus, the gender variable was considered the covariant and then included in the analysis process to derive meaning. However, the department variable was not used for the analyses conducted thereafter.

Table 3. Significance test of the relationships between the dependent variable (RTTS) and the independent variables

Variables	Correlation Coefficients
	RTTS
Gender	.243**
Department	-.079

**.01 level of significance (two-tailed)

Inferential Statistics

Before the ANCOVA test, the assumptions of normality, homogeneity of regression slopes, homogeneity of the variances and random sampling and observation independence were tested and confirmed. Then, the ANCOVA test was conducted to elicit the effect of the grade level variable comprised of the freshmen students who had just started the teacher training program and the senior students in the last year of the program, considering the effect of the gender variable. The results of the ANCOVA analysis are shown in Table 4. Based on the ANCOVA results, the null hypothesis claiming that the grade level variable does not have any effect was not refuted ($F_{(1.274)}$=1.038, p<.01, η^2=.004). In other words, the grade level variable did not create a significant difference in the reflective thinking tendencies scores when the gender variable was taken into consideration.

Table 4. ANCOVA analyses conducted for the dependent variable

Source	Dependent variable	df	F	p	Eta Square	Observed power
Grade level	RTTS	1	1.038	.309	.004	.174

Qualitative Findings Derived from the Reflective Thinking Writings

The reflective thinking writing texts produced by the pre-service teachers during their teaching practices were subjected to descriptive analysis according to the ALACT model developed by Korthagen (1985, 1989). The results of this analysis are presented in Table 5.

Table 5. Findings obtained from the reflective thinking writing texts according to the ALACT model

Steps of reflective thinking	Themes	Explanations	f	%
1.	Action	Recognising that there is something incorrect	26	16.14
2	Looking back	Explaining the action in which something has been done incorrectly	16	16
3	Awareness of essential aspects	Addressing the mistake by combining its results with theoretical knowledge	32	19.87
4	Creating alternative models of action	Planning or thinking of doing the action that has already been done using another method	23	14.28
5	Trial	Putting the alternative action plan into force	5	3.1
	No action	No action has been reported/no reflective thinking has been found	59	36.64
		TOTAL	161[*]	100

* This is the total number of the examined reflective thinking writings text.

As shown in Table 5, in the reflective thinking writing texts of nearly 37% of the fourth-year pre-service teachers, no creative thinking expression was found. When the texts not having any reflective thinking expression are examined, it can be seen that they include expressions related to the summary of the lesson, a general lesson evaluation or self-evaluation. A sample of reflective thinking writing of a pre-service teacher (Reflective Writing, RW-3) produced after a lesson on fish with pre-school children is given below.

> *Children love games in which they are active and there is some kind of competition. Therefore, they loved the game of catching fish. The game was even played a few times. Then, the desk activity was started and fish scales were made with finger paints and the children were very entertained because they used the finger paint freely with their fingers [RW-3].*

In this reflective thinking writing text, no action or problem is mentioned and only a general evaluation of the lesson is made. In the reflective text of another pre-service teacher (RW-14) given below, it is understood that only the lesson is summarized.

> *By making the children watch a video called "Bright Stars", the children's attention was drawn to the subject. Then, it was talked about and a group of volunteer children took the shape of the constellation shown before by lying on the ground and thus all the children were able to see the constellation visually and had fun as well. While trying to make the same constellations that the teacher hung on the board with play dough, the children learned the constellations in a play. Then, the teacher let the children free and each child made his/her constellation with play dough and boasted about themselves by saying "It was wonderful", "It was different". After the completion of the desk activity, they sang the song "Yıldızlar Parıl Parlar [Stars Shine Bright] and thus they released their energy [RW-14].*

It has been determined that the reflective thinking writing texts classified under the theme of "no action" are not suitable for the structure in the ALACT model and that these texts produced by the

pre-service teachers do not include reflective thinking. The texts suitable for the ALACT model constitute 63% of the total produced by the pre-service teachers. However, it can be seen that approximately half of the student writings that can be included in this model are in the "action" step (16.14%), which is related to the realization that there is a problem and in the "looking back" step (16%), which is expressed in a description of this problem. This shows that the pre-service teachers' reflective thinking is at the basic level, including the recognition and expression of the problem. For example, in the pre-service teacher's reflective thinking writing text coded as RW-45, the teacher states that he/she realized that some students in the classroom were not willing to participate in the activity and were bored. Therefore, this reflective thinking is considered in the "action" step.

> *We formed a circle by saying the following rhyme "El ele tutuşalım, halkaya karışalım, haydi gülümse sen de gel, oynayalım [Let's hold hands, join the ring, smile, come and play.]". While the music was being played, the children accompanied it with movements. The children liked the song. They repeated it several times. A few children who were generally bored in other activities as well did not participate in the repetitions. They left the game after they had played it once [RW-45].*

In another example (RW-25), the pre-service teacher explains the action and the situation, including both the steps of action and looking back. In this example, he/she explains, in a detailed manner, that a student did not want to play the game and that the children losing the game generally did not participate in it. However, it can be seen that this explanation did not go beyond the summarization of the event, and the results of the event were not explained from an educational perspective. Therefore, although the pre-service teacher progressed onto the higher step, he/she could not reflect the information gained in the teacher training program in his/her practices nor evaluate the practices from this perspective.

> *We played the game "Eller Çadırda [Hands in Tent]" with the children. I put a tent model made of glass on the table; I gave the children specific instructions such as "hand- on the nose, eyes on the desk" and the children tried to catch the tent and the one who caught it first raised it. While Eren wanted to play this game, Ömer did not want to play. I then realized that the children who had lost did not want to play [RW-25].*

In the ALACT model, the step of realizing the essential aspects, which is the first step in which the theoretical knowledge and practical applications of the teaching are interpreted, is the step where the teacher sees the results of his/her actions and tries to explain this from an educational perspective. As can be seen in Table 5, 32 of the 161 texts analyzed are in this step. The reflective thinking writings in this step include the problem encountered, explanation of the event, the results of the action and the underlying essential situations. For instance, in reflective thinking writing text coded as RW-34, the teacher clearly explains that he/she experienced problems because of the length of the track and individual differences during the application. Thus, it can be argued that he/she could better reflect the theoretical knowledge he/she attained in his/her undergraduate education than during his/her teaching practices.

> *The track was prepared following the objectives. As there were many numbers on the track, some children had difficulty in completing it. While some of them were using hand-eye coordination very well, I saw that in some of them, this coordination had not developed yet and this affected their speed of completing the track. During the game, attention was paid to using expressions (such as beautiful, well done, you need to speed up a little more, etc..) that motivated and directed the children. Although the length of the track and the different developmental levels of children were a problem, it was generally a successful activity [RW-34].*

The step of creating alternative models of action, which is the penultimate step in the ALACT model, includes the actions that the pre-service teacher considers to solve the problem faced in the

same lesson on the next application. For example, the reflective thinking text coded as RW-154 is about a pre-school activity related to making an Indian hat. In this excerpt, it is seen that the pre-service teacher realized a problem in the choice of the activity materials and the children's color preferences. He/she clearly explains the results of his/her actions by explaining these situations in detail.

> *... When we started the activity, the children's adhesives did not stick the hair enough and I used liquid adhesive as the teacher said during the preparation phase. I put the hats on the children's heads, thinking that they were dry, but liquid glue got into the children's hair. I should have taken some measures to prevent this. I could have either used a different glue, or I could have covered them with paper after applying the glue. I should do the activity in the next application by paying more considerable attention to precautionary security measures and making some trials.*

> *... I used red and pink ribbons during the activity. I changed it to red when a male student did not want a pink ribbon. I should not have made concessions in this regard and should not have changed the ribbon. I might have taken a step to let the children develop the same as for all colors. When I become a teacher, I will try to make students develop the same attitude for all colors and, at least, try to demolish the idea that girls use and wear pink while boys blue. To do so, I need to make everyone use all the colors [RW-154].*

In this excerpt, the pre-service teacher states that, in order not to make the same mistake again, he/she could have covered the children's heads with paper after applying the glue and should not have made concessions in this regard and should not have changed the ribbon; thus, he/she indicates that when he/she has the opportunity to do the same application again, he/she will try an alternative method. These statements show that the pre-service teacher questioned the actions he/she had conducted by using his/her existing knowledge about the selection of appropriate materials, the security measures to be taken in the classrooms and the social gender roles, and developed an alternative model.

The trial theme, the highest level of reflective thinking skills, includes actions that involve the use of alternative models developed in the previous section and both end the ALACT cycle and cause a new cycle to start. Only in five of the 161 reflective thinking writing texts analyzed in the current study, have elements related to this theme been found. For example, in the reflective thinking text coded as RW-89, the pre-service teacher stated that there occurred a problem in the classroom when he/she started the activity with fewer children and tools in the rhythm activity. It seems that she thought of an alternative action to solve this problem and tried it. The pre-service teacher stated that his/her trial of alternative action worked and solved the problem.

> *... in my plan, where rhythm tools are used, I wrote that I would choose six students from the class and divide them into two groups of three, and that the selected students would do their activities using rhythm tools and that the other children would watch their friends and wait until their turn came. Nevertheless, when I started this way, the students sitting and waiting for their turn to come started to get bored. When I realized this, I thought that using other rhythm tools in the class would involve those children in the activity. So, I got all the children seated in their seats and gave them all rhythm tools (I used not only maracas and rhythm sticks but all the rhythm tools in the classroom). We did the activity as a whole class and it was better for both the children and the effectiveness of the activity than the one, I had initially planned to do. I think that my students were able to achieve the objectives of my lesson plan [RW-89].*

In summary, it was determined that the majority of these reflective thinking texts (63%) examined in the qualitative dimension of the current study either did not contain any dimension of

reflective thinking or just reached the second step in the ALACT model. The upper steps of reflective thinking could only be detected in 17% of the writings.

Findings related to Reflective Thinking in the National Teacher Training Curriculum

Teacher training programs were updated and put into force in the 2018-2019 academic year. With this update, significant changes were made in the course contents, theoretical and practical hours of the courses, and the number and quality of elective courses. However, since the transition to the new program has not yet been completed, the old and new curriculums are used together. In the current study, the contents of the courses in these curriculums have been examined in terms of including the concepts of "reflective thinking, reflection, reflective practice". According to the findings obtained, it has been determined the previous curriculum which was the program of the senior students none of these concepts was included in the contents of the courses.

They were only found in the curriculum updated in 2018 in the content of the "Teaching Practice" course:

Doing observations related to the field-specific teaching methods and techniques; conducting micro-teaching practices with individual students and groups by using field-specific teaching methods and techniques; developing field-specific activities and materials; preparing teaching environments, managing the class, performing measurements, evaluations and reflections (YÖK, 2017).

It can be seen that, in the current teaching training programs, the concepts examined in the current study are not explicitly addressed and no emphasis is put on reflective thinking

RESULTS, DISCUSSION AND RECOMMENDATIONS

In the current study, the effect of teacher training programs on the development of pre-service teachers' reflective thinking skills was examined. Reflective thinking writing texts of the pre-service teachers were also analyzed according to the ALACT model. Thus, there was an attempt to reveal how the teachers were using these skills. When the data and statistical results obtained were examined, no significant difference was found between the reflective thinking tendencies of the first-year students and fourth-year students. This result shows that teacher training programs are not currently successful in developing these skills in pre-service teachers. This finding concurs with other studies investigating the relationship between reflective thinking and grade level (Aşkın-Tekkol & Bozdemir, 2018; Aydın & Çelik, 2013; Ocak, Eymir & Ocak, 2016; Özmen, 2011; Phan, 2007; Şensoy & Yıldırım, 2017).

As the current teacher training programs cannot support pre-service teachers in developing their reflective thinking skills without needing supplementary materials and practices, they will create problems in training teachers in the mastery of such skills. Dewey (1933) claimed that teachers' lack of reflective thinking leads to "intellectual addiction to those who give clear and precise instructions to them on how to teach" (p. 152). Failure to teach reflective thinking through teacher training programs may lead to a shortage of ways and methods of "thinking like a teacher" (Jay & Johnson, 2002). Reflective thinking can be defined as people questioning their actions, looking for methods to eliminate deficiencies and mistakes, and improving themselves because an active process is experienced in which a connection is established between past experiences and the present, and future applications may well be shaped (Lee, 2005; Wade & Yarbrough, 1996). There is an emphasis on teachers who continuously renew themselves, carry out self-evaluation, and think critically in national reports on teacher training programs (MoNE, 2005; 2017). It can be seen that the teacher profiles mentioned in these reports overlap with the characteristics of the teacher who can think reflectively. However, the effects of the teacher training programs examined in the current study on the development of these skills in pre-service teachers seem not to contribute to pre-service teachers' acquisition of the desired characteristics. In this case, one of the skills that teachers who have

graduated from teaching training programs and who have started their professional careers can use to improve their teaching skills will be missing (Gipe & Richards, 1992). It is suggested that teachers should practice reflective activities not only to learn new ideas better in their undergraduate education but also to continue their professional development after completing this education (Lee, 2005).

The results obtained in the qualitative dimension of the current study provide a better understanding of the effect of teacher training programs on the development of these skills. It was concluded that the pre-service teachers did not experience any reflective thinking in most of their teaching practice, while those who did have such experiences did so at the basic level. It was seen that the reflective thinking texts that were analyzed according to the ALACT model remained between steps 1 and 3; in other words, the pre-service teachers could not reach the dimensions in which solutions are suggested and implemented for the problems experienced following reflection on the theoretical knowledge. This shows that the pre-service teachers could not question their teaching processes or combine theoretical and practical applications. Similar results have been reported in the literature. For example, Korthagen & Kessel (1999) see the teacher training programs that present theory with little connection to practice as the biggest problem in teacher training. Rodgers (2002) presents a similar discussion in that teachers should be given as much permission as possible to experience and teach continuous teaching processes. When the steps in the ALACT model and the development process of reflective thinking skills are considered, it can be seen as a process that should be emphasized by teacher training programs (Lee, 2005). However, when the findings from the pre-2018 and current teacher training programs are evaluated, it is understood that this approach does not exist in the course contents. In fact, this explains the absence of a significant difference between students in the freshmen and senior students of the teacher training program. It can be said that there is no explicit aim to develop the reflective thinking skills of pre-service teachers in the teacher training program. A similar result was obtained in the study conducted by Aşkın Tekkol and Bozdemir (2018) on the reflective thinking skills of pre-service teachers in the elementary school teacher training program. They found that the pre-service teachers' reflective thinking tendencies were low and no course was offered in the program to foster reflective thinking in pre-service teachers. However, in their study investigating the reflective thinking skills of pre-service social studies teachers, Aydın and Çelik (2013) stated that courses such as "Teaching Principles and Methods, Special Teaching Methods, Classroom Management, Instructional Technologies and Material Design" are courses that are suitable for pre-service teachers to develop their reflective thinking skills. It is thought that the reduction of the class hours allocated to the teaching practice course in the teacher training program implemented after 2018 (YÖK, 2017) may adversely affect the acquisition of these skills.

In the current study, teacher training programs were evaluated with a multi-dimensional structure. The emphasis on reflective thinking should be increased in teacher training programs and included in the course contents. In this way, teacher candidates can be provided with the skills they will need in their profession, allowing them to improve their practices continuously. Besides, the targeted structure for developing reflective thinking skills should be increasing to the level of "creating alternative models of action" and "trial". In this way, teacher candidates can be at the level of determining the problems in their practice and can develop and try models to solve those problems. Because, as determined in this study, it was seen that teacher candidates were mostly "action" and "Awareness of essential aspects" in reflective thinking articles. Their effects on the development of reflective thinking skills, which is a skill expected not only from teachers but also from any individual in the 21st century, were discussed in the light of the collected data. As a result, it has been suggested that reflective thinking skills should be explicitly emphasized in the national teacher training programs and that these programs should have a structure suitable for the implementation of various reflective thinking models (e.g., ALACT, micro-teaching). A special course could be opened for pre-service teachers to develop their skills or these could be developed by adopting a cross-curricular approach towards teaching them. It is thought that there is a need to investigate the effects of pre-service teachers' transferring their reflective thinking skills to their professional life in longitudinal studies. Moreover, teacher training programs on the development of this skill and how this skill shapes the professional life of a teacher should be investigated more comprehensibly.

REFERENCES

Abell, S. K., Bryann, L. A. & Anderson, M. A. (1998). Investigating preservice elementary science teacher reflective thinking using integrated media case-based instruction in elementary science teacher preparation. *Science Teacher Education*, *82*(4), 491-509.

Aşkın-Tekkol, İ. & Bozdemir, H. (2018). Öğretmen adaylarının yansıtıcı düşünmeeğilimleri ile eleştireldüşünme becerilerinin incelenmesi [An investigation of reflective thinking tendencies and critical thinking skills of teacher candidates]. *Kastamonu Education Journal*, *26*(6), 1897-1907.

Ayan, D. & Seferoğlu, G. (2011). Using electronic portfolios to promote reflective thinking in language teacher education. *Educational Studies*, *37*(5), 513-521.

Aydın, M. & Çelik, T. (2013). Sosyal bilgiler öğretmen adaylarının yansıtıcı düşünme becerilerinin bazı değişkenler açısından incelenmesi [The prospective teacher' opinions relating reflective thinking skills]. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, *34*(2), 169-181.

Carter, K., & Anders, D. (1996). Program pedagogy. In F. B. Murray (Ed.), *Theteachereducator'shandbook: Building a knowledgebaseforthepreparation of teachers*(pp. 557–592). San Francisco: Jossey-Bass.

Creswell, J. W. (2012). *Educational research: planning, conducting, and evaluating quantitative and qualitative research* (4th Ed.). Boston, MA: Pearson.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th Ed.). California: Sage Publications.

Choy , S. C., Yim, J. S. C., & Sedhu, D. S. (2019). Pre-service teachers' reflection on reflective practices: A Malaysian perspective. *Universal Journal of Educational Research, 7*(12), 18-26.

Dervent, F. (2015). The effect of reflective thinking on the teaching practices of preservice physical education teachers. *Issues in Educational Research*, *25*, 260-275.

Dewey, J. (1933). *How we think*. Retrieved from https://b-ok.cc/book/2884841/193de3

Dewey, J. (1965). The relation of theory to practice in education. In Archambault, R. D. (Ed.), *John Dewey on education: Selected writings* (pp. 313–338). Chicago: The University of Chicago Press

Doyle, W. (1990). Themes in teacher education research. In W.R. Houston, M. Haberman & J. Sikula (Eds.), *Handbook of research on teacher education* (pp. 3–24). New York: Macmillan.

Duban, N., & Yelken, T. Y. (2010). Öğretmen adaylarının yansıtıcı düşünme eğilimleri ve yansıtıcı öğretmen özellikleriyle ilgili görüşleri [Opinions of teachers on reflective thinking tendencies and reflective teacher characteristics]. *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *19*(2), 343-360.

Elmalı, Ş. & Balkan-Kıyıcı, F. (2018). Fen bilgisi öğretmen adaylarının yansıtıcı düşünme eğilimleri ve yansıtıcı düşünmeye ilişkin düşünceleri [Prospective science teachers' tendecies of reflective thinking and views about reflective thinking]. *Elementary Education Online*, *17*(3), 1706-1718.

Erlandson, D. A., Harris, E. L., Skipper, B. L., & Allen, S. T. (1993). *Doing naturalistic inquiry: A quide to methods*. Beverly Hills, CA: Sage.

Eryaman, M. Y. (2007). From reflective practice to practical wisdom: Toward a post-foundational teacher education. *International Journal of Progressive Education*, *3*(1), 87-107.

Evin-Gencel, İ. & Güzel-Candan D. (2014). Öğretmen adaylarının eleştirel düşünme eğilimleri ve yansıtıcı düşünme düzeylerinin incelenmesi [Investigation of critical thinking tendency and reflective thinking levels of teacher candidates]. *Uluslararası Eğitim Programları ve Öğretim Çalışmaları Dergisi*, *4*(8), 55-68

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2011). *How to design and evaluate research in education*. New York: McGraw-Hill.

Gedik, H., Akhan, N. E., & Kılıçoğlu, G. (2014). Sosyal bilgiler öğretmen adaylarının yansıtıcı düşünme eğilimleri [The reflective thinking tendency of social studies candidate teachers]. *Mediterranean Journal of Humanities*, *4*(2), 113-130.

Ghanizadeh, A. (2017). The interplay between reflective thinking, critical thinking, self-monitoring, and academic achievement in higher education. *Higher Education*, *74*, 101-114.

Gipe, J. & Richards, J. (1992). Reflective thinking and growth in novices teaching abilities. *Journal of Educational Research*, *86*(1), 52-57.

Halpern, D. F. (2007). *Halpern critical thinking assessment using everyday situations: Background and scoring standards*. Claremont, CA: Claremont McKenna College.

Huang, H. (2001). Professional development through reflection: A study of pre-service teachers' reflective practice. *International Electronic Journal for Leadership in Learning,* 5(6). 11.

Jay, J. K. & Johnson, K. L. (2002). Capturing complexity: A typology of reflective practice for teacher education. *Teaching on Teacher Education, 18*, 73-85.

Kandemir, M. A. (2015). Sınıf ve ilköğretim matematik öğretmen adaylarının eleştirel düşünme eğilim düzeylerinin bazı değişkenlere göre incelenmesi [Investigation of critical thinking tendency levels of classroom and elementary mathematics teacher candidates in terms of some variables]. *Electronic Turkish Studies*, *12*(6), 453-474.

Keskinkılıç-Yumuşak, G. (2015). Öğretmen adaylarının yansıtıcı düşünme eğilimleri ve mesleğe yönelik tutumları [Reflective thinking tendencies of pre-service teachers and their attitudes towards the teaching profession]. *Bartın Üniversitesi Eğitim Fakültesi Dergisi*, *4*(2), 466-481.

Kızılkaya, G. & Aşkar, P. (2009). Problem çözmeye yönelik yansıtıcı düşünme becerisi ölçeğinin geliştirilmesi [The development of a reflective thinking skill scale towards problem solving]. *Education and Science*, *34*(154), 82-92.

Korthagen, F. (1985). Reflective teaching and pre-service teacher education in the Netherlands. *Journal of Teacher Education*, *36*(5), 11–15.

Korthagen, F., & Kessels, J. (1999). Linking theory and practice: Changing the pedagogy of teacher education. *Educational Researcher*, *28*(4), 4-17.

Korthagen, F. (1999). Linking reflection and technical competence: The logbook as an instrument in teacher education. *European Journal of Teacher Education*, *22*(2/3), 191-207.

Köksal, N. & Demirel, Ö. (2008). Yansıtıcı düşünmenin öğretmen adaylarının öğretmenlik uygulamalarına katkıları [The contributions of reflective thinking to pre-service teachers' teaching practice]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi (HU Journal of Education), 34*, 189-203.

Lee, H. J. (2000). *The nature of the changes in reflective thinking in preservice mathematics teachers engaged in student teaching field experience in Korea*. Paper presented at the Annual Meeting of the America Educational Research Association (AERA), New Orleans, LA, April 24-28, 2000.

Lee, H. J. (2005). Understanding and assessing pre service teachers' reflective thinking. *Teaching and Teacher Education, 21*, 699– 715.

Lee, K. F., & Loughran, J. (2000). Facilitating student teachers' reflection through a school based teaching programme. *International Journal of Reflective Practice*, *1*(1), 69-89.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry.* Beverly Hills, CA: Sage.

McIntyre, D. (1993). Theory, theorizing and reflection in initial teacher education. In J. Calderhead& P. Gates (Eds.), *Conceptualizing reflection in teacher development* (pp. 39–52). Washington, DC: Falmer Press.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis*. USA: SAGE Publications.

Ministry of National Education (MoNE) (2005). *Öğretmenlik mesleği genel yeterlilikleri taslağı [General qualifications draft for the teaching profession]*. Ankara: MEB Yayınları

Ministry of National Education (MoNE) (2017). *Öğretmenlik mesleği genel yeterlilikleri [General qualifications draft for the teaching profession]*. Ankara: Öğretmen Yetiştirme ve Geliştirme Genel Müdürlüğü.

Mills, G. E., & Gay, L. R. (2016). *Education research: Competencies for analysis and applications*. London, England: Pearson Education.

Moon, J. (2008). *Critical thinking: An exploration of theory and practice*. Londonand New York: Routledge.

NG, C. S. L. & Tan, C. (2006). Investigating Singapore pre-service teachers' III structured problem solving processes in an asynchronous online environment: implications for reflective thinking. *New Horizons in Education*, *54*, 1-15.

Ocak, G., Eymir, E. & Ocak, İ. (2016). Investigation of pre service teachers' critical thinking tendencies in terms of different variables. *Erzincan Üniversitesi Eğitim Fakültesi Dergisi, 18*(1), 63-91.

OECD (2015). *Education at a glance 2015: OECD indicators.* OECD Publishing

ÖSYM (2018). *2017 ÖABT değerlendirme raporu (Değerlendirme Raporları Serisi) [2017 ÖABT evaluation report (Evaluation Reports Series)]*. Ankara: T.C. Ölçme, Seçme ve Yerleştirme Merkezi Başkanlığı.

Özmen, C. (2011). Sosyal bilgiler eğitiminde yansıtıcı inceleme yaklaşımına ilişkin öğretmen görüşleri [Teachers opinions related to reflective inquiry approach in social studies]. *Sosyal Bilimler Enstitüsü Dergisi, 30*(1), 61–81.

Phan (2007). An examination of reflective thinking, learning approaches, and self-efficacy beliefs at the university of the South Pacific: A path analysis approach. *EducationalPsychology,27*(6), 789-806.

Riedler, M. & Eryaman M.Y. (2016). Complexity, Diversity and Ambiguity in Teaching and Teacher Education: Practical Wisdom, Pedagogical Fitness and Tact of Teaching. *International Journal of Progressive Education. 12*(3): 172-186

Rodgers, C. (2002). Defining reflection: Another look at John Dewey and reflective thinking. *Teachers College Record*, *104*(4), 842-866.

Schön, D. A. (1983). *The reflective practitioner: How professional think in action.* New York: Basic Books.

Schön, D. A (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. San Francisco: Jossey Bass.

Semerci, Ç. (2007). Öğretmen ve öğretmen adayları için yansıtıcı düşünme eğilimi (Yande) ölçeğinin geliştirilmesi. *Kuram ve Uygulamada Eğitim Bilimleri*, *7*(3), 1351-1377.

Showkat, N., & Parveen, H. (2017). *Non-probability and probability sampling.* [Online] Available at https://www.researchgate.net/ publication/319066480_Non-Probability_and_Probability_ Sampling on 1 November 2020.

Şengül, C. & Üstündağ, T. (2009). Critical thinking disposition levels of physics teachers and state of critical thinking in classroom activities. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi (HU Journal of Education), 36*, 237-248.

Şensoy, Ö., & Yıldırım, H. İ. (2017). Effects of inquiry based learning approach on creative thinking and scientific process skills. *Cumhuriyet International Journal of Education-CIJE*, *6*(1), 34-46.

Tok, Ş. (2008). The impact of reflective thinking activities on student teachers' attitudes toward teaching profession, performance and reflections. *Education and Science*, *33*(149), 105-117.

Töman, U. (2017). Investigation to improve the process of pre-service teachers' reflective thinking skills through an action research. *Universal Journal of Educational Research, 5*, 1535-1548.

Ünver, G. (2003). *Yansıtıcı düşünme [Reflective thinking]*. Ankara: Pegem A.

Wade, R. C. &Yarbrough, D. B. (1996). Portfolios: A tool for reflective thinking in teacher education. *Teaching and Teacher Education*, *12*, 63-79.

Wegner, C., Weber, P. & Ohlberger, S. (2014). Korthagen's ALACT model: Application and modification in the science project "Kolumbus-Kids". *Themes in Science & Technology Education*, *7*(1), 19-34.

Yıldırım, A., & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* [Qualitative research methods in the social sciences]. Ankara: Seçkin Yayıncılık.

Yin, R. K. (2009). *Case study research: Design and method* (4th Ed.). Thousand Oaks: Sage

YÖK (2017). *Okul öncesi öğretmenliği lisans programı* [Early Childhood Teacher Training Cirruculum]. Ankara: Yükseköğretim Kurulu Başkanlığı

Zengin, N., Kaya, G. ve Pektaş, M. (2020). STEM temelli araştırmalarda kullanılan ölçme ve değerlendirme yöntemlerinin incelenmesi [Investigation of measurement and assessment methods used in STEM-based research]. *Gazi University Journal of Gazi Educational Faculty, 40*(2), 329-355.