

AN INVESTIGATION OF THE CRITICAL THINKING DISPOSITIONS OF PRE-SERVICE TEACHERS AT A PRIVATE NON-PROFIT UNIVERSITY

A MASTER'S THESIS

BY

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THE PROGRAM OF CURRICULUM AND INSTRUCTION
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To my mother and father

AN INVESTIGATION OF THE CRITICAL THINKING DISPOSITIONS OF PRE-
SERVICE TEACHERS AT A PRIVATE NON-PROFIT UNIVERSITY

The Graduate School of Education

of

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by

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AN INVESTIGATION OF THE CRITICAL THINKING DISPOSITIONS OF PRE-
SERVICE TEACHERS AT A PRIVATE NON-PROFIT UNIVERSITY

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June 2013

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum and Instruction.

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ABSTRACT

AN INVESTIGATION OF THE CRITICAL THINKING DISPOSITIONS OF PRE-SERVICE TEACHERS AT A PRIVATE NON-PROFIT UNIVERSITY

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M.A., Program of Curriculum and Instruction

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June 2013

The main aim of this study was to investigate the critical thinking dispositions of pre-service teachers. This study further researched critical thinking dispositions by examining factors such as the teachers' age, their year in the graduate program, subject areas, their academic achievement (CGPA), the type of high school from which they graduated and finally the education level of their parents. The sample for this study consisted of 23 first-year and 21 second-year pre-service teachers who were pursuing a Master's Degree in Curriculum & Instruction from the Graduate School of Education at a private non-profit university in Ankara, Turkey. The pre-service teachers were preparing to teach in the fields of biology, mathematics, Turkish and English language and literature. As data collection tool, the California Critical Thinking Disposition Inventory-Turkish (CCTDI-T) was used. A one way analysis of variance (ANOVA), independent samples t-test and Pearson correlation were used to analyze the data. According to findings of this research, it was found that the level of critical thinking dispositions of pre-service teachers is middle. This study found a significant difference in critical thinking dispositions among the pre-service teachers when compared for subject areas and their mother education level. Besides that, no significant difference found for the other factors listed above. Furthermore, it was found that there was no correlation between academic achievement (CGPA) and critical thinking dispositions of pre-service teachers. In conclusion, some suggestions are given for further research in this study.

Key Words: Critical thinking, critical thinking dispositions, pre-service teachers.

ÖZET

VAKIF ÜNİVERSİTESİNDEKİ ÖĞRETMEN ADAYLARININ ELEŞTİREL DÜŞÜNME EĞİLİMLERİNİN İNCELENMESİ

Sinem Çevik

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Çalışmanın esas amacı, öğretmen adaylarının eleştirel düşünme eğilimlerini araştırmaktır. Bu çalışmada ek olarak, eleştirel düşünme eğilimi, öğretmen adaylarının yaşı, sınıf düzeyi, akademik başarıları, mezun oldukları lise türleri, okudukları bölüm ve son olarak anne ve babalarının eğitim düzeyi gibi faktörlere göre incelemiştir. Araştırma evrenini, bir vakıf üniversitesinde Eğitim Bilimleri Enstitüsü, Eğitim ve Öğretim Programı'nda yüksek lisans yapan 23 birinci ve 21 ikinci sınıf öğretmen adayı oluşturmaktadır. Bu öğretmen adayları biyoloji, matematik, Türk dili ve İngiliz dili ve edebiyatı alanlarında öğretmenlik yapmak için hazırlanıyorlardı. Araştırma verileri, Kaliforniya Eleştirel Düşünme Eğilimi Ölçeği-Türkçe ile toplanmıştır. Veriler, tek yönlü varyans analizi (ANOVA), bağımsız örneklem t-test ve Pearson korelasyon analizi kullanılarak çözümlenmiştir. Araştırma sonuçlarına göre, öğretmen adaylarının eleştirel düşünme eğilimi orta seviyede bulunmuştur ve eleştirel düşünme eğilimleri ile öğrenim gördükleri alan ve annelerinin eğitim düzeyi gibi faktörler arasında anlamlı bir fark bulunmuştur. Bunun yanı sıra, yukarıda verilen diğer faktörler arasında anlamlı bir fark bulunamamıştır. Ek olarak, eleştirel düşünme eğilimleri ve akademik başarıları arasında da pozitif veya negatif bir ilişki bulunamamıştır. Son olarak ise; ileride yapılacak çalışmalar için önerilerde bulunulmuştur.

Anahtar Kelimeler: Eleştirel düşünme, eleştirel düşünme eğilimi, öğretmen adayları.

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CHAPTER 1: INTRODUCTION

Introduction

This study explores the critical thinking dispositions of pre-service teachers in a graduate program within a private non-profit university in Turkey. This study further researches critical thinking dispositions by examining the following demographics of the pre-service teachers:

- Age
- Year in the graduate program
- Subject areas (biology education, Turkish and English language & literature education, mathematics education)
- Type of high school from which they graduated
- Education level of their parents
- Academic achievement (cumulative grade point average [CGPA])

This chapter provides background information for the study along with the problem and purpose and associated research questions. The chapter concludes with the significance of the study and definition of the key terms.

Background

Our society needs people who are qualified in applying various thinking skills (Güven & Kürüm, 2006). According to Nickerson (1987) thinking skills include problem solving, decision-making, critical thinking, logical judgment and creative thinking. Critical thinking is a particularly important skill that was strongly supported by Dewey and continues to be examined today (Dayıoğlu, 2003).

Gibson (1995) defines critical thinking as “the norm of good thinking, the rational aspect of human thought, and as the intellectual virtues needed to approach the world in a reasonable, fair-minded way” (p. 28). Ennis (1993) indicates that critical thinking is reasonable reflective thinking that is focused on deciding what to believe or do. Furthermore, American Philosophical Association (APA) (1990) claims that critical thinking is the purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference as well as explanation of the evidential conceptual, methodological, contextual considerations upon which that judgment was based.

Critical thinking is seen as the “desirable outcome” in social sciences and science (Watson & Glaser, 1964, p. 9). Reed (1998) and Lai (2011) advocate that an important and necessary outcome of education is to develop an educated citizenry and quality work-force who are able to think critically. Likewise, Cotton (2001) indicates that

In today's information age, thinking skills are viewed as crucial for educated persons to cope with a rapidly changing world. Many educators believe that specific knowledge will not be as important to tomorrow's workers and citizens as the ability to learn and make sense of new information. (p. 1)

Critical thinking skills benefit people socially and educationally because today's world is complex and the problems we face are complicated (Hirose, 2001). The ability to analyze problems and think critically at all levels of education is essential (Carr, 1990). Therefore, preparing students for this complicated world requires “many changes in the educational setting, curriculum and instruction in any disciplines in line with improving students' thinking skills” (Dayioğlu, 2003, p. 2).

Critical thinking skills involve more advanced learning than just memorization of facts; they enable people to analyze topics, evaluate solutions, and synthesize their own opinions.

Unfortunately, it seems that the current education system in Turkey does not provide methods and techniques to help students develop critical thinking skills (Özdemir, 2005). For students to do well in the current Turkish exam system they must know facts (İrfaner, 2002). Therefore, today's school system focuses on memorization rather than critical thinking; the current workforce is disappointed in the capabilities of students graduating from Turkish schools. For example, Hirose (2001) indicates that "many of today's youth lack the basic skills to function effectively when they enter the workforce. A common complaint is that entry level employees lack the reasoning and critical thinking abilities needed to process and refine information" (p. 1). These concerns further support the importance of all disciplines within the Turkish education system changing to promote critical thinking skills needed for real life and work situations.

Problem

In the 21st century, information and computing technologies are developing rapidly. To keep up with the rate of this progress, societies need people who are able to use critical thinking skills such as analyzing and synthesizing. In Turkey, the Ministry of National Education (MoNE) (2007) changed and revised its purpose of education to indicate that primary and secondary education should improve students' critical thinking skills in terms of analysis, synthesis, and evaluation of knowledge.

For education to develop the critical thinking skills of students, experienced teachers need to be prepared pre-service teachers to teach critical thinking skills (Facione,

1990; Seferoğlu & Akbıyık, 2006; Yetim & Göktaş, 2000). Paul, Elder and Bartell (1997) emphasize that the importance of teacher education by underlining need for teachers “who are able to think critically and who have abilities of problem solving to raise students who are capable of thinking critically as well as capable of solving problems” (p. 1).

Supportively, Wilks (1995) claims that if societies want to change, the first step will be to renew teachers’ critical thinking skills. Many research studies have investigated how teachers can change and develop their thinking skills (Aybek, 2007; Ennis, 1989; Facione, Blohm, Facione, & Giancarlo, 2006; Facione & Facione, 2008; Halpern, 1998; Kennedy, Fisher, & Ennis, 1991). Szaboa and Schwartz (2010) assert that critical thinking skills and its techniques should take place in the courses or activities of teacher education program so that the students have the opportunity to develop these skills before they become in-service teachers. The challenge is then how to determine if teachers themselves have the critical thinking skills necessary to teach their students?

To best investigate critical thinking skills of pre-service and in-service teachers, researchers often explore critical thinking dispositions because the dispositional attributes help predict critical thinking skills (Facione, Giancarlo, Facione, & Gainen, 1995). Moreover, Carter (2008) indicates that there is a connection between critical thinking skills and critical thinking dispositions; “the former pertains to thinking applications; the latter to character tendencies to think and act critically” (p. 90).

A tool commonly used by researchers to predict the critical thinking dispositions of pre-service and in-service teachers is the California Critical Thinking Disposition Inventory-Turkish (CCTDI-T). This tool has been used in the following studies:

Beşoluk & Önder, 2010; Çetinkaya, 2011; Çubukçu, 2006; Ekinci, 2009; Emir, 2012; Gök & Erdoğan, 2011; Güleç, 2010; Gürleyük, 2008; Korkmaz, 2009; Şen, 2009; Tümkaya, 2011; Yenice, 2011 and Zayif, 2008. However, to date there has not been a study that has explored the critical thinking dispositions of pre-service teachers who are studying at Master's degree level. Therefore, this study takes place at the only institution in Turkey, a private non-profit university, that offers a pre-service teacher education program in Curriculum & Instruction at the graduate school level. The uniqueness of the program provides an opportunity to investigate critical thinking dispositions of a new population of pre-service teachers.

Purpose

The main aim of this study was to investigate the critical thinking dispositions of pre-service teachers who are studying within the Graduate School of Education at a private non-profit university in Turkey. Another aim is to determine if there is a significant difference between pre-service teachers' critical thinking dispositions when compared for the following demographic features:

- Age
- Year in the graduate program
- Subject areas (Biology education, Turkish and English language & literature education, Mathematics education)
- Type of high school from which they graduated
- Education level of their parents

A final aim is to find out whether there is a relationship between critical thinking dispositions and pre-service teachers' CGPA levels.

Research questions

The following research questions and sub-question are designed in order to achieve the purpose of the study:

1. What are the levels of critical thinking dispositions of pre-service teachers at a private non-profit university Graduate School of Education?
 - 1.1 Is there a significant difference between pre-service teachers' critical thinking dispositions with regard to their age, year in the graduate program, their subject areas, high school types from which they graduated, and the education level of their parents?
2. Is there a relationship between critical thinking dispositions and CGPA levels of pre-service teachers?

Significance

Critical thinking as a key skill has been advocated by the MoNE for many years. To ensure that students' critical thinking skills are improved, the critical thinking skills of their teachers needs to be improved as well. Specifically, before starting to teach in classrooms, it is important that Faculty of Education programs give courses or activities for pre-service teachers' that will help increase their critical thinking capabilities (Tufan, 2008). For this reason, it is necessary to explore critical thinking dispositions of pre-service teachers who are currently studying teaching at education programs. Therefore, this study aims to contribute to the literature by providing insights into the levels of critical thinking dispositions of pre-service teachers. In addition, this research aims to provide information about the efforts of a private non-profit university Graduate School of Education to promote the critical thinking skills of its pre-service teachers.

It is hoped that the results of this research will further emphasize the importance of promoting education about critical thinking and related teaching skills within teacher preparation programs. Ideally, this study will also help guide investigations to continue to improve critical thinking skills of Turkey's future teaching population.

Definition of key terms

Critical thinking: "To be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference as well as explanation of the evidential, conceptual, methodological, contextual considerations upon which that judgment is based" (Facione, 1990, p. 2).

Critical thinking dispositions: "Character behaviors which include "truth-seeking, open-mindedness, analyticity, systematicity, critical thinking self-confidence, inquisitiveness, and maturity in judgment" (Facione et al., 1995, p. 1).

Critical thinking skills: The skills are one of the components of critical thinking. Core critical thinking skills include analysis, interpretation, inference, evaluation, explanation, and self-reflection (Facione, 1990).

Pre-service teachers: Students who are studying MA in Curriculum & Instruction at a private non-profit university to become teachers.

CHAPTER 2: REVIEW OF RELATED LITERATURE

Introduction

The literature review is organized under eight main sections. First six sections include definitions of critical thinking, the characteristics of a critical thinker, other characteristics of critical thinking, development of critical thinking, teaching and teacher education and critical thinking. Last two sections include definitions of critical thinking dispositions and research related to critical thinking dispositions conducted in Turkey.

Definitions of critical thinking

Critical thinking defined in two primary academic disciplines: philosophy and psychology (Lewis & Smith, 1993). Besides those two academic disciplines, Sternberg (1986) indicated that a critical thinking plays a role in the field of education. Each of these definitions is discussed in detail below.

The philosophical perspectives of critical thinking

This philosophical perspectives focus on the critical thinker, the qualities and characteristics of this person rather than the behaviors or actions the critical thinker can perform (Lewis & Smith, 1993; Thayer-Bacon, 2000). According to Sternberg (1986) the critical thinker as an ideal type, focusing on what people are capable of doing under the best of circumstances. The philosophical perspectives also emphasize qualities or standards of thought. For example, Bailin (2002) defines critical thinking as good thinking that meets a specified criteria or standards of

adequacy and accuracy. In addition to Bailin's view, other philosophically oriented definitions of critical thinking include the following:

- “the propensity and skill to engage in an activity with reflective skepticism” (McPeck, 1981, p. 8);
- “reflective and reasonable thinking that is focused on deciding what to believe or do” (Ennis, 1985, p. 45);
- “skillful, responsible thinking that facilitates good judgment because it 1) relies upon criteria, 2) is self-correcting, and 3) is sensitive to context” (Lipman, 1988, p. 39);
- “purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or conceptual considerations upon which that judgment is based” (Facione, 1990, p. 3);
- “disciplined, self-directed thinking that exemplifies the perfections of thinking appropriate to a particular mode or domain of thought” (Paul, 1992, p. 9);
- thinking that is goal-directed and purposive, “thinking aimed at forming a judgment,” where the thinking itself meets standards of adequacy and accuracy (Bailin, Case, Coombs, & Daniels, 1999, p. 287);
- “judging in a reflective way what to do or what to believe” (Facione, 2000, p. 61).

Psychological perspectives of critical thinking

The psychological perspectives differ from the philosophical in two ways. First, psychological perspectives focus on how people could or should think under ideal

conditions (Sternberg, 1986). Second, rather than defining critical thinking by pointing to characteristics of the ideal critical thinker; cognitive psychology describe critical thinking by the types of actions or behaviors critical thinkers can do (Lai, 2011). Typically, this perspective shows that critical thinking includes skills performed by critical thinkers (Lewis & Smith, 1993). Following are definitions of critical thinking that emerged from the cognitive psychological perspective:

- “the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts” (Sternberg, 1986, p. 3);
- “the use of those cognitive skills or strategies that increase the probability of a desirable outcome” (Halpern, 1998, p. 450); and
- “seeing both sides of an issue, being open to new evidence that disconfirms your ideas, reasoning dispassionately, demanding that claims be backed by evidence, deducing and inferring conclusions from available facts, solving problems, and so forth” (Willingham, 2007, p. 8).

Educational perspectives of critical thinking

Bloom’s taxonomy is one of the sources that is used by many educators to define critical thinking within the educational realm (Lai, 2011). Figure 1 shows all levels of Bloom’s taxonomy. According to Kennedy et al. (1991) analysis, synthesis, and evaluation are the highest level of the taxonomy and represent the critical thinking.

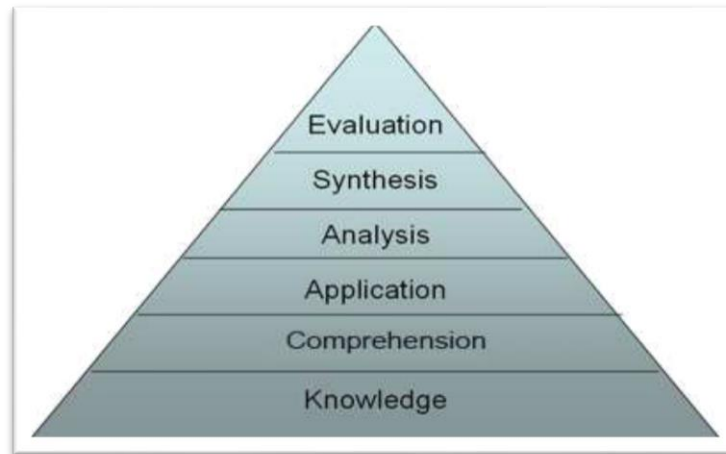


Figure 1. Bloom's Taxonomy of educational objectives (Bloom, 1956)

Similarly, İrfaner (2002) emphasizes that the three highest levels (evaluation, synthesis and analysis) are important for teachers because they need to develop on these skills in order to advance students' skills.

Smyth (2000) provides the following characteristics of students who are able to use critical thinking in both the classroom and their social life.

- To think about and evaluate their own thinking and behavior on issues related to health education, physical education, and home economics
- To make reasonable and defensible decisions about issues related to individual and community well-being
- To challenge and take action (individually and collectively) to address social, cultural, economic, and political inequalities
- To understand the role and significance of the movement culture and its influence on our daily lives and the lives of people in our community (p. 507).

The characteristics of a critical thinker

In addition to the definition of critical thinking, this literature review explores views on the characteristics of the critical thinker. In some instances, definition and characteristics either overlap or resemble to each other.

One of the aims of education is to encourage students to think critically. In order to reach this aim, the identification of the features critical thinker gain is important (Magno, 2010). Beyer (1984) lists the following ten characteristics of critical thinkers.

(a) Distinguishing between verifiable facts and value claims; (b) determining the reliability of a source; (c) distinguishing relevant from irrelevant information, claims, or reasons; (d) detecting bias (e) identifying unstated assumptions; (f) identifying ambiguous or equivocal claims or arguments; (g) recognizing logical inconsistencies or fallacies in a line of reasoning; (h) distinguishing between warranted or unwarranted claims and; (i) determining the strength of an argument. (as cited in Magno, 2010, p. 139)

Similarly, Paul and Elder (2005), outlined the characteristics of a critical thinker and noted that “critical thinkers strive to develop essential traits or characteristics of mind” (p. 5). They list the characteristics of a critical thinker as:

- Raises vital questions and problems, formulating them clearly and precisely;
- Gathers and assesses relevant information, using abstract ideas to interpret it effectively;
- Comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- Thinks open-mindedly within alternative systems of thought , recognizing and assessing as need be, their assumptions, implications, and practical consequences; and
- Communicates effectively with others in figuring out solutions to complex problems (p. xxiii)

Finally, Halpern (1998) stated that skills of critical thinker are decision making skills, problem solving skills, skills for testing hypothesis and careful argumentation.

Other characteristics of critical thinking

Many researchers have studied critical thinking and find that there is a link between critical thinking and creativity (Bailin, 2002; Bonk & Smith, 1998; Ennis, 1985; Paul & Elder, 2006; Thayer-Bacon, 2000).

Young (1992) concludes that thinking can be classified under two main categories: critical and creative. According to Young (1992), critical thinking is described as “logico-analytic thinking” supports rational thought process, on the contrary creative thinking which is defined as “intuitive-synthetic thinking,” relates with inventive processes (p. 49). He believes that critical and creative thinking complete each other.

Bailin (2002) argues that a certain amount of creativity is necessary for critical thought. Paul and Elder (2006) showed that creativity and critical thinking are aspects of good, purposeful thinking. Good thinking needs “the ability to generate intellectual products, which is associated with creativity” (Lai, 2011, p. 21).

Furthermore, the authors point out that the two concepts are inseparably linked and develop in parallel.

Development of critical thinking

This section reviews on the critical thinking capacities of the adults followed by an investigation of critical thinking in young children.

Critical thinking and adults

There are studies indicating that adults have poor levels of critical thinking (Lai, 2011). For instance, Kennedy et al., (1991) and Van Gelder (2005) concluded that many adults lack basic reasoning skills. Similarly, Halpern (1998) working in the area of psychology; found that, many, if not most, adults fail to think critically in many situations.

According to Lai (2011), one reason for this gap in basic reasoning skills may be deficiency in educational experiences. Paul (1992) argues that typical school instruction does not encourage the development of higher-order thinking skills like critical thinking. In addition, he claimed that this type of lower-order thinking skills

cause memorization of material without understanding the logic by students.

However, Kennedy et al. (1991) also claimed that although critical thinking ability appears to improve with age, even young children can benefit from critical thinking instruction. Supportively, Seferoğlu and Akbıyık (2006) indicated that if teacher continuously use critical thinking skills in lesson, students may have tendency to develop these skills by asking more questions and analyzing problem carefully.

Critical thinking and children

Silva (2008) claims that there is no single age when children are developmentally ready to learn more complex ways of thinking. Researchers support that young children are capable of thinking critically. For instance, Koenig and Harris (2005) demonstrated that 3- and 4-year-old children will differentiate the credibility of various sources of information. Supportively Bailin et al. (1999) argue that some critical thinking instruction can be used to develop children who are at the primary school level. These instructions include the following:

- value reason and truth;
- respect others during discussion;
- be open-minded;
- be willing to see things from another's perspective;
- perceive the difference between definitions and empirical statements;
- use cognitive strategies, such as asking for examples when something is unclear and
- use principles of critical thinking, such as considering alternatives before making a decision (as cited in Lai, 2011, p. 24).

Similarly, APA Delphi Report recommends that “from early childhood, people should be taught, for example, to reason, to seek relevant facts, to consider options, and to understand the views of others” (Facione, 1990, p. 27). In addition Lai (2011) indicated that “critical thinking skills, abilities, and dispositions should be built into

all levels of the K–12 curriculum, rather than being limited to junior high or high school students” (p. 24).

Consequently, from childhood on, people are able to think critically and teachers need to integrate strategies in their classes that develop the capacity of children to think critically.

Teaching of critical thinking

As stated in the previous section, the critical thinking levels of students are important. Besides that teachers play an important role in teaching critical thinking skills.

Researchers believe that critical thinking skills and abilities can be taught (Aybek, 2007; Ennis, 1989; Facione et al., 2006; Facione & Facione, 2008; Halpern, 1998; Kennedy et al., 1991). Halpern (1998) showed that there are instructional programs which improve the critical thinking skills of college students. For instance, some college students were instructed in a specific type of problem-solving strategy. After instruction, they produced more effective math expressions compared to the college students who did not get this instruction. Similarly, Kennedy et al. (1991) concluded that instructional interventions aimed to improve students’ critical thinking skills have positive results.

Ennis (1989) asserts that to help students develop critical thinking skills, teachers must understand the cognitive processes that constitute critical thinking and to use instructional activities that will develop these processes. He recommends instructors teach students how to define and clarify information, to ask appropriate questions to clarify or challenge statements or beliefs, to judge the credibility of sources, and to

solve problems by predicting probable outcomes through logic or deduction (as cited in America Dental Education Association [ADEA], 2013)

Furthermore, researchers have recommended eliminating superfluous activities and to add content that focuses on learner-centered active forms which promote critical thinking skills (Facione et al., 2006). If the goal is for students think critically then the following activities should be included the majority of student learning:

- “Engaging in problem-based learning
- Analyzing case-based scenarios
- Engaging in debates, role-play, argument mapping, thinking aloud, and simulation among others” (Facione & Facione, 2008, as cited in ADEA, 2013, para. 10).

According to the research, it is possible to teach critical thinking in classrooms. Therefore, teachers need to gain critical thinking skills as well as the teaching techniques that will increase their students’ critical thinking in class (Aybek, 2007).

Teacher education and critical thinking

After arguing about the importance of teaching of critical thinking, it follows that teacher education needs investigation. According to Wilks (1995) if society wants to change, the first step will be renew teacher’s critical thinking skills. Supportively, Yetim and Göktaş (2000) indicate that the Turkish Education system needs teachers who are able to use critical thinking skills. Regarding the importance of critical thinking in education and teacher training, it seems necessary to establish the critical thinking abilities of pre-service teachers (Türnüklü & Yeşildere, 2005).

According to Aybek (2007) universities and education faculties can help prepare pre-service teachers who can inquire, analyze knowledge and be open-minded.

Furthermore, Szaboa and Schwartz (2010) stated that

Critical thinking skills are essential and need to be fostered as part of any teacher education program. By learning to think critically, pre-service teachers develop the ability to synthesize and analyze instructional materials, identify main ideas, cite evidence in support of a conclusion, practice evaluation skills, and become reflective practitioners. (p. 80)

However, Özmen (2006) warns of the difficulty of constructing well planned courses that develop critical thinking in teacher education.

Critical thinking dispositions

Most researchers agree that in addition to skills or abilities, critical thinking also involves dispositions (Facione, 1990). Based on Facione et al. (1995) some studies have data that shows one-to-one connections between a critical thinking dispositions and a given critical thinking skills.

In the literature, there are a variety of definitions of critical thinking dispositions. Facione (2000) defines critical thinking dispositions as “consistent internal motivations to act toward or respond to persons, events, or circumstances in habitual, yet potentially malleable ways” (p. 64). Insight Assessment (2012) states that a “disposition is a habit of mind, a consistent internal motivation, a mental discipline” (para. 2). Similarly, Halpern (2003) identifies “an essential component of critical thinking is developing the attitude or disposition of a critical thinker” (p. 15). All these definitions relate disposition to the tendencies of person to use critical thinking.

Critical thinking dispositions are also described based on behaviors. These behaviors include “truth-seeking, open-mindedness, analyticity, systematically, critical thinking

self-confidence, inquisitiveness, and maturity in judgment” (Facione et al., 1995, p.

1). Below, the seven characteristics are given in detail:

- Open-mindedness is being tolerant of divergent views and sensitive to the possibility of one's own bias.
- Systematic is being organized, orderly, focused, and diligent in inquiry.
- Analyticity is prizing the application of reasoning and the use of evidence to resolve problems, anticipating potential conceptual or practical difficulties, and consistently being alert to the need to intervene.
- Truth-seeking is disposition of being eager to seek the best knowledge in a given context, courageous about asking questions, and honest and objective about pursuing inquiry even if the findings do not support one's self-interests or one's preconceived opinions.
- Self-Confidence is the trust one places in one's own reasoning processes.
- The Maturity is the disposition to be judicious in one's decision-making.
- The Inquisitiveness is one's intellectual curiosity and one's desire for learning even when the application of the knowledge is not readily apparent (Facione et al., 1995, p. 4-6)

In the light of these definitions, there is support for linking critical thinking dispositions to critical thinking skills. Facione et al. (1995) claimed that critical thinking dispositional attributes help predict critical thinking skills. Likewise, Roberts (2003) and Gadzella, Ginther and Bryant (1997) reported a positive correlation between critical thinking dispositions and critical thinking skills. Furthermore, the positive correlation indicates use of critical thinking. According to Bartlett and Cox (2002) if a person knows that he or she is disposed to a particular critical thinking, the person may be motivated to cultivate it.

Research on critical thinking dispositions of pre-service teachers

On critical thinking dispositions, various studies have been conducted in abroad and Turkey (Akbiyık, 2002; Beşoluk & Önder, 2010; Çetinkaya, 2011; Ekinçi, 2009; Emir, 2012; Gök& Erdoğan, 2011; Güleç, 2010; Gürleyük, 2008; Kong, 2007;

Korkmaz, 2009; Lampert, 2006; Reed, 1998; Ricketts, 2003; Şen, 2009; Tümkaya, 2011; Yenice, 2011; Zayif, 2008; Zhang, 2003).

In this section, recent studies of critical thinking dispositions are presented with regard to pre-service teachers' age, year in the program, subject areas, high school types from which they graduated, their CGPA levels and education level of their parents. A number of the studies used the CCTDI-T survey. Information about this survey can be found in Chapter Three.

Critical thinking dispositions and age of pre-service teachers

In the literature, there are recent studies that present a link between critical thinking dispositions and age. Findings indicated that pre-service teachers of different ages have significantly different critical thinking disposition scores (Bökeoğlu & Yılmaz, 2005; Emir, 2012).

Emir (2012) in her research, aimed to explore critical thinking dispositions of pre-service teachers. The study was conducted by sampling 279 students studying at Istanbul University, Hasan Ali Yücel Yücel Education Faculty in different departments. The CCTDI-T was used as a survey in order to collect data. The findings showed that there is significant difference between age and critical thinking dispositions of pre-service teachers. In terms of inquisitiveness, pre-service teachers who were 24 years old scored higher than others. In addition she indicated that level of dispositions increases with age.

In their research, Bökeoğlu and Yılmaz (2005) sampled 128 undergraduates who were studying at Ankara University Faculty of Educational Sciences. According to the results of their study, there was a significant difference in critical thinking disposition scores among different age groups. The difference is that pre-service

teachers who were 20-21 years old have higher scores than 25 years old specifically as analyticity, self-confidence and inquisitiveness.

Critical thinking dispositions and pre-service teachers' year in the program

Some studies have explored connections between critical thinking dispositions and the year pre-service teachers' are in their program (e.g., freshman, sophomore, junior, senior). Studies have found conflicting results. Some found that the critical thinking disposition levels of pre-service teachers' in different years in their program differed significantly (Güleç, 2010; Zayif, 2008) while others did not (Yenice, 2011).

In her master's thesis, Zayif (2008) aimed to investigate the critical thinking dispositions of pre-service teachers in Faculty of Education at Abant İzzet Baysal University. In this research, a version of the CCTDI-T survey was used. The survey was given to 512 pre-service teachers who were studying in different departments. The findings showed that the critical thinking dispositions of pre-service teachers were generally low. Moreover, the results indicated that there is a significant difference between in the characteristics of critical thinking dispositions such as being analytic, self-confidence, and truth-seeking and pre-service teachers' year in their program.

Güleç (2010), in her research, investigated critical thinking dispositions of pre-service teachers who are studying at elementary and pre-school teacher programs in Faculty of Education at Çanakkale Ondokuz Mart University. Similarly, CCTDI-T was used to explore of critical thinking dispositions of pre-service teachers. Findings present that there is a significant difference between pre-service teachers' year in the program and characteristics of critical thinking dispositions such as being analytic

and truth-seeking. According to the Tukey test results, the differences are found between senior students and first year students.

As a part of her research, Yenice (2011) examined relationship between pre-service science teachers' critical thinking dispositions and year in their program. Sample of this study consists of 124 students studying in Science Education Department of Adnan Menderes University Education Faculty. The findings of her study indicated that there is no significant difference between critical thinking dispositions and pre-service teachers' year in the program.

Critical thinking dispositions and subject areas of pre-service teachers

In the literature, researchers have explored the link between the subject areas of pre-service teachers and their critical thinking dispositions. The results indicated that there is no significant difference between students' departments of study and their critical thinking dispositions (Korkmaz, 2009; Yakar, Altındağ, & Kaya, 2009).

In his research, Korkmaz (2009) explored critical thinking dispositions of pre-service teachers who were studying at Ahi Evran University Faculty of Education.

Participants of this descriptive study were 480 students in different departments. The CCTDI-T was used as a survey. He found that the critical thinking levels and dispositions of the students surveyed were rated at a medium level; furthermore he found no significant differences in critical thinking disposition levels among students studying in different subject areas.

Yakar et al. (2009) used the CCTDI-T survey to collect data of pre-service teacher critical thinking dispositions as well. The research was conducted with 86 pre-service teachers who were studying at Pamukkale University Faculty of Education. The

study showed no significant difference between the critical thinking dispositions levels of pre-service teachers studying in different departments.

Critical thinking dispositions and high school types from which the pre-service teachers graduated

A number of studies have taken place to investigate if the type of high school from which pre-service teachers graduated can account for differences in critical thinking dispositions. Gök and Erdoğan (2011) and Çetinkaya (2011) found no significant difference among pre-service teachers when compared for high school types (general, Anatolian, vocational, Anatolian teacher, science, super, private). The former study was conducted with 103 first year pre-service teachers at the Division of Elementary Teaching Hacettepe University. The latter study was composed of 195 Turkish education pre-service teachers in the department of Turkish Education in Faculty of Education at Çanakkale Onsekiz Mart University. Both studies used the CCTDI-T and found that all teacher candidates' critical thinking dispositions are low.

Critical thinking dispositions and pre-service teachers' mothers and fathers education levels

There are current studies which aimed to investigate connections between critical thinking dispositions of pre-service teachers and their parents' education level.

Ekinci (2009) is among several researchers who explored differences in critical thinking dispositions scores of pre-service teachers when compared for the education levels of their mothers and fathers. The sample of the study is composed of 671 pre-service teachers from the Faculty of Education in Çukurova University. CCTDI-T was used as a survey to measure critical thinking dispositions. In addition,

participants completed an information form which included their parents' education level. According to results of the research, no significant difference was found among critical thinking dispositions of pre-service teachers when compared for the education level of their parents.

Another researcher, Şen (2009), investigated Turkish language and literature teacher candidates' critical thinking dispositions changing according to a number of variables. Samples included 144 Turkish teaching pre-service teachers who are studying at Gazi University, Education Faculty Department of Turkish language and literature teaching. Similar to other research, Şen (2009) found that education level of parents could not account for differences in critical thinking disposition levels of pre-service teachers.

In their research, Beşoluk and Önder (2010) aimed to discover learning approaches, learning styles and critical thinking dispositions of pre-service teachers. The sample of the study consisted of 528 students in Sakarya University Faculty of Education. The CCTDI-T was used as a survey. Beşoluk and Önder (2010) found no significant difference of critical thinking disposition levels of pre-service teachers when compared based on the education level of their parents.

Critical thinking dispositions and pre-service teachers' CGPAs (academic achievement)

A number of researchers have explored whether critical thinking dispositions differ with CGPA levels of pre-service teachers.

In her master thesis, Gürleyük (2008) investigated relationships between critical thinking dispositions and academic achievement levels of teacher candidates. The sample was 322 primary school teacher candidates who were chosen from Zonguldak

Karaelmas University, Ereğli Education Faculty and Erciyes University Education Faculty. Gürleyük (2008) found that there is no significant difference between critical thinking dispositions and academic achievement of pre-service teachers.

In her doctoral thesis, Aybek (2006) investigated the effects of teaching social studies with Edward De Bono's skill based thinking program and teaching with content based critical thinking program on pre-service teachers' critical thinking disposition levels. The research was designed as an experimental pre-test/post-test control group design and it was conducted with 76 pre-service teachers. In this research, Aybek (2006) explored how these programs change academic achievement of the pre-service teachers. According to findings, there is no significant difference between critical thinking dispositions and CGPA levels of pre-service teachers.

Summary

This literature review has shown how critical thinking is defined with different perspectives which are philosophical, psychological and educational. The perspectives indicate that critical thinking plays an important role in social and education life.

This literature review has indicated that researchers believe that students' critical thinking skills may develop and progress with the help of teachers in classroom. Therefore, using of critical thinking in class gain importance. For that reason, teachers and pre-service teachers need to improve their critical thinking skills.

To analyze teachers' and pre-service teachers' awareness and use of critical thinking, many researchers have measured critical thinking dispositions; these researchers believe that dispositions show potentials for critical thinking abilities and tendencies.

Many of these studies used the CCTDI-T survey. The following chapter provides more information about this instrument and how it was used in the current study.

In Turkey and abroad, many researchers have further analyzed critical thinking dispositions of teachers and pre-service teachers by comparing different demographic features. Their aim is to determine if certain demographics can account for differences in critical thinking disposition levels. The literature revealed that the results of analyzing these demographics have been mixed. In some cases, different age groups do have significantly different critical thinking dispositions, for example. Other demographics, such as the high school types that from which they graduated, their subject areas and education level of their parents showed no significant difference in disposition scores.

Chapter Three provides information about the research design for this study and how these analyses were applied to investigate the critical thinking dispositions of pre-service teachers at a private non-profit university in Turkey.

CHAPTER 3: METHOD

Introduction

In this chapter the structure of research design is presented, followed with details about the context, participants and instruments. Finally, the method of data collection and data analysis are provided.

Research design

The purpose of this research is to investigate critical thinking dispositions of pre-service teachers who are studying in a unique program. For this reason, research was designed as a case study.

Case study

Case studies are described as investigations of a phenomenon that occurs within specific context (Miles & Huberman, 1994). According to Yin (2003) a case study defined also a “story about something unique, special, or interesting—stories can be about individuals, organizations, processes, programs, neighborhoods, institutions, and even events ”(as cited in Neale, Thapa & Boyce, 2006, p. 3). For this reason case studies are useful “when the context of study and the extent to which particular program or innovation has been implemented ” (Gay, Mills & Airasian, 2009, p. 427). In this research, there is a case which is complementary to these definitions of case study.

Unique case, program and sample

In this research the case being studied is specific teacher education program at a private non-profit university, Graduate School of Education. This two year teacher

education program also offers a Master degree in Curriculum & Instruction which is sole in Turkey. After completing the program, certificate for teaching and Master degree with thesis are gained.

The program is particular because the pre-service teachers were chosen by following a specific process. In order to apply the program, the applicants needed to fulfill the requirements. The requirements are;

- Undergraduate degree from biology, mathematics, Turkish and English language & literature departments.
- Have undergraduate cumulative great point average (CGPA) ≥ 2.50
- Have *akademik personel ve lisansüstü eğitimi giriş sınavı* (ALES) score ≥ 60
- English proficiency test score: *yabancı dil bilgisi seviye tespit sınavı* (YDS) ≥ 70 or TOEFL (IBT)= 65 / IELTS= 5.5
- Have statement of purpose and letter of recommendation

Besides, these requirements, the applicants need to undergo an interview process to be accepted.

The information shows that the pre-service teachers have already undergraduate level from their departments with sufficient CGPA levels so they have background knowledge in their subject area. In addition they have sufficient English level skills that indicate the pre-service teachers are satisfied to speak second language. Lastly, all of them are able to pass an interview that is conducted by Graduate School of Education. These features are valuable and important because they indicate that the pre-service teachers have different qualifications which make unique case in this research.

Context

Case studies are often used to provide context to other data (such as outcome data), to see complete picture of what happened in the program and why (Neale, Thapa, & Boyce, 2006). This research has a specific case and context which is a private non-profit university, Graduate School of Education.

The Faculty of Education and Graduate School of Education offers: Department of Computer and Instructional Technology Teacher Education, Graduate Programs in Curriculum and Instruction, MA in Management in Education, MA in Teaching English as a Foreign Language (TEFL) and PhD in Curriculum & Instruction. In addition, sports courses are offered through the Faculty's Physical Education Unit.

Participants

In case study research, the samples are chosen generally as small unit which can be a classroom of children, department of teachers. Depending on the research questions, the purposive sampling is type of sampling which is the commonly used in educational field (Gay, Mills, & Airasian, 2009).

Purposive sampling is used in order to understand selected groups' experiences, behaviors and concepts. "Researchers seek to accomplish this goal by selecting "information rich" cases, that is individuals, groups, organizations, or behaviors that provide the greatest insight into the research question" (Frankel & Devers, 2000, p. 264).

The purposive sample for this study is pre-service teachers who are studying MA in Curriculum & Instruction at a private non-profit university, Graduate School of Education.

The total number of sample is 45. Of these 45 pre-service teachers, 21 are second year and 24 of them are first year MA students. However, one first year student departed from the program therefore the final number is 44. The demographics analyzed in this research study are summarized in Table 1.

Participants were enrolled in four different disciplines within the Graduate School of Education: mathematics education, biology education, Turkish and English language & literature education. These subject areas and the participants year in the graduate program were taken into consideration when analyzing differences in critical thinking dispositions. In addition, this study compared the critical thinking disposition level scores of participants based on their age, their CGPA, the high school types from which they graduated and the education level of their parents. There are two CGPAs in Graduate School of Education. One of them is for Curriculum of Teaching Certificate (TE) and other one is for Curriculum of Master of Art in Curriculum and Instruction (CI).

Table 1
Demographic data of participants

Demographic data	Groups	Number (N)
Age	18-21	0
	22-25	38
	25 and above	7
High school types from which they graduated	General High School	4
	Anatolian High School	23
	Vocational High School	0
	Anatolian Teacher High School	2
	Science High School	0
	Other	16
Year in the graduate program	First year	24
	Second year	21
Subject areas	Biology	9
	Mathematics	15
	Turkish language and literature	9
	English language and literature	12
Education level of mothers'	Illiterate	1
	Primary School Graduate	13
	Middle School Graduate	9
	High School Graduate	16
	University Graduate	5
	Postgraduate	1
Education level of fathers'	Illiterate	0
	Primary School Graduate	8
	Middle School Graduate	7
	High School Graduate	14
	University Graduate	15
	Postgraduate	1
CGPA (TE)	4.00-3.70	15
	3.69-3.30	22
	3.29-3.00	6
	2.99-2.70	1
CGPA (CI)	4.00-3.70	6
	3.69-3.30	29
	3.29-3.00	8
	2.99-2.70	1

Instrumentation

In case study, data can be collected through various techniques such as questionnaires or surveys, interviews, observations, or written accounts by the subjects (Wantz, Firmin, Johnson, & Firmin, 2006). In this research, data was collected with demographic forms and survey which was Critical Thinking Disposition Inventory-Turkish (CCTDI-T).

Demographic (Information) forms

The instrument had demographic information part which includes pre-service teachers' age, the type of high school from which they graduated, year in the graduate program, subject areas, education level of their parents.

Survey: California Critical Thinking Disposition Inventory

In this research, in order to examine critical thinking dispositions, California Critical Thinking Disposition Inventory (CCTDI) –Turkish version was used (Appendix A).

The original CCTDI was developed by Facione and Facione (1992). This inventory measures the ‘willing’ dimension in the expression ‘willing and able’ to think critically” (Insight Assessment, 2012, para. 2). According to Insight Assessment (2012), CCTDI was defined;

A person may be disposed toward truth-seeking or bias, toward open-mindedness or intolerance, toward anticipating possible consequences or being heedless of them, toward proceeding in a systematic or unsystematic way, toward being confident in the powers of reasoning or mistrustful of thinking, toward being inquisitive or resistant to learning, and toward mature and nuanced judgment or toward rigid simplistic thinking. The CCTDI measures these character logical attributes and its scale scores profile the survey respondent on these seven dimensions. (para. 6)

The inventory is composed of 75 items focusing on seven critical thinking factors identified by Delphi Project of the American Philosophy Organization (Facione et al., 1995). It includes Likert scaled items (1 to 6). The Turkish version was adapted by Kökdemir (2003) who decreased the survey to 51 items; addressing only six factors. In the translation process, 51 items were translated into Turkish by the researcher, six expert psychologists and one instructor from translation and interpretation department.

In CCTDI-T, the six factors (subscales) are analyticity (10 items), open mindedness (12 items), inquisitiveness (9 items), self-confidence (7 items), truth-seeking (7 items) and systematicity (6 items).

Below, Table 2 shows the distribution of survey's questions and its dimensions.

Table 2
Survey's questions and dimensions

Subscales	Survey questions
Analyticity	10,11,12,13,14,15,16,17,18,19
Open-mindedness	20,21,22,23,24,25,26,27, 28,29,30,31
Inquisitiveness	1,2,3,4,5,6,7,8,9
Self-confidence	32,33,34,35,36,37,38
Truth-seeking	39,40,41,42,43,44,45
Systematicity	46,47,48,49,50,51

(Zayif, 2008, p. 68)

Scoring the CCTDI-T

The CCTDI-T provides an assessment of the participants' critical thinking dispositions by tallying their responses. Each item has a six-point likert scale: 'totally

agree' (six points), 'agree' (five points), 'partially agree' (four points), 'partially disagree' (three points), 'disagree' (two points) and 'totally disagree' (one point). The points are evaluated for six subscales of critical thinking dispositions and the scores identify dispositions level of pre-service teachers. A score under 240 points (40 x 6) would indicate low critical thinking dispositions, while scoring over 300 points (51 x 6) indicates high critical thinking dispositions; average scores range between 240 to 306 points (Kökdemir, 2003).

Besides, if individual's scores in every subscale are under 40, it indicates low critical thinking dispositions. On the other hand, if scores are above 50 it indicates high critical thinking dispositions of person (Kökdemir, 2003).

Reliability of CCTDI-T

Kökdemir (2003) indicated that the original reliability of full scale is .88 and in this research; reliability of the full scale is found .68 (Table 3).

Table 3
Reliability of full scale of critical thinking disposition

Cronbach's Alpha	N of Items
.682	51

Nunnally and Bernstein (1994) provided guidance in the interpretation of the reliability coefficient by stating that a value of .70 is sufficient for early stages of research, but that basic research should require test scores to have a reliability coefficient of .80 or higher. From this interpretation, reliability of the research for six items is sufficient for early stages of research.

Method of data collection

The survey was administered during a single day in the 2012 fall semester. The survey was conducted on the same day by the researcher in the same classroom.

Before distributing the survey, the researcher explained the aim of the research and how participants should complete the survey. The survey took twenty minutes to finish and it was collected by researcher. The survey collected all the data for this study except the participants' CGPAs (Curriculum of Teaching Certificate [TE] and Curriculum of Master of Art in Curriculum and Instruction [CI]) which were obtained from the Graduate School of Education Office's database.

Method of data analysis

All subscales of critical thinking dispositions were evaluated separately. The SPSS 15 program was used as an inferential data analysis tool to analyze the data. Results were evaluated in accordance with pre-service teachers' demographic features and critical thinking dispositions. Statistical significance level was taken as $p < .05$.

One-way Analysis of Variance (ANOVA) was used to find out pre-service teachers' dispositions compared with their demographic features which are the type of high school from which they graduated, subject areas, education level of mothers and fathers of pre-service teachers.

Independent samples t-tests were used to investigate mean differences between critical thinking dispositions and two demographic features which are age and year in the graduate program.

The Pearson Correlation was used to examine relationships between CGPAs (TE & CI) and critical thinking dispositions of pre-service teachers. Statistical significance was taken two single sided ($p < .01$).

CHAPTER 4: RESULTS

Introduction

This chapter shows findings of research questions of this study. First, the demographic data are given in detail. Second, the findings of main research questions and sub questions are presented. The results of research question and sub question share the results of participants' critical thinking dispositions (CTD) when compared for the following demographic features:

- Their age
- Their year in the graduate program
- Subject areas
- High school types from which they graduated
- The education level of their parents

The findings of the second research question present the relationship between pre-service teachers CGPA levels and their critical thinking dispositions.

Demographic data

Age

Participants' age are shown in Figure 2. With all the participants being graduate students, none were below the age of 21. Of the 45 participants, 38 (45 %) are between the ages of 22-25 and seven were 25 or older (15.55 %).

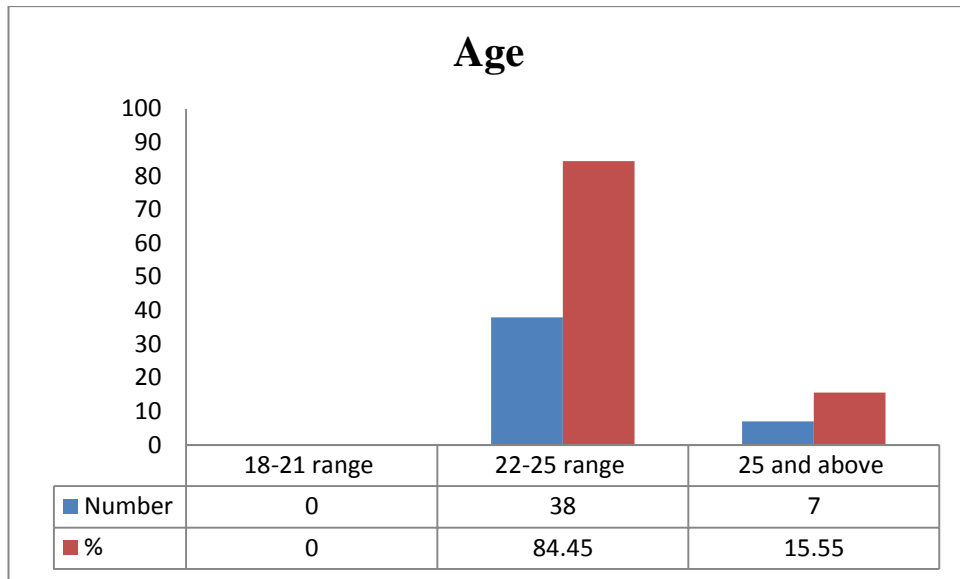


Figure 2. Distribution of pre-service teachers' age

High school types from which they graduated

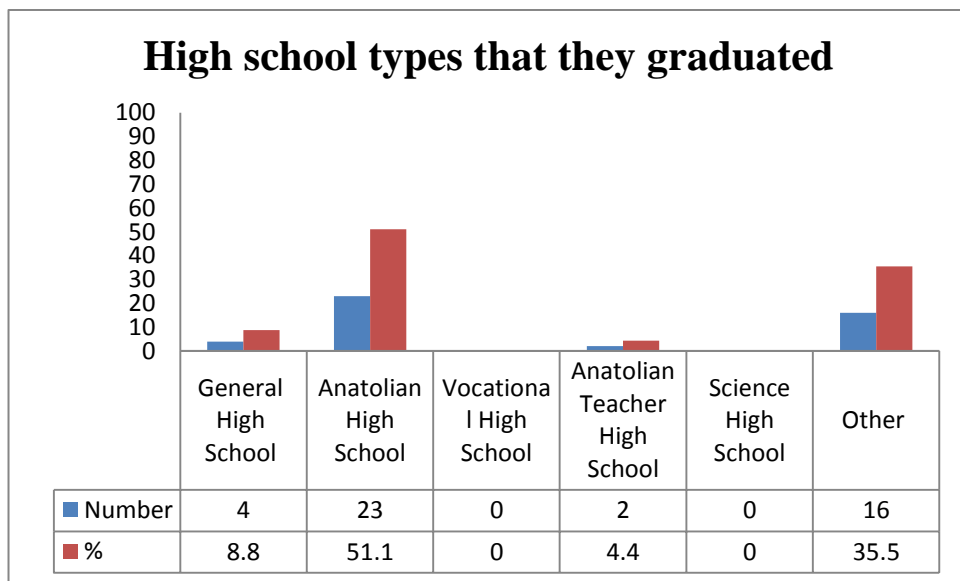


Figure 3. Distribution of pre-service teachers' high school types from which they graduated

As shown in Figure 3, 51.1 % of the sample ($N=23$) graduated from an Anatolian high school. The “other” category of high school types private schools and Super High schools. It should be noted that none of the pre-service teachers graduated from science high schools or vocational high schools.

Year in the graduate program

As shown in Figure 4 there are more first year 53.3 % ($N=24$) pre-service teachers than second years 46.6 % ($N=21$).

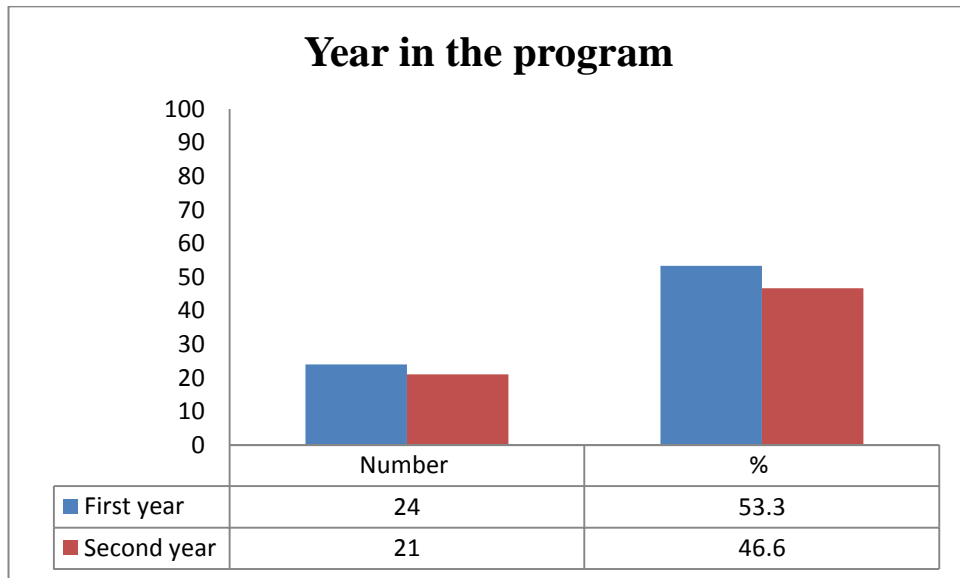


Figure 4. Distribution of pre-service teachers' year in the graduate program

Subject areas

Among the participants, the mathematics department had more pre-service teachers 33.3 % ($N=15$) than others. The subject area distribution for the other pre-service teachers is shown in Figure 5.

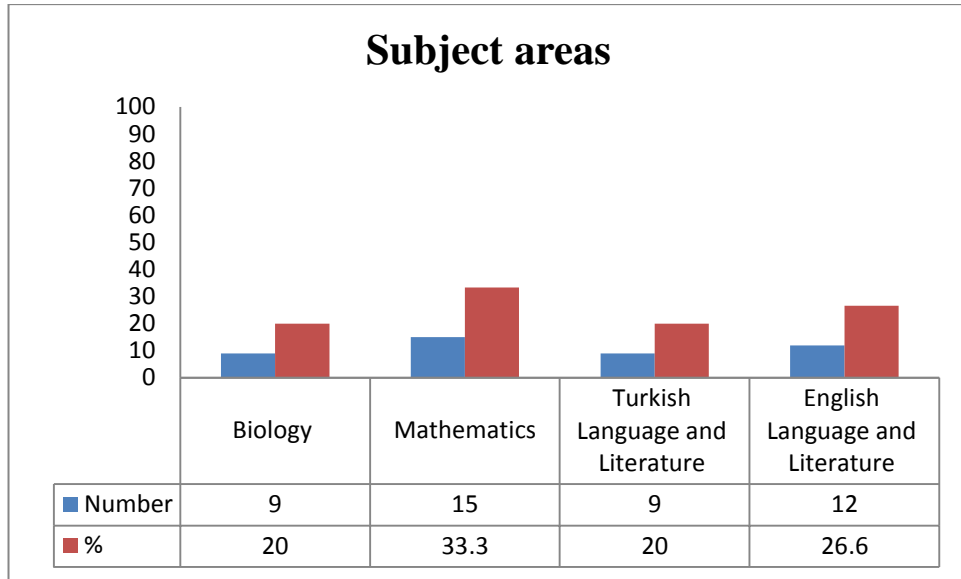


Figure 5. Distribution of pre-service teachers' subject areas

Education level of parents

In this part, education level of pre-service teachers' parents was examined. Figure 6 shows the pre-service teachers' mothers' education level and Figure 7 their fathers' education level.

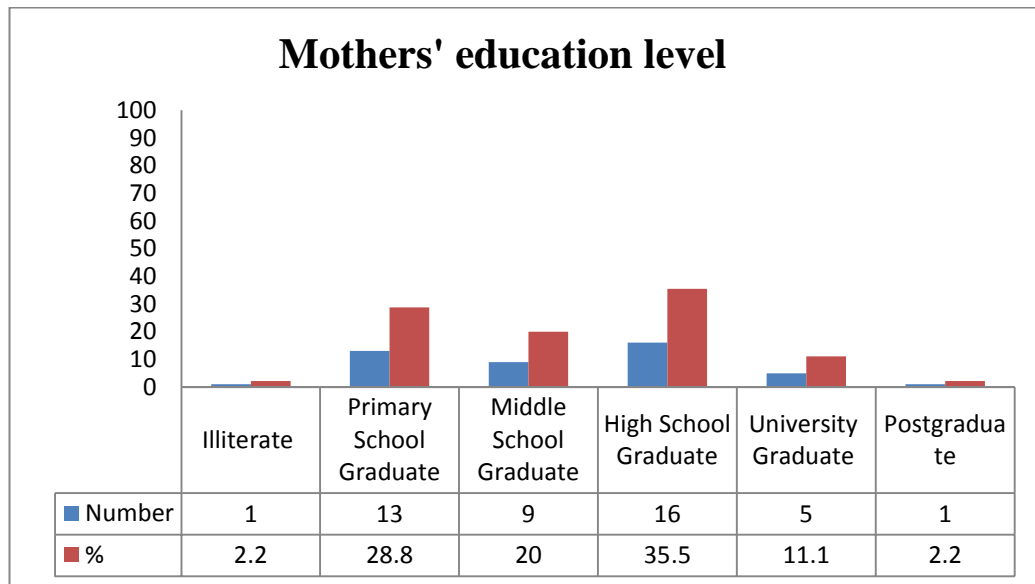


Figure 6. Distribution of pre-service teachers' mothers' education level

Figure 6 represents that most of pre-service teachers' mothers graduated from high school 35.5 % ($N=16$) and the next largest population (28.8 %) from primary school ($N=13$).

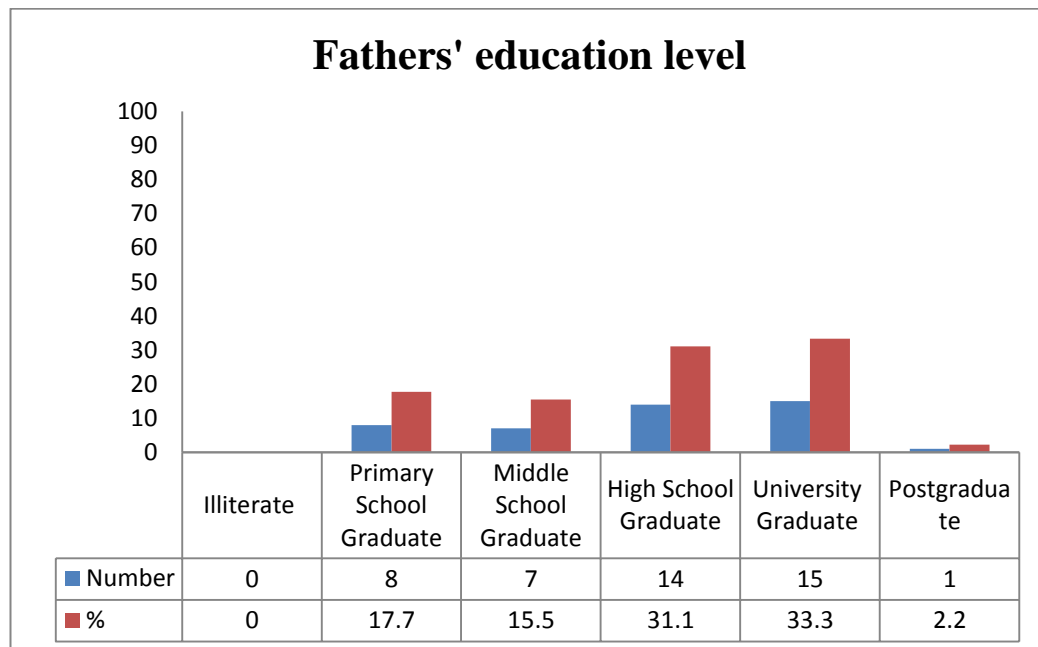


Figure 7. Distribution of pre-service teachers' fathers' education level

Figure 7 shows that most of the fathers of the participants in this study either graduated from university 33.3 % ($N=15$) or high school 31.1 % ($N=14$). None of pre-service teachers' had a father who was illiterate.

CGPA

The last demographic data of participants' is CGPA levels of pre-service teachers. They have two CGPAs which are for Curriculum & Instruction (CI) and Teacher Education (TE) Certificate. Figure 8 shows that most of the pre-service teachers ($N=22$; 50 %) have CGPA TE between 3.69-3.30. Notably, most of the teachers ($N=29$; 65,9 %) have a CGPA CI between 3.69-3.30 for their TE scores as well (Figure 9).

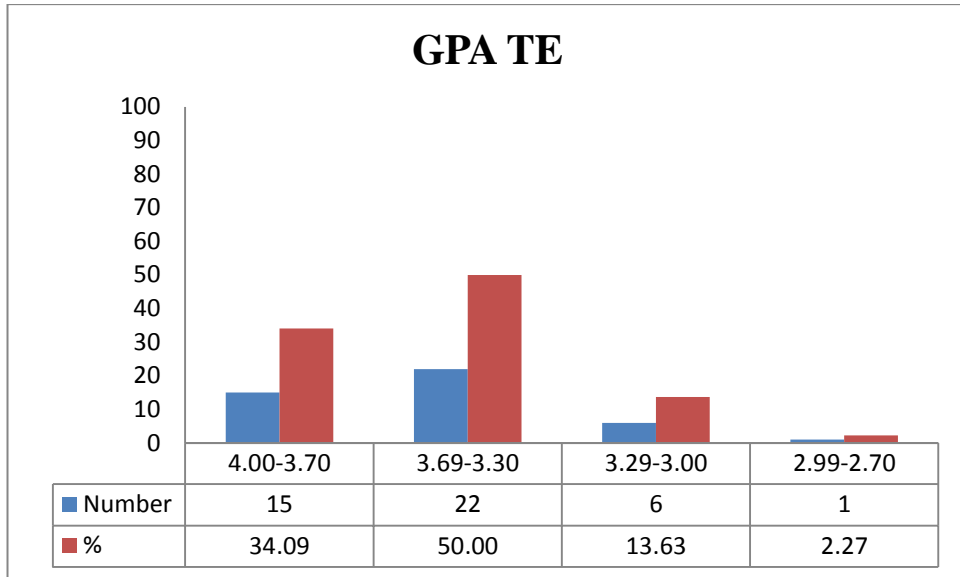


Figure 8. Distribution of pre-service teachers' CGPA (TE) scores

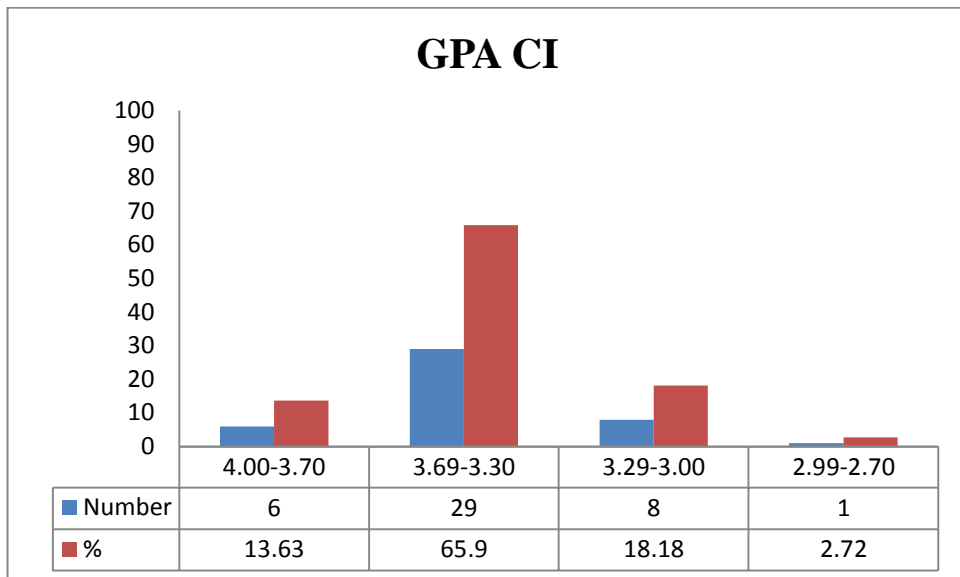


Figure 9. Distribution of pre-service teachers' CGPA (CI) scores

Findings of critical thinking dispositions

In this part, results are given according to the main research questions and sub question.

Research question 1: Find out critical thinking dispositions of pre-service teachers

As described earlier, CCTDI-T version survey was used to assess the Critical Thinking Disposition (CTD) levels of teachers. The survey was comprised of 51 questions divided into six subscales. Table 4 shows the mean scores of the participants for each of the subscales which were accounted for separately. The total score is the sum of all subscales of critical thinking dispositions.

Table 4
Descriptive results of CTD of pre-service teachers

	N	Minimum	Maximum	Mean	Std. Deviation
Inquisitiveness	44	38.89	54.44	46.5909	3.40911
Analyticity	43	32.00	48.00	41.1860	3.73692
Openmindedness	45	35.00	52.50	41.7037	3.96065
Confidence	44	35.71	61.43	47.2078	6.03702
Truthseeking	45	27.14	45.71	33.9683	3.98151
Systematicity	43	28.33	45.00	38.6434	4.19838
Totals	41	214.41	278.04	248.5550	16.37582
Valid N (listwise)	41				

According to Kökdemir (2003) if a person's total score is less than 240 points (40x6) this indicates he or she has low critical thinking dispositions levels while if total score is between 240 to 306 points it shows middle level of critical thinking dispositions of a person. As is seen in Table 4, the average total score for the pre-service teachers in this study is $M= 248.55$. Therefore the results indicate that they have a middle critical thinking disposition level. The results show that participants scored highest in the Confidence ($M= 47.20$) subscale and the lowest subscale was Truth-seeking ($M= 33.96$).

In addition, Figure 10 shows how the total score of critical thinking disposition of pre-service teachers distribute. It can be stated that the distribution is normal and some of pre-service teachers have high level of critical thinking disposition while some of them has low level of critical thinking dispositions.

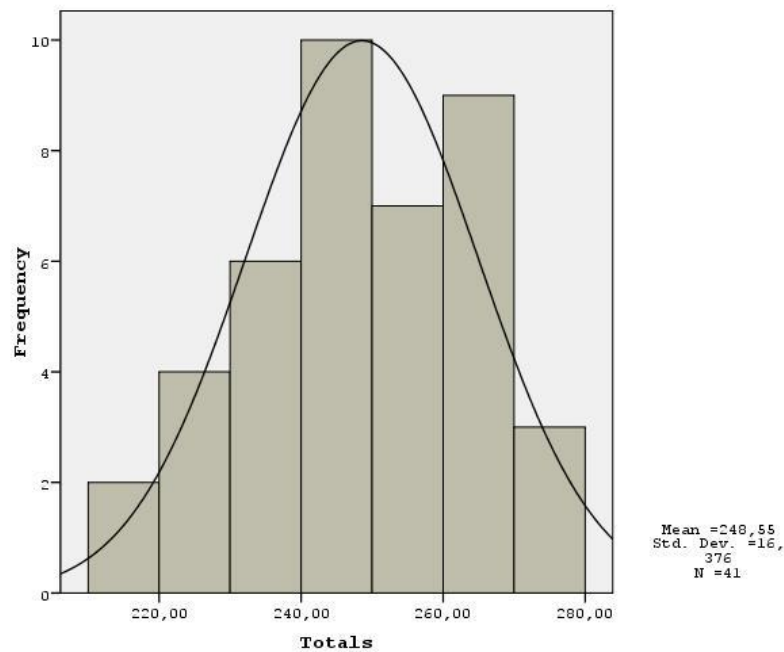


Figure 10. Frequency distribution of total scores of CTD of pre-service teachers

How pre-service teachers' critical thinking dispositions differ with their age

For this study, two age groups were compared: ages 22 through 25 and ages over 25 and Figure 11 shows mean scores of subscales between these two groups. As is seen in figure, highest mean is taken from Inquisitiveness subscale and the lowest mean is taken from Truth-seeking subscale.

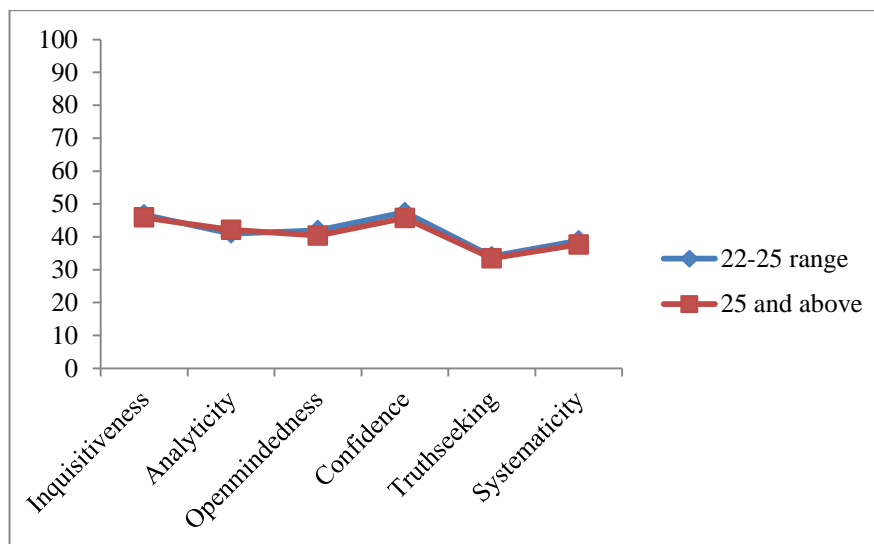


Figure 11. Means of subscales of age groups

To investigate difference between the age groups, independent samples t-tests were used. Table 5 reveals that there is no significant mean differences in critical thinking dispositions levels – neither for the total score nor any of the subscales – of pre-service teachers when compared based on their age ($p < .05$).

Table 5
Result of CTD and pre-service teachers' age

	t	df	Sig. (2-tailed)	Mean Difference
Inquisitiveness	.603	42	.550	.85371
Analyticity	-.736	41	.466	-1.14286
Openmindedness	.978	43	.333	1.59461
Confidence	.710	42	.482	1.77606
Truthseeking	.357	43	.723	.59076
Systematicity	.701	41	.487	1.22354
Totals	.595	39	.555	4.07496

How pre-service teachers critical thinking dispositions differ when compared based on the high school type from which graduated

Table 6 shows that when the mean CTD levels scores (total score and subscales) of participants were compared based on the high school from which they graduated (See Figure 3) no significant difference was found ($p < .05$).

Table 6
Result of CTD and type of high school from which pre-service teachers graduated

		Sum of Squares	df	Mean Square	F	Sig.
Inquisitiveness	Between groups	66.716	3	22.239	2.054	.122
	Within groups	433.032	40	10.826		
	Total	499.747	43			
Analyticity	Between groups	32.089	3	10.696	.752	.528
	Within groups	554.423	39	14.216		
	Total	586.512	42			
Openmindedness	Between groups	56.973	3	18.991	1.230	.311
	Within groups	633.243	41	15.445		
	Total	690.216	44			
Confidence	Between groups	51.345	3	17.115	.452	.718
	Within groups	1515.816	40	37.895		
	Total	1567.161	43			
Truthseeking	Between groups	4.355	3	1.452	.086	.967
	Within groups	693.151	41	16.906		
	Total	697.506	44			
Systematicity	Between groups	30.100	3	10.033	.551	.651
	Within groups	710.210	39	18.211		
	Total	740.310	42			
Totals	Between groups	623.796	3	207.932	.762	.523
	Within groups	10102.903	37	273.051		
	Total	10726.699	40			

How pre-service teachers' critical thinking dispositions differ from first year to second year

In this study, there are two year groups which are first and second year in the graduate program and Figure 12 indicates means of subscales of the groups. As is seen in the figure, subscale of Analyticity and Openmindedness have similar mean for both year groups. On the other hand highest mean is taken from Confidence subscale by second year group.

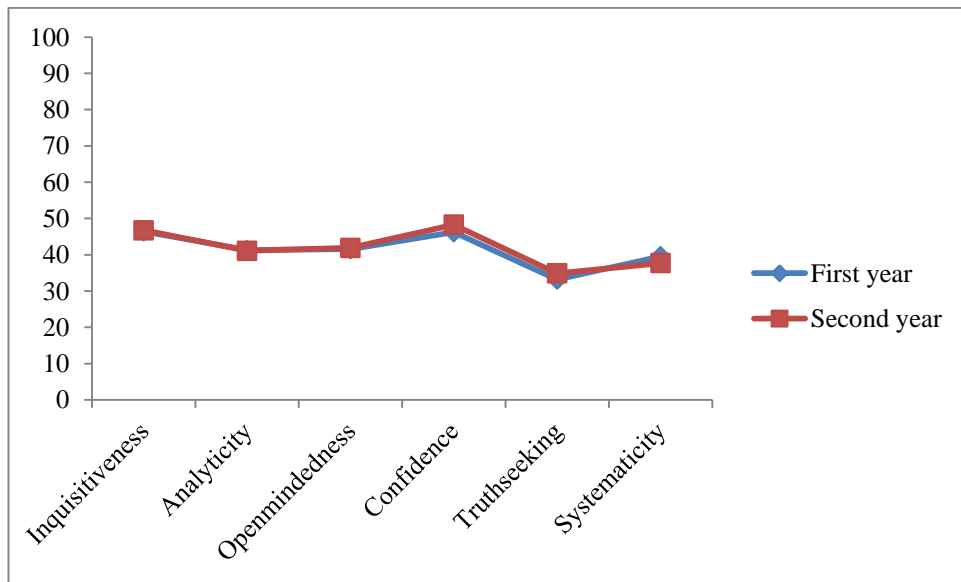


Figure 12. Means of subscales of year in the graduate program

To explore mean difference of these two groups, independent samples t-test were used. Table 7 indicates that the mean CTD level scores of pre-service teachers in the first year of graduate school studies is not significantly mean different from their colleagues who are in their second year ($p < .05$).

Table 7
Result of CTD and pre-service teachers' year in the graduate program

	t	df	Sig. (2-tailed)	Mean Difference
Inquisitiveness	-.334	42	.740	-.34737
Analyticity	.139	41	.890	.16087
Openmindedness	-.315	43	.754	-.37698
Confidence	-1.150	42	.257	-2.08814
Truthseeking	-1.485	43	.145	-1.74320
Systematicity	1.461	41	.152	1.84704
Totals	-.529	39	.599	-2.73369

How pre-service teachers' critical thinking dispositions differ with subject areas

As shown in Figure 5, there are four subject area groups of study for the pre-service teachers in this study. Table 8 reveals that when the mean scores (for both total and subscale) for the teachers in these groups were compared, a significant difference was found between critical thinking dispositions and Inquisitiveness subscale ($F(3,40)= 3.05, p < .05$).

Table 8
Result of CTD and pre-service teachers' subject areas

		Sum of Squares	df	Mean Square	F	Sig.
Inquisitiveness	Between groups	93.202	3	31.067	3.057	.039
	Within groups	406.545	40	10.164		
	Total	499.747	43			
Analyticity	Between groups	15.081	3	5.027	.343	.794
	Within groups	571.431	39	14.652		
	Total	586.512	42			
Openmindedness	Between groups	35.907	3	11.969	.750	.529

Table 8 (Cont'd)
Result of CTD and pre-service teachers' subject areas

	Within groups	654.309	41	15.959		
	Total	690.216	44			
Confidence	Between groups	225.794	3	75.265	2.244	.098
	Within groups	1341.367	40	33.534		
	Total	1567.161	43			
Truthseeking	Between groups	42.483	3	14.161	.886	.456
	Within groups	655.023	41	15.976		
	Total	697.506	44			
Systematicity	Between groups	53.912	3	17.971	1.021	.394
	Within groups	686.398	39	17.600		
	Total	740.310	42			
Totals	Between groups	912.562	3	304.187	1.147	.343
	Within groups	9814.137	37	265.247		
	Total	10726.699	40			

Multiple comparisons were conducted by using Least Significant Difference (LSD) to investigate difference in the subject areas (Table 9).

Table 9
Post-hoc results for CTD and subject areas

(I) Subjectareas	(J) Subjectareas	Mean Difference (I-J)
Biology	Mathematics	-2.39859
	Turkish language & literature	.37037
	English language & literature	-3.08642(*)
Mathematics	Biology	2.39859
	Turkish language & literature	2.76896(*)
	English language & literature	-.68783

Table 9 (Cont'd)
Post-hoc results for CTD and subject areas

Turkish language & literature	Biology	-.37037
	Mathematics	-2.76896(*)
	English language & literature	-3.45679(*)
English language & literature	Biology	3.08642(*)
	Mathematics	.68783
	Turkish language & literature	3.45679(*)

* The mean difference is significant at the .05 level.

Based on result on the Table 9, the significant difference is found in inquisitiveness among biology and English language & literature (i), mathematics and Turkish language & literature (ii), Turkish and English language & literature (iii) students.

How pre-service teachers' critical thinking dispositions differ with education level of their parents

Below, there are presented two tables. First one (Table 10) shows pre-service teachers mothers' and second one (Table 12) shows their fathers' education levels.

Table 10 indicates when the participants were compared based on the education level of their mothers; a significant difference was found in inquisitiveness and systematicity ($p < .05$).

Table 10
Result of CTD and pre-service teachers' mothers' education level

		Sum of Squares	df	Mean Square	F	Sig.
Inquisitiveness	Between groups	153.832	5	30.766	3.380	.013
	Within groups	345.915	38	9.103		
	Total	499.747	43			
Analyticity	Between groups	70.023	5	14.005	1.003	.429
	Within groups	516.489	37	13.959		
	Total	586.512	42			
Openmindedness	Between groups	77.142	5	15.428	.981	.441
	Within groups	613.074	39	15.720		
	Total	690.216	44			
Confidence	Between groups	169.910	5	33.982	.924	.476
	Within groups	1397.251	38	36.770		
	Total	1567.161	43			
Truthseeking	Between groups	23.614	5	4.723	.273	.925
	Within groups	673.891	39	17.279		
	Total	697.506	44			
Systematicity	Between groups	223.767	5	44.753	3.206	.017
	Within groups	516.543	37	13.961		
	Total	740.310	42			
Totals	Between groups	1790.165	5	358.033	1.402	.248
	Within groups	8936.534	35	255.330		
	Total	10726.699	40			

However, to investigate the difference, multiple comparisons (post-hoc analyses) were not conducted because one group has fewer than two cases both for these subscales. For that reason, to explore the differences, two groups were removed from the data. New data were analyzed by using LSD to investigate the differences in mother education level (Table 11).

Table 11
Post-hoc results for CTD and mother education level

Dependent Variable	(I) Mother.edu	(J) Mother.edu	Mean Difference (I-J)
Inquisitiveness	Primary school graduate	Middle school graduate	1.75689
		High school graduate	-1.82336
		University graduate	-2.11966
	Middle school graduate	Primary school graduate	-1.75689
		High school graduate	-3.58025(*)
		University graduate	-3.87654(*)
	High school graduate	Primary school graduate	1.82336
		Middle school graduate	3.58025(*)
		University graduate	-.29630
	University graduate	Primary school graduate	2.11966
		Middle school graduate	3.87654(*)
		High school graduate	.29630
Systematicity	Primary school graduate	Middle school graduate	.18519
		High school graduate	-2.66667
		University graduate	-4.77778(*)
	Middle school graduate	Primary school graduate	-.18519
		High school graduate	-2.85185
		University graduate	-4.96296(*)
	High school graduate	Primary school graduate	2.66667
		Middle school graduate	2.85185
		University graduate	-2.11111
	University graduate	Primary school graduate	4.77778(*)
		Middle school graduate	4.96296(*)
		High school graduate	2.11111

* The mean difference is significant at the .05 level.

Based on the results, significant difference was found in inquisitiveness among middle school graduate and high school graduate (i), middle school and university graduate (ii). Besides, significant difference was found in systematicity among primary school graduate and university graduate (iii), middle school graduate and university graduate (iv).

In addition, Table 12 shows that dividing the participants into groups based on their fathers' education level also reveals no among their mean scores ($p < .05$).

Table 12
Result of CTD and pre-service teachers' fathers' education level

		Sum of Squares	df	Mean Square	F	Sig.
Inquisitiveness	Between groups	75.380	4	18.845	1.732	.163
	Within groups	424.367	39	10.881		
	Total	499.747	43			
Analyticity	Between groups	50.703	4	12.676	.899	.474
	Within groups	535.808	38	14.100		
	Total	586.512	42			
Openmindedness	Between groups	103.844	4	25.961	1.771	.154
	Within groups	586.372	40	14.659		
	Total	690.216	44			
Confidence	Between groups	271.200	4	67.800	2.040	.108
	Within groups	1295.962	39	33.230		
	Total	1567.161	43			
Truthseeking	Between groups	123.443	4	30.861	2.150	.092
	Within groups	574.062	40	14.352		
	Total	697.506	44			
Systematicity	Between groups	77.074	4	19.269	1.104	.369
	Within groups	663.236	38	17.454		
	Total	740.310	42			
Totals	Between groups	2109.515	4	527.379	2.203	.088
	Within groups	8617.184	36	239.366		
	Total	10726.699	40			

Research question 2: Relationship between pre-service teachers' critical thinking dispositions and their CGPA levels

Finally, this study sought to determine if there was a relationship between CGPA and CTD levels of pre-service teachers. Extensive analysis was conducted for two types of CGPA (Teacher Education and Curriculum& Instruction).

Relationships were analyzed not only for the total critical thinking levels scores, but also for the subscales of critical thinking dispositions which are Inquisitiveness, Analyticity, Open-mindedness, Confidence, Truth-seeking and Systematicity.

Tables 13 through 19 focus on the Teacher Education (TE) CGPA and Tables 20 through 26 highlight results for Curriculum and Instruction (CI). Both Table 13 and 20 show the results for the total CTD scores and the rest of the tables are for the subscales. None of the relationships studied revealed any significant correlations.

CGPA TE & total score of subscales of critical thinking dispositions

Table 13 indicates that there is no correlation between CGPA TE levels and total critical thinking dispositions scores of pre-service teachers ($p < .01$).

Table 13
Correlation between CGPA TE and total critical thinking dispositions scores of pre-service teachers

		CGPA TE	Totals
Totals	Pearson Correlation	.067	1
	Sig. (2-tailed)	.682	
N		40	41

CGPA TE & inquisitiveness

Table 14 shows that there is no correlation between CGPA TE levels and inquisitiveness scores of pre-service teachers ($p < .01$).

Table 14
Correlation between CGPA TE and inquisitiveness scores of pre-service teachers

		CGPA TE	Inquisitive ness
CGPA TE	Pearson Correlation	1	.110
	Sig. (2-tailed)		.482
N		44	43

CGPA TE & analyticity

Table 15 represents that there is no correlation between CGPA TE levels and analyticity scores of pre-service teachers ($p < .01$).

Table 15
Correlation between CGPA TE and analyticity scores of pre-service teachers

		CGPA TE	Analyticity
CGPA TE	Pearson Correlation	1	-.032
	Sig. (2-tailed)		.841
	N	44	42

CGPA TE & open-mindedness

Table 16 indicates that there is no correlation between CGPA TE levels and open-mindedness scores of pre-service teachers ($p < .01$).

Table 16
Correlation between CGPA TE and open-mindedness scores of pre-service teachers

		CGPA TE	Openmind edness
CGPA TE	Pearson Correlation	1	.096
	Sig. (2-tailed)		.534
	N	44	44

CGPA TE & confidence

Table 17 presents that there is no correlation between CGPA TE levels and confidence scores of pre-service teachers ($p < .01$).

Table 17
Correlation between CGPA TE and confidence scores of pre-service teachers

		CGPA TE	Confidence
CGPA TE	Pearson Correlation	1	-.016
	Sig. (2-tailed)		.917
	N	44	43

CGPA TE & truth-seeking

Table 18 presents that there is no correlation between CGPA TE levels and truth-seeking scores of pre-service teachers ($p < .01$).

Table 18
Correlation between CGPA TE and truth-seeking scores of pre-service teachers

		CGPA TE	Truth-seeking
CGPA TE	Pearson Correlation	1	.051
	Sig. (2-tailed)		.743
	N	44	44

CGPA TE & systematicity

Table 19 indicates that there is no correlation between CGPA TE levels and systematicity scores of pre-service teachers ($p < .01$).

Table 19
Correlation between CGPA TE and systematicity scores of pre-service teachers

		CGPA TE	Systematicity
CGPA TE	Pearson Correlation	1	.000
	Sig. (2-tailed)		.999
	N	44	42

CGPA CI & total Score of subscales of critical thinking dispositions

Table 20 shows that there is no correlation between CGPA CI levels and sum of critical thinking dispositions of pre-service teachers ($p < .01$).

Table 20
Correlation between CGPA CI and total critical thinking dispositions scores of pre-service teachers

		Totals	CGPA CI
Totals	Pearson Correlation	1	.048
	Sig. (2-tailed)		.771
	N	41	40

CGPA CI & inquisitiveness

Table 21 indicates that there is no correlation between CGPA CI levels and inquisitiveness scores of pre-service teachers ($p < .01$).

Table 21
Correlation between CGPA CI and inquisitiveness scores of pre-service teachers

		CGPA CI	Inquisitiveness
CGPA CI	Pearson Correlation	1	.126
	Sig. (2-tailed)		.421
	N	44	43

CGPA CI & analyticity

As it seen in Table 22 there is no correlation between CGPA CI levels and analyticity scores of pre-service teachers ($p < .01$).

Table 22
Correlation between CGPA CI and analyticity scores of pre-service teachers

		CGPA CI	Analyticity
CGPA CI	Pearson Correlation	1	-.111
	Sig. (2-tailed)		.483
	N	44	42

CGPA CI & open-mindedness

Table 23 indicates that there is no correlation between CGPA CI levels and open-mindedness scores of pre-service teachers ($p < .01$).

Table 23
Correlation between CGPA CI and open-mindedness scores of pre-service teachers

		CGPA CI	Open-mindedness
CGPA CI	Pearson Correlation	1	.070
	Sig. (2-tailed)		.653
	N	44	44

CGPA CI & confidence

Table 24 represents that there is no correlation between CGPA CI levels and confidence scores of pre-service teachers ($p < .01$).

Table 24
Correlation between CGPA CI and confidence scores of pre-service teachers

		CGPA CI	Confidence
CGPA CI	Pearson Correlation	1	.027
	Sig. (2-tailed)		.865
	N	44	43

CGPA CI & truth-seeking

As given Table 25 there is no correlation between CGPA CI levels and truth-seeking scores of pre-service teachers ($p < .01$).

Table 25
Correlation between CGPA CI and truth-seeking scores of pre-service teachers

		CGPA CI	Truth-seeking
CGPA CI	Pearson Correlation	1	.041
	Sig. (2-tailed)		.790
	N	44	44

CGPA CI & systematicity

Table 26 shows that there is no correlation between CGPA CI levels and systematicity scores of pre-service teachers ($p < .01$).

Table 26
Correlation between CGPA CI and systematicity scores of pre-service teachers

		CGPA CI	Systematicity
CGPA CI	Pearson Correlation	1	-.153
	Sig. (2-tailed)		.333
	N	44	42

Summary

As a conclusion, the methods used for this study is found that,

- The pre-service teachers have middle level of critical thinking dispositions.
- Significant difference was found between critical thinking dispositions scores of pre-service teachers and their demographic features which are subject areas and mother education level.
- None of the other demographic features analyzed could account for differences in CTD levels among the population of pre-service teachers studied.
- There is no positive or negative correlation between CTD scores of pre-service teachers in this study and their CGPAs; nor were there any correlations between their CGPAs and any of the subscales of the critical thinking dispositions.

CHAPTER 5: DISCUSSION

Introduction

In this chapter, the findings of the research are discussed in detail. First, an overview of the study that includes a general explanation of results is given. Second, the major findings of the research are shown comprehensively. Third, the implications for practice and for further research are explained. The final part of the chapter includes the limitations.

Overview of the study

This research aimed to discover how critical thinking dispositions of pre-service teachers differed when compared for different variables. These variables included the pre-service teachers' age, their year in the graduate program, their subject areas, type of high school from which they graduated, their CGPA levels and the education level of their parents. According to the results, the level of critical thinking dispositions of pre-service teachers' is middle; and a significant difference was found in critical thinking dispositions levels of teachers when compared for subject areas in inquisitiveness and their mother education level in inquisitiveness and systemacity subscales. On the other hand, no significant difference was found for other variables listed above. Furthermore, no correlation was found between the critical thinking dispositions and the CGPAs of the pre-service teachers. In the following section, the major findings and possible reasons for these findings are discussed in detail.

Major findings

In this research, one of the aims was to investigate the critical thinking dispositions of pre-service teachers. As shown in Table 4, the average for the critical thinking disposition score of the participants was $M= 248.5550$. According to Kökdemir (2003), if the total score is between 240 to 360, this indicates that the critical thinking disposition level of the people assessed is middle. Therefore, based on this criteria, the critical thinking disposition levels of the pre-service teachers in this study are middle. In the literature, there are studies that found similar results (Çetin, 2008; Özdemir, 2005; Türnüklü & Yeşildere, 2005; Kürüm, 2002; Şen, 2009). However, some studies did find pre-service teachers with low level of critical thinking dispositions (Genç, 2008; Tüm kaya, 2011; Zayıf, 2008).

There are possible reasons for these results. For example, the content of the courses and activities that they attend from primary school to university may have affected their critical thinking skills. Tüm kaya (2011) and Korkmaz (2009) indicated that the Turkish education system still uses traditional teaching techniques that focus on memorization. They claimed that memorization decreases critical thinking skills because students do not need to examine, analyze, and synthesize information. Therefore, they become passive learners which is not conducive to developing critical thinking skills. Korkmaz (2009) claimed that one of the reasons for low and middle level of critical thinking skills is their teachers and instructors may not receive professional development in new teaching techniques, assessment strategies, and evaluation methods that support critical thinking such as discussion, questioning, and problem solving.

In addition to the total critical disposition score, various subscales of critical thinking dispositions were analyzed (Table 4). According to Kökdemir (2003), any subscale

under 40 indicates a low level, and any subscale above 50 shows a high level, of critical thinking dispositions. As given in Table 4, pre-service teachers in this study did not score above 50 points in any of the subscales of critical thinking dispositions. The highest score was Confidence ($M=47, 20$). One possible reason for this is that pre-service teachers may be able to manage their fears, successfully tackle life's challenges, and maintain a positive mental attitude. The next highest score was Inquisitiveness ($M=46, 59$). One interpretation of this CCTDI-T score is that pre-service teachers may have intellectual curiosity and the desire to learn new things. However, other studies (Tüm kaya, 2011; Zayif, 2008) found that the Confidence and Inquisitiveness scores were actually among the lowest when they assessed pre-service teachers. It should be noted that these studies focused on undergraduate pre-service teachers, while the current one assessed graduate students.

In the current study, the lowest score was Truth-seeking ($M=33.96$). One indication of these scores is that pre-service teachers may not desire to follow reasons and evidence by asking many questions. Zayif (2008) and Dutoğlu and Tuncel (2008) found similar results in their research. Another low subscale score among the pre-service teachers was Systematicity ($M= 38, 64$). Other research had similar results (Güven & Kürüm, 2008; Tüm kaya, 2011; Türnüklü & Yeşildere, 2005). These findings could be interpreted as the pre-service teachers needing to improve their organizational skills. A low Systematicity level implies challenges for skills such as time management which could affect teaching quality.

The current study also analyzed a variety of demographic features in attempt to gain greater insights into factors that might account for varying levels of critical thinking dispositions. Following, is a discussion of the findings regarding the analysis of these demographic features.

Pre-service teachers' age and their critical thinking dispositions

The participants in this study were divided into two groups based on their age; one group (16 %) includes students who were between 22-25 years old and other group (84%) includes participants who were older than 25. The findings show that there is no significant mean differences in critical thinking dispositions levels of these two age groups (Table 5). Şen (2009) also had similar results. On the other hand, Emir (2012) claimed that when people get older, their critical thinking dispositions develop and she found that pre-service teachers who are 25 years old have critical thinking dispositions score higher than others. Alternatively, Kürüm (2002) indicated that pre-service teachers who were 21 years old had higher critical thinking skills than older pre-service teachers. However, similar findings were not found in other studies. Therefore, given the varying findings in these studies and the results of the current research, age may not account for differences in critical thinking dispositions among the pre-service teachers in this study.

Pre-service teachers' year in the graduate program and critical thinking dispositions

Among the students in this study, 53 % were in the first year of the graduate program and 47 % were in their second year (Figure 4). The findings show that there was no significant mean differences between the critical thinking disposition scores of pre-service teachers in these two years (Table 7). Yenice (2011), Beşoluk and Önder (2010) and Ekinçi and Aybek (2010) found similar results to these findings. Zayıf (2008) and Çetin (2008), however, indicated that there was significant difference between critical thinking dispositions of pre-service teachers in different years of their undergraduate program. Specifically, pre-service teachers in their final year had

higher scores in some subscales than those who were just beginning. Their study claimed that from the first to the last year, the pre-service teacher has a chance to develop their thinking skills.

As mentioned, this was not the case in the current study which is a two-year graduate program. With no significant difference of scores between the first and second year students who participated in this study, it could be stated that the year in the graduate program does not affect critical thinking dispositions. Furthermore, it is not clear whether the course content in either the first or second year in the graduate program of study at this institution has any effect on critical thinking dispositions.

Pre-service teachers' subject areas of study and their critical thinking dispositions

Pre-service teachers in this study are students from four different subject areas (Figure 5): Turkish language and literature (20 %), English language and literature (26.6 %), biology (20 %) and mathematics (33.3 %). According to the findings, there was significant difference in one subscale which is inquisitiveness (Tables 8 and 9). Based on result of Table 9, significant difference was found between biology and English language (i), mathematics and Turkish language & literature (ii), Turkish and English language & literature (iii). Kürüm (2002), Zayıf (2008) and Doğanay, Taş and Erden (2007) have similar results with this study. On the other hand, Korkmaz (2009), Lampert (2006) and Kökdemir (2003) found no significant difference between them.

These differences were found among the students' from four different subject areas analyzed in the current study. It can be stated that quality and approaches of courses in the different areas regarding developing critical thinking skills may be different.

Therefore, pre-service teachers in mathematics and biology departments may have higher critical thinking dispositions than students in social science education departments, implying that the former may progress problem solving and reasoning skills, intellectual curiosity and the desire to learn new things.

The type of high school from which the pre-service teachers graduated and their critical thinking dispositions

In this study, just under nine percent (8.8%) of the pre-service teachers graduated from a general high school, nearly half from an Anatolian high school (51.1%), and the rest (35.5%) from super and private high schools (see Figure 3). No significant difference was found among the critical thinking dispositions of students based on the high school from which they graduated (Table 6). Zayıf (2008), Şen (2009), Çetinkaya (2011) and Gök and Erdoğan (2011) have similar findings. However, Kürüm (2002) and Yenice (2011) have different results from these finding; they indicated that pre-service teacher who graduated from an Anatolian high school have higher scores than pre-service teachers who graduated from a general high school. According to Gök and Erdoğan (2011) the reason for this difference is that these high schools have different perspectives and qualities; therefore they would expect that Anatolian high school graduates would have higher critical thinking disposition scores than graduates from a general high school.

Based on the results of the current study, the type of high school pre-service teachers attended does not account for any difference in critical thinking dispositions. It is noteworthy that pre-service teachers who graduated from general high schools have critical thinking disposition scores nearly the same as those from Anatolian high schools and super high school graduates. Another consideration is that participants in

the current study are graduate students and may have had opportunities to advance their thinking skills levels after high school, during their undergraduate studies and other experiences. Therefore, it can be interpreted that the pre-service teachers who graduated from general high schools (8.8%) either had similar thinking skills as students from other schools or were able to advance their critical thinking skills after graduation.

Pre-service teachers' critical thinking dispositions and education level of their parents

The parents of the participants in this study had varying level of education (Figures 6 and 7); in general, their fathers' education level is higher than their mothers.

According to the findings, there was a significant difference in critical thinking dispositions scores among the pre-service teachers' with mothers education levels in inquisitiveness and systemacity subscales but not in father education levels (Tables 10, 11 and 12). Kürüm (2002) and Güleç (2010) have similar findings from their studies. They indicated that pre-service teachers whose mothers graduated from high school or university have higher critical thinking level from others. This study shows similar results with the research given above. Based on the results, significant difference was found in inquisitiveness among middle school graduate and high school graduate (i), middle school and university graduate (ii). In addition, significant difference was found in systemacitiy among primary school graduate and university graduate (iii), middle school graduate and university graduate (iv).

According to Kürüm (2002) this difference can be attributed to children spending more time with their mothers than their fathers; therefore, mothers may positively affect the development of their children's thinking skills. Güleç (2010) went so far as

to say that if mothers have a higher level of education, this education can be reflected in the thinking skills and problem solving skills of their children.

However, Ekinçi (2009), Gülveren (2007), Özdemir (2005) and Gök and Erdoğan (2011) have different results and they claimed that the education level of neither parents seemed to affect the pre-service teachers' critical thinking dispositions.

In the current study, it can be interpreted that the education levels of fathers does not account for differences in the critical thinking dispositions of pre-service teachers.

However, mother education level may have positive or negative affect to change the level of critical thinking dispositions of pre-service teachers.

In addition, it can be stated that pre-service teachers may have other opportunities in school life and social life, in addition to what they obtained from their parents, to develop their thinking skills.

Pre-service teachers' CGPA and their critical thinking dispositions

Last aim of this study was to investigate the relationship between CGPA and the critical thinking dispositions of pre-service teachers. There are two types of CGPA which are CGPA TE and CGPA CI. As given in Figure 8 and Figure 9, pre-service teachers were divided based on whether they had high or low CGPA scores in both types. According to the findings, there was no correlation, either positive or negative, between the CGPA and critical thinking dispositions of pre-service teachers.

Gürleyük (2008), Aybek (2006), Gök and Erdoğan (2011) and Emir (2012) found similar results. Therefore, it can be stated that neither high nor low levels of CGPA indicate the critical thinking dispositions of pre-service teachers. However, Akbıyık (2002), Tümkaya (2011) and Seferoğlu and Akbıyık (2006) have different results in their research. Tümkaya (2011) indicated that pre-service teachers who have a high

level of critical thinking dispositions also have a high CGPA and they might interpret a positive correlation between these variables. However, this correlation was not found in the current study. One reason may be that students' test scores are not based on critical thinking and therefore these skills are not reflected in their grades. Therefore, student CGPA scores do not seem to affect their critical thinking dispositions.

Summary

In this research, one of the aims is to investigate how critical thinking dispositions differ with regard to demographic features of pre-service teachers. Before conducting survey, it was expected that there would be a significant difference between first years and second years, high school types which they graduated, their subject areas and their academic achievement. One of the sources of these differences would be characteristics of the pre-service teachers because they have already undergraduate level from their departments and they were able to pass specific process to be a student at Graduate School of Education. However, after explored the results of the study, significant difference was found among the demographic features which are subject areas and their mother education level. The result can be interpreted that without considering the demographic features, different high school types, age, academic achievement do not account for any differences in the pre-service teachers' critical thinking dispositions scores. Therefore, it can be stated that the pre-service teachers had chance to develop their thinking skills. In addition, in terms of Graduate School of Education, this may be the outcome of the careful selection process of pre-service teachers. Following is a discussion about what implications these findings have on practice and research.

Implications for practice

This study found that the pre-service teachers in a graduate teacher education program at a private non-profit university have low critical thinking dispositions levels. Following are implications for teachers, pre-service teachers, instructors and parents to help improve critical thinking skills among pre-service teachers:

- From primary school to university, the content of courses should support and develop critical reading, writing, and discussion.
- Universities can design elective or compulsory courses to introduce what critical thinking is and how critical thinking can be used in lesson planning and instruction.
- In-service and pre-service teachers should attend seminars that give information about how they can transfer their critical thinking skills to students.
- In order to develop awareness of using critical thinking, schools can organize seminars for parents.
- In education faculties, instructors should prepare performance and problem-based assessments and evaluation methods that give pre-service teachers opportunities to apply critical thinking skills.
- In universities, students may attend clubs and scientific communities to practice thinking skills in social life.

Implications for further research

There are also some implications for further research;

- In this research, one of the aim is to explore critical thinking dispositions in a unique case which include four subject areas; biology, Turkish and English language and literature, and mathematics. Therefore, new research can be done with different departments.
- The research investigated the critical thinking dispositions only of pre-service teachers. Other researches can be conducted with instructors, experienced teachers, and students.
- Data was collected during just one semester for this research. Multiple measurements at different times over different years can give more information about the critical thinking dispositions of pre-service teachers.
- In this study, critical thinking dispositions are analyzed with regard to several types of variables. The research can be repeated with gender, parents' social-economic status, types of universities, content of courses.
- The research analyzed the pre-service teachers of only one university. Researchers can work with pre-service teachers who are studying at different universities.
- In this research, data was collected through the CCTDI-T survey. Either a different tool or different data collection methods could be used to provide greater insight into critical thinking dispositions.

Limitations

This study is limited to the data gathered from first and second year MA students in a private non-profit university Graduate School of Education in the fall semester of Academic Year 2011-2012.

In this research CCTDI-T was used as a measurement instrument. Although the literature includes seven sub-skills of critical thinking dispositions, the instrument used in this study only encloses the six different dimensions of the dispositions which are Intuitiveness, Confidence, Systematicity, Analyticity, Open-mindedness and Truth-seeking. For this reason, the findings of this study are only limited to this test.

This research was designed as a case study and number of samples were small unit ($N=44$). Therefore, results and interpretation was limited in terms of sample size.

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APPENDICES

Appendix A: Survey

California Critical Thinking Disposition Inventory (CCTDI)

Eleştirel Düşünme Eğilimi Ölçeği

Değerli Öğretmen Adayları,

Bu ölçek sizin eleştirel düşünme eğiliminizi belirlemek amacıyla hazırlanmıştır. Ölçek doğruyu arama, açık fikirlilik, analitiklik, sistematiklik, kendine güven, meraklılık olmak üzere 6 alt parçadan oluşmaktadır.

Araştırma sonuçlarının sağlıklı olabilmesi için soruları dikkatli yanıtlayınız ve hiçbir soruyu boş bırakmamaya çalışınız. Vereceğiniz cevaplar yalnızca bu araştırma için kullanılacak ve hiçbir kurum, makam ya da kişiye verilmeyecektir. Ölçek için belirlenen bitirme süresi 20 dakikadır.

Araştırmaya verdiğiniz destek için teşekkür ederim.

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Kişisel Bilgiler

Ad Soyad:

1. Cinsiyetiniz: Kız () Erkek ()
2. Yaşınız: () 18-21 () 22-25 () 25 ve üzeri
3. Bitirdiğiniz lise türü: () Genel (Düz) Lise () Anadolu Lisesi Mesleki-Teknik Lise () Anadolu Öğretmen Lisesi () Fen Lisesi () Diğer ()
4. Bölümünüz: CITE 1. Sınıf () 2. sınıf ()
() Biyoloji
() Matematik
() Türk Dili ve Edebiyatı
() İngiliz Dili ve Edebiyatı

5. Annenizin eğitim düzeyi

6. Babanızın eğitim düzeyi

Okuryazar değil		Okuryazar değil	
Okuryazar		Okuryazar	
İlkokul mezunu		İlkokul mezunu	
Ortaokul mezunu		Ortaokul mezunu	
Lise mezunu		Lise mezunu	
Üniversite mezunu		Üniversite mezunu	
Lisans üstü mezunu		Lisans üstü mezunu	

California Critical Thinking Disposition Inventory (CCTDI-T)
Eleştirel Düşünme Eğilimi Ölçeği

1	2	3	4	5	6
Hiç katılmıyorum	Katılmıyorum	Kısmen katılmıyorum	Kısmen katılıyorum	Katılıyorum	Tamamen katılıyorum

1. Tüm hayatım boyunca yeni şeyler çalışmak harika olurdu.	1	2	3	4	5	6
2. İnsanların iyi bir düşünceyi savunmak için zayıf fikirlere güvenmeleri beni rahatsız eder.	1	2	3	4	5	6
3. Cevap vermeye kalkışmadan önce, her zaman soruya odaklanırım.	1	2	3	4	5	6
4. Büyük bir netlikle düşünebilmekten gurur duyuyorum.	1	2	3	4	5	6
5. Dört lehte, bir aleyhte görüş varsa, lehte olan dört görüşe katılırım.	1	2	3	4	5	6
6. Pek çok üniversite dersi ilginç değildir ve almaya değmez.	1	2	3	4	5	6
7. Sadece ezberi değil düşünmeyi gerektiren sınavlar benim için daha iyidir.	1	2	3	4	5	6
8. Diğer insanlar entelektüel merakımı ve araştırmacı kişiliğimi takdir ederler.	1	2	3	4	5	6
9. Mantıklıymış gibi davranıyorum, ama değilim.	1	2	3	4	5	6
10. Düşüncelerimi düzenlemek benim için kolaydır.	1	2	3	4	5	6
11. Ben dahil herkes kendi çıkarı için tartışır.	1	2	3	4	5	6
12. Kişisel harcamalarımın dikkatlice kaydını tutmak benim için önemlidir.	1	2	3	4	5	6
13. Büyük bir kararla yüz yüze geldiğimde, ilk önce, toplayabileceğim tüm bilgileri toplarım	1	2	3	4	5	6
14. Kurallara uygun biçimde karar verdiğim için, arkadaşlarım karar vermek için bana danışırlar.	1	2	3	4	5	6
15. Açık fikirli olmak neyin doğru olup olmadığını bilmemek demektir.	1	2	3	4	5	6
16. Diğer insanların çeşitli konularda neler düşündüklerini anlamak benim için önemlidir.	1	2	3	4	5	6
17. İnandıklarımın tümü için dayanaklarım olmalı.	1	2	3	4	5	6
18. Okumak, mümkün olduğunca, kaçtığım bir şeydir.	1	2	3	4	5	6
19. İnsanlar çok acele karar verdiğimi söylerler.	1	2	3	4	5	6
20. Üniversitedeki zorunlu dersler vakit kaybıdır.	1	2	3	4	5	6
21. Gerçekten çok karmaşık bir şeyle uğraşmak zorunda kaldığımda benim için panik zamanıdır.	1	2	3	4	5	6
22. Yabancılar sürekli kendi kültürlerini anlamaya uğraşacaklarına, bizim kültürümüzü anlamaya çalışmalılar.	1	2	3	4	5	6
23. İnsanlar benim karar vermeyi oyaladığımı düşünürler.	1	2	3	4	5	6
24. İnsanların, bir başkasının fikrine karşı çıkacaklarsa, nedenlere ihtiyacı vardır.	1	2	3	4	5	6
25. Kendi fikirlerimi tartışırken tarafsız olmam imkansızdır.	1	2	3	4	5	6

26. Ortaya yaratıcı seçenekler koyabilmekten gurur duyarım.	1	2	3	4	5	6
27. Neye inanmak istiyorsam ona inanırım.	1	2	3	4	5	6
28. Zor problemleri çözmek için uğraşmayı sürdürmek o kadar da önemli değildir.	1	2	3	4	5	6
29. Diğerleri, kararların uygulanmasında mantıklı standartların belirlenmesi için bana başvurular	1	2	3	4	5	6
30. Zorlayıcı şeyler öğrenmeye istekliyimdir.	1	2	3	4	5	6
31. Yabancıların ne düşündüklerini anlamaya çalışmak oldukça anlamlıdır.	1	2	3	4	5	6
32. Meraklı olmam en güçlü yanlarımdan birisidir.	1	2	3	4	5	6
33. Görüşlerimi destekleyecek gerçekleri ararım, desteklemeyenleri değil.	1	2	3	4	5	6
34. Karmaşık problemleri çözmeye çalışmak eğlencelidir.	1	2	3	4	5	6
35. Diğerlerinin düşüncelerini anlama yeteneğimden dolayı takdir edilirim.	1	2	3	4	5	6
36. Benzetmeler ve analogiler ancak otoyol üzerindeki tekneler kadar yararlıdır.	1	2	3	4	5	6
37. Beni mantıklı olarak tanımlayabilirsiniz.	1	2	3	4	5	6
38. Her şeyin nasıl işlediğini anlamaya çalışmaktan gerçekten hoşlanırım.	1	2	3	4	5	6
39. İşler zorlaştığında, diğerleri problem üstünde çalışmayı sürdürmemi isterler.	1	2	3	4	5	6
40. Elimizdeki sorun hakkında açık bir fikir edinmek ilk önceliklidir.	1	2	3	4	5	6
41. Çelişkili konulardaki fikrim genellikle en son konuştuğum kişiye bağlıdır.	1	2	3	4	5	6
42. Konu ne hakkında olursa olsun daha fazla öğrenmeye hevesliyimdir.	1	2	3	4	5	6
43. Sorunları çözenin en iyi yolu, cevabı başkasından istemektir.	1	2	3	4	5	6
44. Karmaşık problemlere düzenli yaklaşımıyla tanırım.	1	2	3	4	5	6
45. Farklı dünya görüşlerine karşı açık fikirli olmak, insanların düşündüğünden daha az önemlidir.	1	2	3	4	5	6
46. Öğrenebileceğin her şeyi öğren, ne zaman işe yarayacağını bilemezsin.	1	2	3	4	5	6
47. Her şey görüldüğü gibidir.	1	2	3	4	5	6
48. Diğer insanlar, sorunun ne zaman çözümleneceği kararını bana bırakırlar.	1	2	3	4	5	6
49. Ne düşündüğümü biliyorum, o zaman neden seçenekleri değerlendiriyor gibi davranayım.	1	2	3	4	5	6
50. Diğerleri kendi fikirlerini ortaya koyarlar ama benim onları duymaya ihtiyacım yok.	1	2	3	4	5	6
51. Karmaşık problemlerin çözümüne yönelik düzenli planlar geliştirmede iyiyimdir.	1	2	3	4	5	6