TURKISH PRE-SERVICE TEACHERS' CRITICAL THINKING LEVELS, ATTITUDES AND SELF-EFFICACY BELIEFS IN TEACHING FOR CRITICAL THINKING

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

NİHAL AKDERE

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF DOCTOR IN PHILOSOPHY
IN
THE DEPARTMENT OF EDUCATIONAL SCIENCES

MAY 2012

Approval of the Graduate School of Social Sciences

_____

Prof. Dr. Meliha Altunışık
Director

I certify that this thesis satisfies all requirements as a thesis for the degree of Doctor of Philosophy.

_____

Prof. Dr. Ali Yıldırım
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy.

_____

Assoc. Prof. Dr. Hanife Akar
Supervisor

Examining Committee Members

Assoc. Prof. Dr. Ahmet Ok (METU, EDS) _____

Assoc. Prof. Dr. Semra Sungur (METU, ESE) _____

Assis. Prof. Dr. Yeşim Çapa-Aydın (METU, EDS) _____

Assoc. Prof. Dr. Hanife Akar (METU, EDS) _____

Assoc. Prof. Dr. Sadegül Akbaba-Altun _____

(Başkent Univ., EDS)

I hereby declare that all the information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name: Nihal Akdere

Signature:

ABSTRACT

TURKISH PRE-SERVICE TEACHERS' CRITICAL THINKING LEVELS, ATTITUDES AND SELF-EFFICACY BELIEFS IN TEACHING FOR CRITICAL THINKING

Akdere, Nihal
Ph.D., Department of Educational Sciences
Supervisor: Assoc. Prof. Dr. Hanife Akar

May 2012, 209 pages

The aim of this study was three-fold: first, to describe pre-service teachers' (i) critical thinking levels, (ii) attitudes towards teaching for critical thinking, and (iii) self-efficacy beliefs in teaching for critical thinking in terms of performance and outcome efficacy beliefs; secondly, to investigate whether there was a correlation between these three variables; and finally, to examine the relationship between participants' certain background variables and their critical thinking levels, attitudes and self efficacy beliefs in teaching for critical thinking.

A cross-sectional survey design was employed. The participants of the study were senior pre-service teachers from fourteen state universities across the seven geographical regions in Turkey. Quantitative data were collected by means of (i) a critical thinking test, (ii) an attitude scale, (iii) a self-efficacy scale with two subscales: performance efficacy and outcome efficacy, and (iv) a participant profile form, all of which were designed by the researcher.

Both descriptive and inferential statistics (MANOVA) were used. Results indicated that pre-service teachers' critical thinking levels were 'below average'; however,

they had a moderately positive attitude towards and a moderate level of self efficacy in teaching for critical thinking. The correlation analyses indicated that there was a moderate degree of positive correlation between teachers' attitude and self efficacy beliefs towards critical thinking. Finally, the results of MANOVA analyses indicated that pre-service teachers' gender and level of motivation towards teaching had no impact on their critical thinking levels, attitudes or self efficacy beliefs in teaching for critical thinking. On the other hand, major, academic achievement, high school background, father's level of education, reading behaviour, and prior training in critical thinking had impacts of varying degrees on one or more of the dependent variables.

Keywords: Critical thinking; teaching for critical thinking; attitude towards teaching for critical thinking; self-efficacy beliefs in teaching for critical thinking

ÖZ

TÜRKİYE'DE ÖĞRETMEN ADAYLARININ
ELEŞTİREL DÜŞÜNME BECERİLERİ,
ELEŞTİREL DÜŞÜNME ÖĞRETİMİNE YÖNELİK TUTUMLARI
VE ÖZ YETERLİK SEVİYELERİ

Akdere, Nihal
Doktora, Eğitim Bilimleri Bölümü
Tez Yöneticisi: Doç. Dr. Hanife Akar

Mayıs 2012, 209 sayfa

Bu çalışmanın amacı üç boyutludur: Birinci amaç, öğretmen adaylarının (i) eleştirel düşünme düzeylerini, (ii) eleştirel düşünme öğretimine yönelik tutumlarını ve (iii) eleştirel düşünme öğretimi konusundaki öz yeterlik inançlarını performans ve kazanım yeterlikleri açısından tanımlamaktır. İkinci amacı, bu üç değişken arasında bir ilişki olup olmadığını araştırmaktır. Son olarak, çalışmaya katılan öğretmen adaylarının bazı özellikleri ile eleştirel düşünme seviyeleri, eleştirel düşünme öğretimine yönelik tutumları ve öz yeterlik düzeyleri arasında anlamlı bir etki olup olmadığını incelemektir.

Çalışmada kesit-tarama yöntemi kullanılmıştır. Çalışmaya Türkiye'nin yedi bölgesinden toplamda ondört devlet üniversitenin Eğitim Fakültesi son sınıfta eğitim

gören öğretmen adaylarıdır. Çalışmanın araştırmacısı tarafından geliştiren dört araç kullanılarak nicel veri elde edilmiştir. Geliştirilen veri toplama araçları şöyledir: (i) eleştirel düşünme testi, (ii) eleştirel düşünme öğretimine yönelik tutum ölçeği, (iii) eleştirel düşünme öğretimine yönelik öz yeterlik ölçeği ve (iv) katılımcı bilgi formu.

Tanımlayıcı, korelasyon ve çoklu varyans (MANOVA) analizleri kullanılmıştır. Tanımlayıcı istatistik analiz sonuçları, öğretmen adaylarının eleştirel düşünme seviyelerinin 'orta derecenin altında' olduğu, eleştirel düşünme öğretimine yönelik tutumlarının orta derecede olumlu ve öz yeterlik seviyelerinin orta düzeyde olduğunu göstermektedir. Korelasyon analiz sonuçları, öğretmen adaylarının tutum ve öz yeterlik seviyeleri arasında orta derecede anlamlı pozitif korelasyon bulunduğunu göstermektedir. Son olarak MANOVA analiz sonuçları, öğretmen adaylarının cinsiyeti ve öğretmenliğe ilişkin motivasyon düzeyleri ile eleştirel düşünme seviyeleri, eleştirel düşünme öğretimine yönelik tutumları ve öz yeterlik seviyeleri arasında anlamlı bir ilişki göstermemiştir. Diğer yandan, eğitim gördükleri bölüm, akademik başarıları, mezun oldukları lise türü, babanın eğitim düzeyi, okuma alışkanlıkları ve daha önce eleştirel düşünme konusunda eğitim alıp almamalarının, bir veya daha fazla değişken üzerinde çeşitli derecelerde etkili olduğu görülmüştür.

Anahtar sözcükler: Eleştirel düşünme; eleştirel düşünme öğretimi; eleştirel düşünme öğretimine yönelik tutum; eleştirel düşünme öğretimine ilişkin öz yeterlik inançları

To my angel PHD supervisor Assoc. Prof. Dr. Hanife AKAR
&
To my beloved daughter Deniz CİHAN

ACKNOWLEDGEMENTS

"You are not a research team, but just one person" was the first comment that Prof. Dr. Hasan Şimşek had made when I completed presenting my dissertation proposal. He was right; however, I was lucky to have so many people, working like a research team, helping me out throughout the various stages of this study.

I would like to begin by extending my deepest gratitude to my supervisor, Assoc. Prof. Hanife Akar, to whom I am so profoundly indebted. Words are not strong enough to express how thankful I am as this thesis would not have been completed if it were not for her long-lasting patience, her continuous support and encouragement, and her valuable and insightful contributions to the study. I will always appreciate all that you have done for me towards the completion of this study. Thank you so much.

This thesis has been produced with the contributions of many other valuable people. First of all, I would like to thank Prof. Dr. Ali Yıldırım, who has provided me with valuable feedback and expert opinion at various stages of my study. I would also like to thank Prof. Dr. Hasan Şimşek, who made valuable contributions to the study at the initial stages as a former member of my thesis examining committee. I extend my sincere gratitude to Assoc. Prof. Dr. Ahmet Ok, Assis. Prof. Dr. Yeşim Çapa, Assoc. Prof. Semra Sungur and Assoc. Prof. Dr. Sadegül Akbaba Altun – my thesis examining committee members – for sparing their time in providing me with their invaluable and constructive criticisms, recommendations and contributions.

I would not have been able to devise my instruments if it were not for the experts who provided me with invaluable feedback at various stages of my study. Thank you Prof. Dr. Ali Yıldırım, Assoc. Prof. Dr. Ahmet Ok, Assoc. Prof. Dr. Semra Sungur, Prof. Dr. Nuray Sakallı Uğurlu and Dr. Melek Türkmen.

Another significant person in my ‘research team’ was Prof. Dr. Hüsnü Enginarlar. I owe so much to him as the most difficult and demanding phase of this study – data collection – would not have been possible if it were not for his efforts in making contacts and arranging places for data collection. What’s more, I am so grateful for his supportive attitude and for giving me permission to spend time off work during the data collection and the final stages of the thesis.

Next I wish to wholeheartedly thank all the people who helped me collect data throughout Turkey, either by travelling to destinations within and out of Ankara to administer the research instruments, or by accompanying me during my travels to other cities for data collection and helping me out in admninistering the instruments, or for arranging classes for me to administer the instruments in. So special thanks go to my ‘data collection team’:

Prof. Dr. Ahmet İlhan Şen
Prof. Dr. İsmet Cemiloğlu
Prof. Dr. Erdoğan Bada
Assoc. Prof. Dr. Hayri Ertan
Assoc. Prof. Dr. Paşa Tevfik Cephe
Assoc. Prof. Dr. Kerim Gündoğdu
Assis. Prof. Dr. Birsen Bahçe
Assis. Prof. Dr. Aysel Kılıç
Assis. Prof. Dr. Abdullah Coşkun
Assis. Prof. Dr. Abdullah Ertaş
Assist. Prof. Dr. Onur Köse
Assist. Prof. Dr. Mustafa Yeşilyurt
Assis. Prof. Dr. Kadim Öztürk
Assis. Prof. Dr. Elif Demirel
Dr. Servet Çelik
Dr. Işıl Günseli Kaçar
Nazlı Alakuzu
Ayşem Karadağ Ötkür
Oya Sezginer
Neval Akdere
Arif Altınkese
Cemile Doğan

I would also like to take the opportunity at this point to thank all the students who participated in my study and the class teachers for sparing their class hours.

Next, I would like to express my heart-felt gratitude to Ayşem Karadağ Ötkür and Dr. Vildan Şahin for spending their whole summer rating the open ended answers in the Critical Thinking Test. I definitely owe you a summer holiday.

Last but not least, I would like to thank my family, especially my parents, my sisters and my dear daughter for bearing with me during my busy hours, days, weeks, months, actually years… Thank you all for your patience, support and encouragement. Special thanks go to my sister, Neval, who was by me whenever I needed her, and my daughter, Deniz, who had to bear the lack of time and attention I devoted to her during my travels and studies in relation to my dissertation.

And my dear friends: Dr. Vildan Şahin, Ayşem Ötkür, Oya Sezginer, Assoc. Prof. Dr. Necla Çıkıgil, Aylin Graves, Dr. Gamze Karbi. Thank you all for confiding in me and encouraging me to complete my thesis.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF BOXES

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
ASTCT	Attitude Scale towards Teaching for Critical Thinking
CCTDI	California Critical Thinking Disposition Inventory
CCTST	California Critical Thinking Skills Test
CT	Critical Thinking
CCTT	The Cornell Critical Thinking Test
DV	Dependent Variable
EWCTET	Ennis-Weir Critical Thinking Essay Test
HCTAES	The Halpern Critical Thinking Assessment Using Everyday Situations
SESTCT	Self Efficacy Scale in Teaching for Critical Thinking
MANOVA	Multivariate Analysis of Variance
WGCTA	Watson Glaser Critical thinking Appraisal

CHAPTER I

INTRODUCTION

"Nothing is permanent but change" (Heraclitus, 500 B.C.); and
"Critical-thinking skills offer the greatest chance for creating and adjusting to change" (Halpern, 2001, p. 284).

1.1. Background to the Study

Ceaseless changes within all spheres of life have their impacts on public education, the overall aim of which is to equip individuals with the knowledge, skills, attitudes, and habits necessary to not only adapt to the changes in a society but also create changes and transform the society. Thus, society and education have a mutual impact on each other as Rury (2009, p. 1) points out, "Influences run in both directions. Education clearly affects the course of social development, and schools also invariably reflect the impact of the larger social context."

Rapid changes in technology, science and the social environment coined with the emergence and development of new approaches to and theories in learning create new challenges and needs for individuals, which necessitate the questioning of the functions of public education and methods of instruction. With the development of the cognitive and constructivist learning theories in the 20th century, the teaching of higher-order thinking and problem-solving skills have gained considerable amount of importance with less emphasis on the transmission of a large body of facts. Put simply, the aim and focus of education has shifted from teaching *what* to think (transmission of knowledge) to teaching *how* to think (promotion of thinking skills and strategies). Lipman (1988,

p. 43) justifies this shift by saying, "We want students to think for themselves, and not merely to learn what other people have taught." Likewise, Dewey (cited in McGregor, 2007) stated that schools need to cater to pupils' needs in terms of development of thinking. In parallel to this function of public education, Piaget (cited in Wood, 1998) asserted that the main aim of education is to equip people with skills which they can utilize to do new things rather than repeat what other generations have done so that they become creative individuals, inventors, and discoverers. A second aim of education he mentions is forming minds that are critical, that can verify, rather than simply accept everything that is offered to them. Thus, there seems to be agreement that contemporary education should help students to think well and to think for themselves, which is at the core of *critical thinking* (Pithers, 2000). *Critical thinking* is regarded as being at "the heart of well-conceived educational reform and restructuring, because it is at the heart of the changes of the 21st century" (Paul, 1995, p. 6). The 21st century that necessitates critical thinkers is characterized as follows:

> The fundamental characteristic of the world students now enter is ever-accelerating change; a world in which information is multiplying even as it is swiftly becoming obsolete and out of date; a world in which ideas are continually restructured, retested, and rethought; where one cannot survive with simply one way of thinking; …where one must respect the need for accuracy and precision and meticulousness; a world in which job skills must continually be upgraded and perfected – even transformed.
>
> (Paul, 1995, p. 6).

The current era is characterized as the Globalization and Information Age in which access to information and worldviews has become easier than ever. As stated by Vaughn (2008), we are confronted with an abundance of assertions, opinions, arguments, and pronouncements from all directions every day. They all implore us to *believe*, to *agree*, to *accept*, to *follow*, or to *submit*. In addition, as the world is globalizing problems are becoming more and more complex, competition in the business world is becoming harsh and the maintenance of democracy is becoming more difficult.

Hence, to compete and survive in the current era of globalization and information era, active life-long learning, problem solving and empowerment have been cited as necessary skills that needs to be fostered in individuals. This being the situation, there is widespread consensus that *critical thinking* provides the tools to become an active and effective life-long learner, and effective problem solver and an effective decision-maker leading to empowerment and autonomous thinking (Kincheloe, 2004; Lai, 2009). Vaughn (2008, p. 6) states that "going with the wind is a loss of personal freedom" and "…if we want to rise above blind acceptance and arbitrary choices" we need to resort to the tools provided by critical thinking since critical thinking is "the careful deliberate determination of whether to accept, reject, or suspend judgment about a claim" (Moore & Parker, 1989). This definition can be elaborated on with Thomson's (2002) articulation of the important aspects of critical thinking: "...the ability to understand and evaluate arguments, the ability to make well-reasoned decisions, and the tendency to be fair-minded." Ennis (2002) has proposed a definition that is broad enough to embrace the aspects of critical thus far discussed: "Critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do".

Despite variations in definitions of critical thinking in related literature, there seems to be consensus worldwide that education, in all disciplines and all levels, should embrace the mission of providing appropriate learning conditions for students to engage in critical thinking and enhance their critical thinking ability (Pithers, 2000). To this end, 'critical thinking' has started to take its place in national education documents as a generic skill or ability.

Turkey has also felt the necessity to adapt its education system to meet the challenges of the current era by determining some generic skills that students should develop, one of which is *critical thinking*. With the Educational Reform initiated in 2005, the Turkish National Curriculum adopted a student-centred learning approach with specific focus on certain generic skills to be treated across the curriculum. In all the programs the following eight learning outcomes were identified and listed as fundamental generic skills to be treated in every course:

1. Critical thinking ability
2. Creative thinking ability
3. Communication ability
4. Researching-Questioning ability
5. Problem-solving ability
6. Ability to use technology
7. Initiative skills
8. The ability to use the Turkish language accurately and effectively

(Gülveren, 2007, p. 26)

To what extent functions and goals of an education system are realized mainly depend on three agents: the curriculum, the student and the teacher (Yüksel, 2012). According to Ennis (2002), the teacher is the most important agent in the teaching of critical thinking. The curriculum may undergo changes to address desired learning outcomes; however, whether the curriculum is implemented in an effective way by teachers who are willing and prepared to do is another dimension to consider.

With this awareness, the Turkish National Ministry of Education, with the collaboration of various universities in Turkey, conducted a comprehensive study (TEDP, 2006) between the years 2002 and 2006 to determine standard teacher competencies. As an outcome of the study, six domains of competencies were identified with a total of 31 sub competencies and 221 performance indicators. The six domains enlisted were: 1) personal and vocational values – vocational development; 2) knowing the student; 3) the teaching and learning process; 4) observation of the learning, progress and assessment; 5) school, family and social relations; 6) knowledge of program and content. All the sub competencies and performance indicators listed under these titles are based on a student-centred approach of education with specific focus on valuing, understanding, respecting, confiding in students and their learning processes and styles, with *critical thinking* being specifically addressed in two of the sub competency areas. First of all, teachers are expected to assess their teaching performances by critically analyzing in-class and extra-curricular activities and be open to different views and criticisms (sub competency A4).

In addition, teachers are expected be think critically, solve problems and communicate effectively (sub competency A5).

Yet, whether teachers are creating a change in students' critical thinking abilities is questionable. The Program for International Student Assessment (PISA), which is an international test administered to 15 year olds around the world, enables the test takers to use their current knowledge and requires them to apply critical thinking skills in novel situations. The most recently conducted PISA, which was in 2009, yielded results that were not very promising for Turkey, even though a slight improvement since 2003 was reported. In the report for PISA 2009, Turkish students were claimed to be at level 2 (6 being the highest level) in all three categories: science, mathematics and reading (OECD, 2010).

Educational reforms in Turkey may have their merits. However, whether teacher effectiveness has been ensured sufficiently remains to be investigated thoroughly.

In teaching for critical thinking three crucial *antecedents* of teachers are likely to be influential in teacher effectiveness: ability to think critically, having a positive attitude towards teaching for critical thinking and having a strong sense of self efficacy beliefs in teaching for critical thinking.

To be able to teach critical thinking effectively, it is agreed by many scholars that teachers need to think critically themselves. Modelling critical thinking within the classroom is cited as one of the effective strategies in teaching critical thinking effectively (Aslan, 2003; Czaja-Chudyba, 2009; Erdoğan & Uşak, 2005; Halpern, 1998; Kincheloe, 2004; Yapıcı, 2007; Yetim & Göktaşı, 2004). However, it is put forward by Seferoğlu and Akbıyık (2006) that the situation in Turkey in terms of teachers' critical thinking levels is not very promising. Studies carried out to measure teachers' critical thinking levels show that teachers have low critical thinking levels (Güven & Kürüm, 2007). If this is the case, teacher education programmes should be assuming the

responsibility of developing critical thinking skills of pre-service teachers before they take up their professional teaching career.

According to Gibbs (2002), teacher education programmes are generally based on the 'action-outcome' approach. That is, teacher education programmes lay strong emphasis on providing and equipping student teachers with the knowledge and skills to practice teaching in certain ways to achieve certain outcomes. However, Gibbs contemplates that such knowledge and skills do not guarantee that teachers will willingly act in these ways. Teachers need to develop a positive attitude and be willing to teach and act in certain ways. Thus, if teachers are expected to teach for critical thinking, teacher education programmes should also assume the role of instilling a positive attitude in pre-service teachers towards teaching for critical thinking.

Similarly, Gibbs believes that the outcome-expectation approach in teacher training increases knowledge of the links between behaviours and expected outcomes, but does not ensure that the teacher believes in his/her capability (that is, self-efficacy) to set this in action. On the other hand, teacher self efficacy is a powerful predictor of whether or how a teacher will act. Teacher with a strong or high sense of self efficacy tend to believe and have confidence in their future teaching conducts. In addition, people who hold strong self-efficacy beliefs tend to use new teaching approaches (Gibson & Dembo, 1984) and are more effective in student achievement (Brookover et al., 1979).

Research findings suggest that self-efficacy is mediational in explaining what teachers know and can do and how and whether teachers are willing to be motivated to act on what they know and can do. The task of teacher education, then, is to recognise that teachers have the cognitive capacities to self-reflect, self-motivate and self-regulate, and to harness self-efficacy so that teachers develop competence in exercising control of their thinking, behaviour and emotions (Gibbs, 2002).

In conclusion, with changes in and mutual influence of the society and public education, teaching for critical thinking has drawn much attention in the field of education. For effective critical thinking instruction, it seems that teachers' critical thinking ability, their attitude towards and self efficacy beliefs in teaching for critical thinking all have a role to play, which has implications for pre-service and in-service training programs as presented in the figure below:

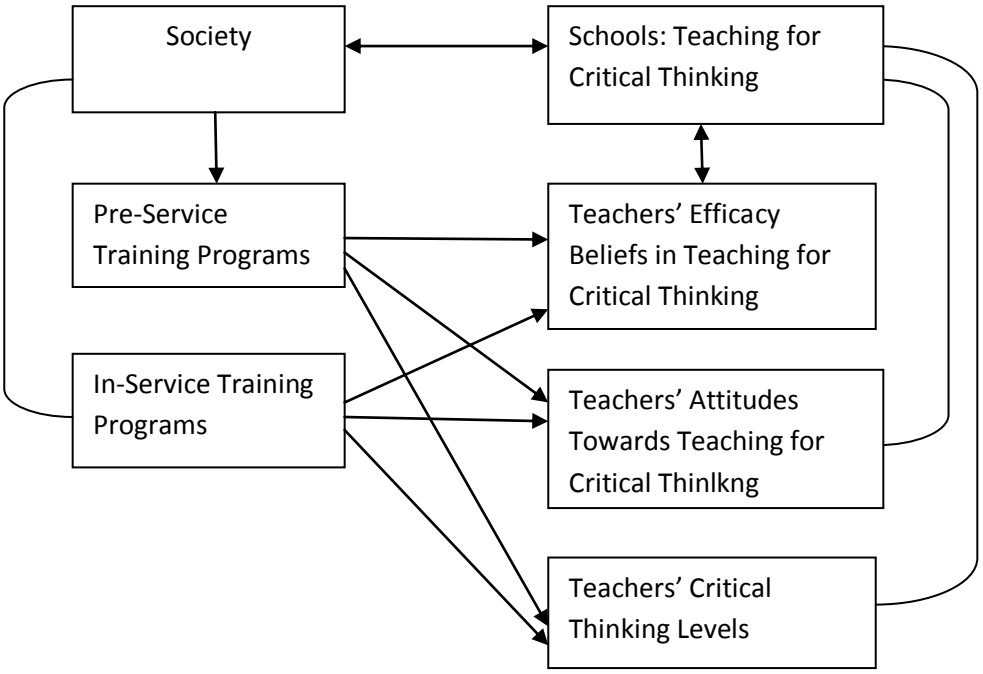


Figure 1.1. Interactions in the Background of Critical Thinking Instruction

(Adapted from Barros & Elia, 1998)

1.2. Purpose of the Study

In light of the above discussion, this study primarily aimed to examine Turkish pre-service teachers' critical thinking levels, attitudes towards teaching for critical thinking and self efficacy in teaching for critical thinking skills. It also sought to find out whether there was a relationship between these three variables and whether certain background

variables had an impact on their critical thinking levels, attitudes towards teaching for critical thinking and their self-efficacy levels in teaching for critical thinking skills.

To this end, this study specifically aimed to answer the following research questions:

1. What are the Turkish pre-service teachers' critical thinking levels?

2. What are the Turkish pre-service teachers' attitudes towards teaching for critical thinking?

3. What are the Turkish pre-service teachers' self-efficacy beliefs in teaching for critical thinking in terms of (i) performance efficacy and (ii) outcome efficacy?

4. Is there a relationship between Turkish pre-service teachers' critical thinking levels, attitudes towards teaching for critical thinking and their self efficacy beliefs in teaching for critical thinking?

a) Is there a relationship between Turkish pre-service teachers' critical thinking levels and their attitudes towards teaching for critical thinking?
b) Is there a relationship between Turkish pre-service teachers' critical thinking levels and their self efficacy beliefs in teaching for critical thinking?
c) Is there a relationship between Turkish pre-service teachers' attitude towards teaching for critical thinking and their self efficacy beliefs in teaching for critical thinking?

5. Do Turkish pre-service teachers' critical thinking levels differ in terms of certain background variables?

a) Do Turkish pre-service teachers' critical thinking levels differ in terms of gender?

b) Do Turkish pre-service teachers' critical thinking levels differ in terms of major?
c) Do Turkish pre-service teachers' critical thinking levels differ in terms of academic achievement?
d) Do Turkish pre-service teachers' critical thinking levels differ in terms of the type of high school background?
e) Do Turkish pre-service teachers' critical thinking levels differ in terms of their parents' level of education?
f) Do Turkish pre-service teachers' critical thinking levels differ in terms of reading behaviour?
g) Do Turkish pre-service teachers' critical thinking levels differ in terms of their level of motivation towards teaching?
h) Do Turkish pre-service teachers' critical thinking levels differ depending on prior training in critical thinking?

6. Do Turkish pre-service teachers' attitudes towards teaching for critical thinking differ in terms of certain background variables?

a) Do Turkish pre-service teachers' attitudes towards teaching for critical thinking differ in terms of gender?
b) Do Turkish pre-service teachers' attitudes towards teaching for critical thinking differ in terms of major?
c) Do Turkish pre-service teachers' attitudes towards teaching for critical thinking differ in terms of academic achievement?
d) Do Turkish pre-service teachers' attitudes towards teaching for critical thinking differ in terms of high school background?
e) Do Turkish pre-service teachers' attitudes towards teaching for critical thinking differ in terms of their parents' level of education?
f) Do Turkish pre-service teachers' attitudes towards teaching for critical thinking differ in terms of reading behaviour?

g) Do Turkish pre-service teachers' attitudes towards teaching for critical thinking differ in terms of their level of motivation towards teaching?
h) Do Turkish pre-service teachers' critical thinking levels differ depending on prior training in critical thinking?

7. Do Turkish pre-service teachers' self efficacy levels in teaching for critical thinking differ in terms of certain background variables?

a) Do Turkish pre-service teachers' self efficacy levels in teaching for critical thinking differ in terms of gender?
b) Do Turkish pre-service teachers' self efficacy levels in teaching for critical thinking differ in terms of major?
c) Do Turkish pre-service teachers' self efficacy levels in teaching for critical thinking differ in terms of academic achievement?
d) Do Turkish pre-service teachers' self efficacy levels in teaching for critical thinking differ in terms of high school background?
e) Do Turkish pre-service teachers' self efficacy levels in teaching for critical thinking differ in terms of their parents' level of education?
f) Do Turkish pre-service teachers' self efficacy levels in teaching for critical thinking differ in terms of reading behaviour?
g) Do Turkish pre-service teachers' self efficacy levels in teaching for critical thinking differ in terms of their level of motivation towards teaching?
h) Do Turkish pre-service teachers' critical thinking levels differ depending on prior training in critical thinking?

1.3. Significance of the Study

With globalization and rapid development of science and technology, which has enabled easy and rapid access of information, the functions of schooling and the role of the teacher has gradually been undergoing transformation. With decreasing emphasis on the

transmission of information and theoretical knowledge, and an increasing interest in improving thinking skills and teaching how to utilize and apply knowledge and other practical skills, teachers, regardless of their major, are assuming new roles, one of which is to cultivate some generic and survival skills in their students. One of the most acknowledged skills is critical thinking.

There is general agreement in literature that it is crucial to teach for critical thinking in order to meet the demands and cope with the challenges of the current era (Halpern, 2003; Pithers, 2000).

Thus, teachers are expected to equip their students with the necessary skills and dispositions so that they can think critically to become life-long learners, solve problems effectively, make sound decisions, and become rational individuals (Facione, 1996; Brookfield, 1987; Sternberg, 1986).

That criticial thinking is enlisted as a generic skill in the Turkish national curriculum shows that teaching for critical thinking is also valued and cherished, at least theoretically, in Turkey at the national level. However, how it is viewed by individual Turkish teachers, whether they are capable enough to teach for critical thinking, whether they value critical thinking and to what extent they themselves think critically are all research areas that need to be investigated.

There is considerable amount of literature indicating that to teach anything effectively, teachers need to be willing and hold positive attitudes towards what they are teaching (Barros & Ellia, 1998). A positive teacher attitude is closely linked to their strategies for coping with challenges in their daily professional life and for influencing student motivation and achievement (OECD, 2009).

Consequently, it can be confidently claimed that teachers with positive attitudes towards teaching for critical thinking could enable them to cope with the challenges inherent in

teaching for critical thinking, motivate their students to think critically and, thereby, increase student achievement.

Similarly, "Teachers' self-efficacy beliefs have been repeatedly associated with positive teaching behaviours and student outcomes" (Henson, 2001). Teachers with high efficacy are found to have a tendency to experiment with methods of instruction, seek improved teaching methods, and experiment with instructional materials (Allinder, 1994; Guskey, 1988; Stein & Wang, 1988).

Thus, there is increasing interest in research on teacher self-efficacy. There is considerable amount of research on describing teachers' self efficacy beliefs in their overall teaching capacity and exploring factors that influence their sense of efficacy (Aston & Webb, 1986; Çapa, 2005; Dellinger, Bobbett, Olivier, & Ellett, 2008; DeMesquita & Drake, 1994).

Based on these grounds, understanding pre-service teachers' attitudes and self efficacy beliefs is important to improve teacher training and education curruicula and practices. It is crucial that teacher training and education programs instill in their teacher candidates a positive attitude and a strong sense of efficacy towards teaching for critical thinking. However, there is limited literature on studies exploring Turkish pre-service teachers' attitudes and self efficacy beliefs towards teaching for critical thinking.

Thus, this study attempts to contribute to Turkish literature on teacher education by describing Turkish pre-service teachers' attitudes and their self efficacy beliefs towards teaching for critical thinking.

From the perspective of practice, measuring Turkish pre-service teachers' self efficacy beliefs can provide stakeholders of teacher training and education programmes with insights upon the measures that can be taken to maintain or improve their programmes

for the preservation or cultivation of a strong sense of self efficacy in pre-service teachers.

In conlusion, there is consensus in literature that teachers who have a positive attitude and a strong sense of efficacy are more effective and confident in achieving their teaching goals. When the topic of discussion is teaching for critical thinking, teachers also need to have the quality of thinking critically themselves and model this skill to their students (Ashton, 1988; Dan & Volman, 2004; Pierce, 2006). That is why this study also aims to measure Turkish pre-service teachers' critical thinking levels.

To measure the three variables – critical thinking level, attitude towards teaching for critical thinking and self efficacy beliefs in teaching for critical thinking – three measurement tools were devised. All three tools yielded high coefficient values of significance and were validated in terms of content and construct validity. Thus, these three instruments can of significant contribution to those researchers interested in measuring pre-service teachers' critical thinking levels, attitudes and self efficacy beliefs towards teaching for critical thinking.

In conclusion, exploring pre-service teachers' critical thinking levels, their attitudes towards teaching for critical thinking and their sense of efficacy in teaching for critical thinking would be of significance by contributing both to literature and practice in terms of both research and instruments.

1.4. Definition of Terms

Academic achievement: The CGPA earned until the final semester in the department by meeting course requirements.

Critical thinking: is the purposeful, reflective and self-regulatory judgment based on what to believe or what to do in response to observations, experience, verbal or written

expressions or arguments. It involves the cognitive skills of critical reasoning by interpretating, analysing, and evaluating the evidential, conceptual, methodological, criteriological, or contextual considerations upon which judgment is based. The ideal critical thinker is motivated and willing not only to exert the cognitive effort for credible judgment but also display the behavioural habits that facilitate critical thinking (adapted from Ennis, 1987 & APA, 1990).

Outcome Efficacy: An individual's judgment of to what extent he/she achieve the outcome intended (Gibson & Dembo, 1984).

Performance Efficacy: An individual's judgment of how well he/she can execute behaviour required to influence outcome (Poole & Okeafor, 2007).

Self-Efficacy: "...people's beliefs in their capabilities to produce given attainments" (Bandura, 2006, p. 307).

Teacher's Attitude towards Thinking for Critical Thinking: The combination of beliefs, feelings and actions of teachers with respect to the use of methods which promote critical thinking in various curricular contexts (adapted from Reid, 2006).

Teachers' Self Efficacy Level: A term used interchangeably with a teacher's sense of efficacy and a teacher's efficacy beliefs to mean a teacher's belief in his or her level of capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context (Tschannen-Moran, Hoy & Hoy, 1998).

Teaching for Critical Thinking: use of methods which promote critical thinking in various curricular contexts (Swartz and Parks, 1994).

CHAPTER II

REVIEW OF LITERATURE

This chapter aims to provide the essential literature in relation to the three major dependent variables of the present study, namely critical thinking, attitude towards teaching for critical thinking and self efficacy in teaching for critical thinking. To this end, the chapter is presented under four main headings. The first section is entitled 'Critical Thinking' and aims to provide insight into definitions, dimensions, some educational issues and assessment tools, and procedures in relation to critical thinking. The second section of this chapter dwells on the 'Teacher Attitude' construct. It is comprised of literature regarding definitions, dimensions and issues related to the measurement of 'teacher attitude'. The third section, 'Teacher Self Efficacy', reviews literature for definitions, dimensions, and issues related to the assessment of teachers' sense of efficacy. The chapter ends with a section entitled, "research related to critical thinking, teacher attitude and teacher self efficacy."

2.1. Critical Thinking

In this section, literature on critical thinking is reviewed in relation to various definitions, dimensions, some educational issues and assessment tools.

2.1.1. Definitions of Critical Thinking

A majority of critical thinking research articles, books, conference papers or unpublished theses and dissertations usually begin with a sentence asserting that definitions of critical thinking in literature are abundant, quite varied and inconsistent (Dağlı, 2008; King,

Wood & Mines, 1990; Yücel, 2008). The variations in critical thinking definitions at the surface level often derive from how comprehensive or narrow the definition is (Moon, 2007). To illustrate, critical thinking can be simply defined as "A logical and rational way of dealing with ideas" (Ruggerio, 1990, p. 3) or "reasonable, reflective thinking that is focused on what to believe or do" (Ennis, 1987, p. 10). On the other hand, the definition can be broad enough to include the cognitive skills and dispositions of a critical thinker, the context in which critical thinking occurs, the tasks involved and/or the beneficial outcomes of thinking critically (Sternberg, 1986). One of the most comprehensive definitions was produced by a Delphi study in which a group of experts arrived at a consensus on the following definition:

> We understand 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, criteriological, or contextual considerations upon which that judgment is based. Critical thinking is essential as a tool of inquiry. As such, critical thinking is a liberating force in education and a powerful resource in one's personal and civic life. While not synonymous with good thinking, critical thinking is a pervasive and self-rectifying human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fairminded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. Thus, educating good critical thinkers means working toward this ideal. It combines developing critical thinking skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society.
>
> (APA, 1990)

More important than the amount or type of information definitions include is from which perspective the construct of critical thinking is approached. Critical thinking is generally approached from four perspectives, namely the philosophical, psychological, political and the educational schools of thought.

2.1.1.1. The Philosophical Perspective

Within the domain of philosophy, critical thinking is regarded essential for the "liberation of the intellect of the individual" (Dağlı, 2008, p. 2). To this end, the philosophical point of view of critical thinking is primarily based on the norm of "good thinking, rational aspect of human thought, and as the intellectual virtues needed to approach the word in a reasonable, fair-minded way" (Dam & Volman, 2004). Thus, scholars representative of the philosophical school of thought in the critical thinking domain tend to focus on reasoning and informal logic in the context of *argument* in their approach to critical thinking. That is, they have focused their attention not so much on the requirements of critical thinking in the classroom, but on the requirements of formal logical systems. Upon this foundation, critical thinking is defined as "determining whether arguments are sound, i.e., whether they have true premises and logical strength" (Hughes, 1996, p. 21). Similarly, Moore and Parker (1989, p. 6) define critical thinking as "the careful, deliberate determination of whether we should accept, reject, or suspend judgment about a claim--and of the degree of confidence with which we accept or reject it". Some scholars refer to this process of action as 'evaluating arguments' as in Epstein's (2000, p. i) definition, in which 'formulating arguments' is also mentioned: "Critical thinking is evaluating whether we should be convinced that some claim is true or some argument is good, as well as formulating good arguments". In some definitions how evaluation of arguments or reasoning should be performed is mentioned: "A critical thinker is someone who uses specific criteria to evaluate reasoning and make decisions" (Diestler, 2001, p. 2). In addition to evaluation of arguments, critical thinking necessitates basing our own arguments on plausible reasoning. In this sense, critical thinking is defined as "The ability to correctly validate or refute claims presented for our belief" (Kiersky & Caste, 1995, p.3). In brief, the majority of the definitions within the philosophical school of thought boil down to Ennis' widely acknowledged definition that critical thinking is "reasonable, reflective thinking that is focused on what to believe or do" (1987, p. 6).

2.1.1.2. The Political Perspective

Critical thinking, within the domain of politics, is primarily considered to be crucial for protection against economic or political exploitation (Facione, 1998). To this end, critical thinking is considered essential for either the maintenance or the transformation of institutions, ideologies, traditions and relationships (Freire, 1993). For one school of thought critical thinking refers to "the capacity to recognize and overcome social injustice" (Dam & Volman, 2004, p. 359). In this sense, critical thinking is regarded as a tool for the emancipation of the oppressed people in different social classes as Freire (1993) points out that critical thinking is that "which discerns an indivisible solidarity between the world and the people and admits of no dichotomy between them –thinking which perceives reality as process, as transformation, rather than as a static entity – thinking which does not separate itself from action". On the other hand, critical thinking is a means for the maintenance of a democratic society (Facione, 1998). Brookfield (1987) maintains that critical questioning is vital for democracy, referring to the fact that individuals need to think critically about the choices that are available and arrive at their own rational judgments without having others make decisions on their behalf. In this sense, critical thinking is defined as "the ability of individuals to disengage themselves from the tacit assumptions of discursive practices and power relations in order to exert more conscious control over their everyday lives" (Kincheloe, 2004, p. 24).

2.1.1.3. The Cognitive Psychological Perspective

Within the domain of cognitive psychology, critical thinking is generally defined with specific attention attributed to the mental processes and the outcomes of thinking critically, which can clearly be understood from Sternberg's (1986, p. 3) definition of critical thinking: "the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts." Based on the mental

processes involved, critical thinking is often regarded synonymous with higher-order thinking skills (Halpern, 1998; Kuhn, 1999). The three levels in Bloom's taxonomy of educational objectives, namely *analysis*, *evaluation* and *synthesis*, are often referred to as the higher order thinking skills which make up the core of critical thinking (Bloom, 1956). Furthermore, scholars in this domain focus more on the outcome of thinking critically, with specific attention to problem solving, as can be observed in the following definition by Halpern (2003, p. 5): "Critical thinking is the use of those cognitive skills and strategies that increase the probability of a desirable outcome…purposeful, reasoned and goal directed – the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions." Similarly, Facione et al. (1996, p. 41) define critical thinking "as that higher order reasoning used in reaching professionally informed judgments in high-stakes, time constrained, and, many times, novel problem situations".

2.1.1.4. The Educational Perspective

John Dewey, a philosopher, psychologist, and educator, is considered as the pioneer of the critical thinking tradition in education (Fisher & Scriven, 1997). Dewey (1909, p. 9) referred to critical thinking as 'reflective thinking' and defined it as "Active, persistent, and careful consideration of a belief or supposed form of knowledge in the light of the grounds which support it and the further conclusions to which it tends." As school and society have a mutual impact on each other, the domain of education is impacted by the philosophical, political and more heavily by the psychological domains, depending on how the function of school is viewed.

When the function of school rests dominantly on liberating the intellect, which is the ultimate aim of *liberal education*, definitions of critical thinking draw more on the philosophical view of critical thinking. Critical thinking in liberal education is defined as learning to learn, think for oneself and in collaboration with others. It involves principled reflective judgment and cultivates the critical spirit (Facione, 1998).

On the other hand, *critical pedagogy* views the function of the school as raising students' 'critical consciousness' so that they can become aware of their sociopolitical environment and fight against the status quo, with the intention of transformation both in the society and in the classroom (Norton & Toohey, 2004). Thus, when such is the goal of education, critical thinking definitions rely heavily on those produced from a political perspective.

However, when the ultimate aim of education is considered to be effective learning, the educational sciences depend mostly on psychologically-oriented research. Hence, Bloom's taxonomy of learning objectives is frequently referred to in studies related to critical thinking in education and is highly influential in the definitions of critical thinking as can be observed in the following definition: "Critical thinking in education is defined as the intellectual thought process of analyzing, conceptualizing, synthesizing, and evaluating information gathered through observation, reflection, reasoning, or experience."

2.1.2. Dimensions of Critical Thinking

Two primary dimensions of critical thinking are most prevalently cited in literature: the cognitive and the affective dimension, which is referred to as dispositions.The cognitive dimension of critical thinking has come to the forefront and takes it place in most of the critical thinking frameworks proposed by scholars of various disciplines, mostly because it is easier to asses than the dispositions. However, an individual may have the competence in critical thinking cognitive skills but not have the dispositions, i.e. the tendency, motivation or the habitual features to exercise them. On the other hand, an individual may be highly motivated and display the habits of a critical thinker, but not be cognitively competent to carry out the necessary cognitive skills required in critical thinking. The other two dimensions that are less frequently mentioned, but are increasingly gaining attention in related literature and thus deserve mentioning are the metacognitive dimension and the ontological and epistemological beliefs.

2.1.2.1. The Cognitive Dimension

The list of cognitive skills inherent in critical thinking offered by various scholars shows some common features and variations. The variations mostly derive from the complexity of the critical thinking construct, which intensifies the difficulty of differentiating general cognitive skills from the subskills. On the other hand, the difficulty of assessing the cognitive skills inherent in critical thinking enforces researchers to classify them into as few components as possible. For example, Cheung et al. (2002) have reduced the cognitive dimension into two components: *reasoning and deduction* skills.

On the other hand, Watson and Glaser (1980) list five cognitive subskills: *deduction, recognizing assumptions, inference, interpretation,* and *evaluating assumptions.*
As an outcome of a delphi study initiated and guided by Facione (1990a), a Panel of experts arrived at a concensus on six general cognitive skills and listed the sub-skills invoved in each as can be seen in Table 2.1.

Table 2.1. *List of Critical Cognitive Skills and Sub-Skills*

Skill	**Sub-skills**
1. Interpretation	Categorization Decoding significance Clarifying meaning
2. Analysis	Examining ideas Identifying arguments Analyzing arguments
3. Evaluation	Assessing claims Assessing arguments
4. Inference	Querying evidence Conjecturing alternatives Drawing conclusions
5. Explanation	Stating results Justifying procedures Presenting arguments
6. Self-regulation	Self-examination Self-correction

Yet, a more comprehensive framework has been offered by Paul et al. (1989) in which two categorizations exist: Macro cognitive abilities and micro cognitive skills (Table 2.2).

Table 2.2 *Macro and Micro Cognitive Skills in Critical Thinking*

Macro Cognitive Abilities	**Micro Cognitive Skills**
1. Refining generalizations and avoiding oversimplifications	1. Comparing and contrasting ideals with actual practice
2. Comparing analogous situations	2. Thinking precisely about thinking: Using critical vocabulary
3. Developing one's perspective	3. Noting significant similarities and differences
4. Clarifying issues, conclusions or beliefs	4. Examining or evaluating assumptions
5. Clarifying and Analyzing the meanings of words or phrases	5. Distinguishing relevant from irrelevant facts
6. Developing criteria for evaluation	6. Making plausible inferences, predictions, or interpretations
7. Evaluating the credibility of sources of information	7. Evaluating evidence and alleged facts
8. Questioning deeply	8. Recognizing contradictions
9. Analyzing or evaluating arguments, interpretations, interpretations, beliefs, or theories	9. Exploring implications and consequences
10. Generating or assessing solutions	
11. Analyzing or evaluating actions and policies	
12. Reading critically: Clarifying or critiquing texts	
13. Listening critically: The Art of Silent Dialogue	
14. Making interdisciplinary connections	
15. Practicing socratic discussion	
16. Reasoning dialogically	
17. Reasoning dialectically	

2.1.2.2. The Dispositions Dimension

Even though the cognitive domain of critical thinking is placed at the centre of the construct, the disposition dimension is cited by most scholars to be as important as the cognitive domain. While some employ the term affective domain or dispositions or affective dispositions to refer to habits, others use it to describe motivations or even personality traits. For example, Norris and Ennis (1989) use the term "critical spirit" to refer to this domain and list the traits that make up this spirit as follows (Table 2.3):

Table 2.3 *Dispositions in Critical Thinking*

Critical thinkers...
Seek a statement of the thesis or question
Seek reasons
Try to be well-informed
Use credible sources and mention them
Take into account the total situation
Keep their thinking relevant to the main point
Keep in mind the original or most basic concern
Look for alternatives
Are open-minded
Take a position and change a position when the eviedence and reasons are sufficient to do so
Seek as much precision as the subject permits
Deal in an orderly manner with the parts of a complex whole
Employ their critical thinking abilities
Are sensitive to feelings, level of knowledge, and degree of sophistication of others

Paul et al. (1989) refer to these affective dispositions as affective strategies, which are comprised of "thinking independently, developing insight into egocentricity or sociocentricity, exercising fair-mindedness, exploring thoughts underlying feelings and feelings underlying thoughts, developing intellectual humility and suspended judgment, developing intellectual courage, developing intellectual good faith or integrity, developing intellectual perseverance, and developing confidence in reason."

On the other hand, Cheung et al. (2002) divide this dimension into motivational dispositions and behavioural habits with two sub components in each (Table 2.4).

Table 2.4 *Dimensions of Dispositions in Critical Thinking*

Motivational Dispositions	Truth seeking disposition Inquisitiveness disposition
Behavioural Habits	Analysis habit Compliance habit (a negative trait)

2.1.2.3. The Metacognitive Dimension

The metacognitive dimension of critical thinking is also emphasized and addressed by various scholars since recent studies have shown that in addition to cognitive skills, critical thinking involves the use of metacognitive skills, such as planning, monitoring, and revising the progress of cognitive skills and dispositions (Norris, 2003). Paul (2002) refers to the metacognitive dimension as standards needed for the assessment of one's own thinking. Thus, the metacognitive dimension of critical thinking emphasizes the reflective, self-evaluative nature of critical thinking. It is stressed in literature related to critical thinking instruction that the metacognitive skills should be addressed in instruction (Dan & Volman, 2004; Halpern, 2003).

2.1.2.4. Ontological and Epistemological Dimension

Kuhn (as cited in Dam & Volman, 2004) considers both metacognitive skills and knowledge, and epistemological beliefs crucial for critical thinking. Kuhn considers epistemological beliefs to be the most important part, claiming that it influences the other components (Dan and Volman, 2004).

That critical thinking is impacted by the individual's ontological and epistemological beliefs is gaining increasing importance in literature. Ontological and epistemological beliefs are culturally and historically bound (Sarris, 2003). According to Paul (cited in Sarris, 2003), individuals need to see beyond the world views that distort their

perception and prevent them from reasoning effectively. Sarris contends that "…critical discourse and any activity that predicates interpretive acts depend largely on the thinker's tie to a given knowledge base and belief system and on the linguistic features associated with the belief system" (p. 61).

Kuhn (cited in Dam & Volman, 2004) asserts that different stages of epistemological beliefs correspond with different roles critical thinking can assume. In the realist stage critical thinking is unnecessary; in the absolutist stage critical thinking is a vehicle for comparing assertions with reality and determining whether they are true or false; in the multiplist stage critical thinking is irrelevant (because by then everyone has his/her own truth), and finally in the evaluative stage critical thinking is valued as a vehicle that promotes sound assertions and enhances understanding. Kuhn suggests that educators who wish to foster critical thinking may gain from conceptualizing students' potential for critical thinking in such a developmental framework.

2.1.3. Educational Issues Regarding Critical Thinking

The emergence of the concept of critical thinking in education is relatively new. However, it is gaining importance and attention at an alarmingly rapid pace with many issues and questions that remain to be dealt with. Some educational issues regarding critical thinking is whether it can be taught, whether it is generalisable across discipline, how it should be taught, and what the role of the teacher is in critical thinking instruction.

Issue 1: Can critical thinking be taught?

There is common agreement in literature as regards the teachability of critical thinking (Dwyer, 1993), which is derived from studies providing evidence that critical thinking can be taught (Dam & Volman, 2004; Kennedy et al., 1991).

Issue 2: Is critical thinking generalisable across disciplines?

Just as there is no agreement on what critical thinking is, so there is lack of consensus on whether critical thinking is generalisable across disciplines. On the one end of the spectrum, there are those who advocate that critical thinking is subject-specific (McPeck, 1981), meaning that each discipline requires a unique kind of thinking. On the other end of the spectrum, there are those who assert that critical thinking is completely generalisable across disciplines (Facione, 1990a; Kennedy, Fisher & Ennis, 1991; Siegel, 1998; Tsui, 2000).

In other words, there is controversy as to whether critical thinking should be taught as an independent course (the process or stands-alone approach) or within established courses (the content or infused instruction approach). Lipman (1988) and Ennis (1987) assert that critical thinking is an enabling skill, like reading and writing, and thus deserves to be treated by means of a separate stand-alone course. On the other hand, teaching critical thinking in a separate course may not ensure its transferrability to other content areas or real-life situations. Research suggests that critical thinking needs to be taught across the curriculum in order to secure success in its outcomes. From this perspective, two terms emerge: *teaching critical thinking* and *teaching for critical thinking*. This study rests on the proposal that even though stand-alone critical thinking courses where critical thinking is explicitly taught may have its merits, this does not discharge teachers of other disciplines from teaching for critical thinking.

Issue 3: How can critical thinking be taught?

Critical thinking instruction rests on the following two assumptions:

- that there are clearly identifiable and definable thinking skills which students can be taught to recognize and apply appropriately, and
- if recognized and applied, the students will be more effective thinkers.

Thus, critical thinking is considered both a *process* and an *outcome* in the educational setting. That is, it is considered a *means* to the *end*. It is a process that students go through by being active, rather than passive learners within classrooms that are transformed into centers of inquiry (Weil & Anderson, 2000). One of the most important and commonly cited strategies in teaching critical thinking is establishing a climate in which students feel free and comfortable to inquire about any discussion that is held in class. With respect to characteristics of instruction that enhance critical thinking, Dam and Volman (2004, p. 1) suggest the following: "paying attention to the development of the epistemological beliefs of students; promoting active learning; a problem-based curriculum; stimulating interaction between students; and learning on the basis of real-life situations."

According to (Paul et al., 1989) a teacher committed to teaching for critical thinking must think beyond subject matter and adopt the critical theory of knowledge and learning. Table 2.5. summarizes the differences between the didactic and the critical theory of knowledge, learning and literacy proposed by Paul et al. (1989).

Table 2.5. *Differences between Didactic and Critical Theory of Knowledge, Learning and Literacy*

The Scholastically Dominant Theory of Knowledge, Learning and Literacy assumes that:	***The Critical Theory of Knowledge, Learning and Literacy assumes that:***
the fundamental need of students is to be taught more or less directly what to think, not how to think	the fundamental need of students is to be taught *how* not *what* to think
knowledge is independent of the thinking that generates, organizes, and applies it	all knowledge or "content" is generated, organized, applied, analyzed, synthesized, and assessed by thinking: gaining knowledge is unintelligible without engagement in such thinking
educated, literate people are fundamentally repositories of content analogous to an encyclopedia or a data banks	an educated, literate person is fundamentally a repository of strategies, principles, concepts, and insights embedded in processes of thought rather than in atomic facts
knowledge, truth, and understanding can be transmitted from one person to another by verbal statements in the form of lectures or didactic writing	knowledge and truth can rarely, and insight never, be transmitted from one person to another by the transmitter's verbal statements alone.

Table 2.5. *continued*

students do not need to be taught skills of listening in order to learn from others	students need to be taught how to listen critically
the basic skills of reading and writing can be taught without emphasis on higher-order critical thinking skills	the basic skills of reading and writing are inferential skills that require critical thinking
students who have no questions typically are learning well	students who have no questions typically are not learning, while those have pointed and specific questions are
quiet classes with little student talk are typically reflective of students learning.	quiet classes with little student talk are typically classes with little learning
knowledge and truth can typically be learned best by being broken down into elements and the elements into sub-elements, each taught sequentially and atomistically	knowledge and truth are heavily systemic and holistic and can be learned only by continual synthsis
people can gain significant knowledge without seeking or valuing it	people gain only the knowledge that they seek and value
understanding the mind and how it functions, its epistemological health and pathology, are not important or necessary parts of learning	understanding the mind and how it functions, its health and pathology, are important, are necessary parts of learning
ignorance is a vacuum or simple lack	prejudices, biases, and misconceptions are built up through actively constructed inferences embedded in experience and must be broken down through a similar process
students need not understand the rational ground or deeper logic of what they learn in order to absorb knowledge	rational assent is essential for a genuine learning
it is more important to cover a great deal of knowledge or information superficially than a small amount in depth	it is more important to cover a small amount of knowledge or information in depth
The roles of teacher and learner are distinct and should not be blurred	We learn best by teaching and explaining to others what we know
The teacher should correct the learners' ignorance by telling them what they don't know and correcting their mistakes	Students need to learn to distinguish for themselves what they know from what they don't know
The teacher has the fundamental responsibility for student learning	Students should have increasing responsibility for their own learning
Students will automatically transfer what they learn in didactically taught courses to relevant real-life situations	Most of what students memorize in didactically taught courses is either forgotten or inert
Personal experience of the student has no essential role to play in education	The personal experience of the student is essential in all schooling
Students who can correctly answer questions, provide definitions, and apply formulae while taking tests have proven their knowledge or understanding of those details	The students can often provide correct answers, repeat definitions, and apply formulae while yet not understanding those questions, definitions, or formulae
Learning is essentially a private monological process in which learners can proceed more or less directly to established truth	Learning is essentially a public, communal dialogical and dialectical process

Similarly, there are several generally recognized "hallmarks" of teaching for critical thinking offered by Bonnie (2004). These include:

- Promoting interaction among students as they learn - Learning in a group setting often helps each member achieve more.
- Asking open-ended questions that do not assume the "one right answer" - Critical thinking is often exemplified best when the problems are inherently ill-defined and do not have a "right" answer. Open-ended questions also encourage students to think and respond creatively, without fear of giving the "wrong" answer.
- Allowing sufficient time for students to reflect on the questions asked or problems posed - Critical thinking seldom involves snap judgments; therefore, posing questions and allowing adequate time before soliciting responses helps students understand that they are expected to deliberate and to ponder, and that the immediate response is not always the best response.
- Teaching for transfer - The skills for critical thinking should "travel well." They generally will do so only if teachers provide opportunities for students to see how a newly acquired skill can apply to other situations and to the student's own experience.

Issue 4: What is the role of the teacher in critical thinking instruction?

It has been widely accepted that teachers should act as role models within the classroom (Dam & Volman, 2004). Pierce (2004) claims that teachers need to model both the cognitive and metacognitive thinking processes to the students. Ennis (1991) goes as far as stating that the most important factor in teaching for critical thinking is the teacher. Similarly Wilks (cited in Akbey, 2007) states that in order to raise students who can question effectively, participate more, be open to discussions, seek alternatives, and make inferences from various perspectives, it is initially essential to raise teachers who possess these skills in the first place. Ashton (1988) approaches the same issue from the opposite end, claiming that the greatest obstacle in teaching for critical thinking at schools is the teachers' lack of critical thinking skills.

In addition to the comprehension and internalization of the rationale underyling the critical theory of learning, and displaying appropriate teacher behaviour, creating a "natural critical learning environment" is of utmost importance. According to Bain (2004), it should be *natural* because what is important for students is to deal with questions and tasks that they naturally find of interest; they should make decisions, justify their choices, receive feedback on their efforts and then try again, and it should be *critical* because "by thinking critically, students learn to reason from evidence and to examine the quality of their reasoning, to make improvements while thinking, and to ask probing and insightful questions. This is, by far, the most important principle -- the one on which all others are based and which commands the greatest explanation."

Issue 5: Obstacles teachers face while teaching for critical thinking

According to Mangena and Chabeli (2005), educators face obstacles in facilitating students' critical thinking ability. One obstacle they noted is teachers' lack of knowledge regarding critical thinking. In addition, Shell (2001) identified other barriers faculty encounter when incorporating critical thinking strategies into their curriculum: Students' lack of motivation; resistance to active learning; time constraints; difficulty in developing methods to teach critical thinking. Similarly, Hackworth (2009) mentioned lack of student motivation as well as other factors, such as students' concern for good grades rather than for learning, and the teachers' need to deliver a large amount of information to cover content and lack of time to learn new methods for infusing critical thinking into the course content.

2.1.4 Assessment of Critical Thinking Skills

The assessment of proficiency levels in critical thinking has been difficult. This mostly derives from the construct being abstract and multi-nature. Thus, designing and developing new instruments or finding readily developed ones that can effectively and objectively measure students' strengths and weaknesses in critical thinking is a challenging process (Ennis, 2003; Halpern, 2003; Norris, 2003).

However, there are currently a number of popular critical thinking instruments being used in research:

- **The Watson Glaser Critical Thinking Appraisal** (WGCTA) is based on multiple choice items measuring only the cognitive dimension of critical thinking. The standard form (i.e. Forms A and B) is composed of 80 items that measure skills in five aspects of critical thinking: *inference, recognition of assumptions, deductions, interpretations,* and *evaluation of arguments* (Watson & Glaser 1980).

- **The Ennis-Weir Critical Thinking Essay Test** (EWCTET) is an open ended test of critical thinking in which test-takers are asked to generate and evaluate arguments, loaded significantly on both the cognitive and affective dimensions of critical thinking. It is a highly structured test examining students' ability to identify built-in reaoning flaws in an argumentative passage as well as their ability to define their own arguments (Ennis & Weir, 1985).

- **The Cornell Critical Thinking Test (CCTT)** consists of two levels (X and Z). It is a story based test based on only multiple-choice questions. Level X contains 71 items designed for Grade 4 college students and Level Z contains 62 items designed for gifted high school and college students. Altogether , the two forms measure seven aspects of critical thinking including *induction, deduciton, credibility*, *assumption, semantics, definition* and *prediction* (Ennis, 1985).

- **The California Critical Thinking Test** (CCTST) is composed of 34 items and measures five categories of skills including interpretation, analysis, evaluation, inference, and explanation (Facione, 1990b).

- **The Halpern Critical Thinking Assessment Using Everyday Situations** (HCTAES) measures critical ability in five categories of skills:
    1. *verbal reasoning* (e.g. recognizing the use of pervasive or misleading language)
    2. *argument analysis* (e.g. recognizing reasons and conclusions in arguments)
    3. *hypothesis testing* (e.g. applying relevant principles of problabilty, base rates)
    4. *decision making*
    5. *problem solving* (identifying the problem goal, generating and selecting solutions among alternatives) (Halpern, 2007).

It uses questions set in authentic and believable contexts. The test consists of 25 scenario-based questions. Each asks for open ended responses as well as multiple choice resopnses, totalling 50 questions. The multiple choice part tests recognition of correct responses from a list of alternatives, whereas the open-ended part tests strategic use of thinking skills as well as the ability to self construct solutions without hints. Test takers are required to answer the open-ended part first.

Previous studies using these different instruments as estimates of individuals' critical thinking competence have rested on the assumption that the chosen measurements of critical thinking are compatible with the conceptualization of critical thinking. However, despite overlap in some aspects, these critical thinking tests vary in their purposes, formats and contexts (Lai, 2008).

These readily available tests have both strengths and weaknesses. The strengths and weaknesses of CCTST, CCTT-Level Z and WGCTA are summarized in Table 2.6 (Williams, Wise & West, 2001).

Table 2.6. *Strengths and Weaknesses of CCTST, CCTT-Level Z and WGCTA*

Test	**Strength**	**Weakness**
The California Critical Thinking Skills Test (CCTST)	Covers more of the domain than the other instruments.	Cronbach alpha estimates of its reliability are consistently near 0.58.
The Cornell Critical Thinking Test- Level Z	More reliable than CCTST: Cronbach α values range between .68-.72	Thoroughly addressed only two facets of the critical thinking domain: analysis and evaluation
The Watson and Glaser Critical Thinking Appraisal (WGCTA)	Most reliable test scores	Covers the least amount of the critical thinking domain of three tests mentioned in this table.

As can be observed in Table 2.6, the critical instruments developed and utilized widely thus far have led to some discussions concerning validity and reliability issues. The validity of some of the instruments is threatened by the mismatch between how critical thinking is conceptualized and what is tested by the instrument. One criticism is that existing measures do not seem to adquately reveal the dispositional aspect of critical thinking because the response format of some tests disallow unprompted thinking or self-generated solutions to questions (Lai, 2008). This criticism is based on the multiple choice format of most instruments. Multiple choice tests are not believed to be reliable indicators of critical thinking because they "ask for recall of thinking described in the lectures or textbook" (Pierce, 2006). WGCTA and CCTST are examples of two widely used instruments that utilize a single multiple-choice response format. These instruments tap the cognitive component of critical thinking, with the dispositional component incompletely revealed (Ennis, 2003).

Ennis (2003) argues that the single right-and-wrong answer approach of multiple-choice tests is unable to reflect test-takers' inclinations to engage in critical thinking. In multiple choice tests, test takers are not free to determine their own evaluative criteria nor generate their own solutions to problems. They fail to serve as indicators of test-takers' ability to think critically in unprompted context. It has been argued that

satisfactory performance in prompted-thinking contexts cannot be generalized to contexts where prompts are not given. Moreover, real life problems often require the use of several skills at one time and a strategic approach in selecting suitable skills for different problems (Halpern, 2003), which can be very much unlike the multiple-choice response format that readily provides test-takers with the answers to choose from.

In response to the above-mentioned concerns, employing the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI) together when assessing critical thinking to reflect the two-factor conceptualization of critical thinking has been suggested (Facione, 1990). However, measuring each factor of critical thinking using separate measures is unlikely to fill the gap between what people claim they would do in self-reported dispositional measures and what they actually do. Their reliability and validity have also been questioned (Lai, 2008). That is why open-ended test are preferred by several researchers (Halpern, 2003; Norris & Ennis, 1989).

One concern here is that to obtain objective grading, these tests are constructed in a highly structured manner. For example, the highly specific context and strict structure have been commented as restricting test takers' responses and thus the effects of dispoision on thinking performance may not be adequately revealed (Taube, 1997).

The subjective scoring process and potential biases in favor of test takers who are more proficient in writing have also been noted (Adams et al., 1996). Moreover, open-ended questions aimed to test critical thinking may also be testing verbal performance.

Thus, the new trend is a multi-response format. Since both the multiple choice and the open ended test of critical thinking have their respective limitations, the current trend is to combine the two response formats into one test. HCTAES (Halpern, 2003) is a recent attempt to address the above mentioned issues by incorporting both multiple-choice and open-ended response formats into a single measurement tool. Unlike EWCTET,

HCTAES is less structured and presents more life-like situations. The CTAES measures critical thinking ability using questions set in authentic and believable contexts. The test consists of 25 scenario-based questions, each asks for open-ended responses as well as multiple choice resopnses, totalling 50 questions. The multiple choice part tests recgnition of correct responses from a list of alternatives, whereas the open-ended part tests strategic use of thinking skills as well as the ability to self-construct solutions without hints. Test takers are required to answer the open-ended part first.

Another concern is that all these instruments of Western origin require modification and adaptation when applied to countries where English is not the primary language and whose cultures, including values and lifestyles, are remarkably different from that of the West (Cheung et al. 2002).

2.2. Teacher Attitude

How teacher attitude is defined has an impact on how it is measured. Hence, this section of the literature review is devoted to the definition and assessment of teacher attitude.

2.2.1. Definition of Teacher Attitude

'Attitude' is defined within the discipline of social psychology as a mental or subjective preparation (Barros & Ellia, 1998). It refers to an individual's psychological condition based on his/her feelings, beliefs and values (Phillips, 2003). While some scholars state that attitudes can be positive, negative or neutral (Fishbein, 1967), others consider it be either a positive or a negative psychological condition towards an object (Karlinger, 1984). Barros and Ellia (1998) refer to positive attitudes as *values* and negative attitudes as *prejudices*. Barros and Ellia also mention *resistance* of teachers to curricular and methodological innovations as a negative teacher attitude.

Attitudes have been cited by many researchers (Dwyer, 1993; Gagne, 1985; Reid, 2006; Tavşancıl, 2006) as being comprised of three elements or dimensions: 1. Cognitive; 2.

Affective, and 3. Behavioural. The cognitive dimension refers to the ideas or beliefs one holds about an attitudinal object. The affective dimension entails the emotions and feelings that influence the ideas. Lastly, the behavioural dimension includes the acts or behaviours that one performs. All these components together can reveal the attitude of an individual.

Teacher attitude, then, can be defined as feelings, behaviours and beliefs in relation to the teaching profession and the constructs it entails.

The motive to measure teacher attitude derives from the notion that if the teacher has a positive attitude towards what he/she is teaching, then his/her teaching performance will be better and student outcomes will be more rewarding. As Smith (1990) points out, the attitude of a teacher plays a significant role in a teacher's behavior and it has great impact on a student's achievement.

2.2.2. Assessment of Teacher Attitude

Attitude can be inferred from verbal or nonverbal behavior. Thus, information about teacher attitudes can be gathered in two fundamental ways: by observation or self-report methods (Anderson, 1981).

Obtaining information regarding attitude is based on the assumption that attitude can be inferred from the overt behavior observed. However three major problems are reported by Dwyer (1993, p. 6) in relation to observational research in examining attitudes:

1. The problem of inaccurately inferring affective characteristics from overt behavior.
2. The problem of determining which behaviours to observe and how to accurately record those behaviors.
3. The problem of misinterpreting the behavior noted by the observer.

Self-report methods are more commonly used. These methods entail asking respondents to read and react to a question, an adjective or statement about an attitudinal object in terms of agreement or disagreement. Responses are then scored in terms of positivity or negativity towards the attitudinal object. Some scales that are employed to measure attitudes are Thurstone scales, Guttman scales and semantic differential scales. However, the most commonly used and popular scale for measuring attitudes is the Likert scale as they are regarded as the most efficient and effective method in the measurement of attitude (Dwyer, 1993).

2.3. Teacher Self-Efficacy

Teachers' sense of efficacy, self efficacy level and self efficacy beliefs are more or less used interchangeably in related literature. Thus, the present study does not make a distinction among them and utilizes the terms interchangeably. This section dwell upon on how teacher self efficacy is defined in literature and issues related to its assessment.

2.3.1. Definition of Teacher Self Efficacy Beliefs

The 'self-efficacy' construct was first introduced by Albert Bandura, who defined it as "beliefs in one's capacity to organize and execute the courses of action required to produce given attainments" (1997, p. 3). Self efficacy beliefs are believed to be based on two constituents: 1) performance efficacy beliefs and 2) outcome efficacy beliefs. While the former refers to one's sense of efficacy in how he/she will perform a task, the latter is related to one's sense of efficacy in achieving a goal or outcome (Bandura, 2001).

In this sense, self-efficacy is related to one's perceptions of his/her competence in a certain area; thus, it may not be an accurate reflection of one's actual performance. People may overestimate or underestimate their actual abilities, which could, in turn, have an impact on the conducts they pursue and the effort they put into them (Woolfolk Hoy & Spero, 2005). Feeling doubtful or insecure about one's own capabilities can hinder making use of one's strengths (Bandura, 1997). On the other hand, slightly

overestimating one's own capabilities can boost confidence and affect performance positively. Based on this background information, expecting a relationship between teachers' sense of efficacy and their future teaching performance would not be groundless.

A teacher's sense of efficacy is defined as "judgements of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (Tschannen-Moran & Woolfolk Hoy, 2001, p. 783). In other words, it is "teachers' belief in their ability to influence valued student outcomes" (Wheatley, 2005, p. 748). Wheatley points out that as teachers' efficacy beliefs do not refer to actual teaching effectiveness, they may not be an accurate reflection of their actual teaching effectiveness (Wheatley, 2005).

Bandura (1997) mentions four sources that influence self-efficacy: mastery experiences, vicarious experiences, social or verbal persuasion, and physiological and emotional states. *Mastery experiences* refer to experiences of success. If the teacher feels successful in his/her teaching performances, his/her level of self-efficacy for future performances increases. On the other hand, experiencing failures repeatedly lowers levels of self-efficacy. *Vicarous experiences* are those experiences that are based on the modeling of the target activity by someone else. The more the observer identifies with the modeled behavior, the higher level of self-efficacy he/she holds. *Social or verbal persuasion* is related to the feedback or comments a teacher receives from other people regarding his/her teaching performance. The more positive feedback and comments a teacher receives, the higher the level of self efficacy a teacher has. Finally, *physiological and emotional states* also contribute to a teacher's feeling of capability or incompetence. While positive feelings experienced from a teaching practice may increase a teacher's sense of efficacy, negative feelings, such as stress and anxiety, may lead to lower self-efficacy beliefs.

Researchers in education are interested in teacher self-efficacy as teacher's self-efficacy beliefs are believed to be one of the crucial factors impacting student achievement (Hoy

& Spero, 2005). According to Bandura (1997), self-efficacy beliefs have an impact on their level of motivation and choice of activities. More specifically, having a high sense of efficacy is reported to have several positive impacts upon the teacher. These positive effects can be listed as follows:

- exhibiting greater levels of planning, organization and enthusiasm (Hoy & Spero, 2005);
- setting instructional goals that are achievable (Hoy and Spero, 2005);
- being open to new ideas and willing to implement new methods of instruction (Guskey, 1988; Hoy & Spero, 2005);
- spending more time on academic instruction (Gibson & Dembo, 1984);
- employing a more positive and humanistic classroom management strategies (Emmer & Hickman,1991; Woolfolk & Hoy, 1990);
- displaying persistence in the face of failure in student achievement (Hoy & Spero, 2005);
- managing stress and burnout more effectively (O'Neill & Stephenson, 2012).

Wheatley (2005) raises a criticism related to teacher efficacy research, claiming that efficacy beliefs regarding learning is not so often addressed. He claims that teacher efficacy research should also examine teachers' efficacy beliefs about their ability to learn new teaching methods rather than just on their beliefs regarding their skills and performances in the near future.

Another issue pointed out by Wheatley (2005) is that many prospective and practicing teachers tend to believe that they are more efficacious than they really are. Similarly, Weinstein (1988) asserts that novice teachers often begin their professional lives with high hopes about the kind of impact that they will be able to have on students' lives, but often encounter a "reality shock" when they learn that it may be more difficult than they had realized to achieve the results they desired.

2.3.2. Assessment of Teachers' Self-Efficacy Beliefs

Teacher efficacy is claimed to remain as a conceptually vague construct, thus making it difficult to assess with certainty (Wheatley, 2005).

One way of assessment used for measuring teacher efficacy is through self-reports based on Likert-scale items. The reported scores generally indicate teachers' general efficacy beliefs; that is, they are measurements of global aspects of teaching or global aspects of teaching for a certain subject, such as efficacy in teaching science (Wheatley, 2005).

Teacher efficacy is generally described in terms of two groups: teachers with a "positive, high, or greater" teacher efficacy and those with "low, lower, or lesser" teacher efficacy. (Wheatley, 2005). Wheatley asserts that even though the term "teachers' efficacy beliefs" is used occasionally in literature, hardly does any research focus on specific efficacy beliefs, such as "I can teach fractions effectively."

There are various instruments reported in related literature for the assessment of teacher self-efficacy in terms of general teaching performance. Gibson and Dembo (1984) developed a 30-item Likert-type teacher efficacy scale, which consisted of two factors: personal teaching efficacy and general teaching efficacy. Personal teaching efficacy focused on 'self-efficacy', i.e. teachers' evaluation of how much they were able to create positive student change, whereas general teaching efficacy aimed to measure 'outcome expectancy.' Riggs and Enochs (1990) developed a 25-item Science Teaching Efficacy Belief Instrument, with the implementation of which they found two distinct dimensions: personal science teaching efficacy and science teaching outcome expectancy. While the former referred to teachers' level of confidence in their ability to teach science, the latter reflected the teachers' beliefs that student learning could be influenced by effective instruction. Bandura (2001) developed a teacher self-efficacy scale with seven subscales: (1) efficacy to influence decision making, (2) efficacy to influence school resources, (3) instructional efficacy, (4) disciplinary efficacy, (5)

efficacy to enlist parental involvement, (6) efficacy to enlist community involvement, and (7) efficacy to create a positive school climate. The Scale consisted of 30 items on a nine-point scale. One other teacher efficacy scale was developed by Tschannen-Moran and Woolfolk Hoy (2001), who criticized previously developed scales on the grounds that they did not include items on personal competence and tasks which exist in the teaching process. Hence, they developed a 24-item long form scale and a 12-item short form scale called Techers' Sense of Efficacy Scale. This scale consisted of three factors: 1) efficacy for student engagement, 2) efficacy for instructional strategies and 3) efficacy for classroom management. Another scale was developed by Schmitz and Schwarzer (2005), which consisted of 10 items on a 4-point response scale. The most recent scale of teacher self efficacy was developed by Dellinger, Bobbet, Olivier and Ellett (2007), which was called Teachers' Efficacy Beliefs System-Self Form. The scale was based on a 4-point rating scale and included 30 items.

General teacher efficacy scales used in studies carried out in Turkey are mainly adaptations of previously established instruments. Yılmaz, Köseoğlu, Gerçek and Soran (2004) adapted the Teacher Self-Efficacy Scale developed by Schmitz and Schwarzer in 1999, reducing the 10 items to 8. The original scale was translated into Turkish, administered to Turkish teachers and analysed for reliability and validity. Bıkmaz (2004) adapted the Science Teaching Efficacy Belief Instrument developed by Riggs and Enochs, reducing the 25 items to 20 and maintaining the two subscales reported by Riggs and Enochs (1990). Another adaptation study was carried out by Çapa, Çakıroğlu, and Sarıkaya (2005). They adapted the Teachers' Sense of Efficacy Scale developed by Tschannen-Moran and Woolfolk Hoy in 2001. Çapa and her colleagues confirmed the three-factor model of the scale after administering it to Turkish pre-service teachers.

There are also teacher scales which are originally developed by Turkish researchers. These are mainly developed to measure teacher efficacy in specific subjects, such as the Teacher Self Efficacy Scale for Computer Teachers (Akkoyunlu, Orhan & Umay, 2005) and a teacher efficacy scale to measure efficacy in teaching geography (Karadeniz,

2005). However, no scale that measured efficacy in teaching for critical thinking was encountered in literature. For this reason, a new scale was developed in the current study.

In constructing self-efficacy scales, Bandura (2006) reported some guidelines to follow. Firstly, he states that the items in the instrument should include "can" or "will" to express capability or a statement of intention. Secondly, he suggests constructing a unipolar scale, meaning that it should not include negative values since zero value does not indicate any gradation. Thirdly, he believes that participants need to be ensured that their answer will not be revealed to other people so that they can give earnest responses. Finally, the predictive validity of self-efficacy scales is crucial since self-efficacy is meant to be an indication of people's future performance on a given task.

2.4. Related Research on Critical Thinking, Teacher Attitude and Teacher Self Efficacy Beliefs

There are multiple studies conducted in Turkey which are based on measuring the critical thinking levels of teachers and teacher candidates, their attitudes towards and their sense of efficacy in the teaching profession in general or towards a certain subject area. There are also some studies investigating the relationship between one or more of these variables. However, teacher attitude and self-efficacy beliefs in teaching for critical thinking are hardly existent.

There are research studies in the assessment of the critical thinking levels of teachers and teacher candidates and the impact of certain background variables on their critical thinking levels are dwelled on in the following sections.

There are numerous studies conducted in Turkey which are based on measuring the critical thinking levels of teachers and teacher candidates. Almost all of these studies have resorted to critical thinking instruments that are available in literature.

Dutoğlu and Tuncel (2008) used the Turkish version of the California Critical Thinking Dispositions Inventory in the survey they carried out on 374 senior education students at İzzet Baysal University, Bolu. They concluded in their report that these students did not have a sufficient level of critical thinking ability. Şen (2009) investigated Turkish teacher candidates' critical thinking levels with respect to the dispositions dimension with a sample of 144 senior students at Gazi University. She reported that their critical thinking levels were at a moderate level. A study by Küçük (2007) also looked into the critical thinking dispositions, as measured by using the California Critical Thinking Dispositions Inventory, of senior teacher candidates at Abant İzzet Baysal University and reports that a higher frequency of teacher candidates reported that they *agree* or *partially agree* with the critical thinking attitudes expressed in the Inventory. The same instrument was used by Beşoluk and Önder (2010) to examine the teacher candidates' critical thinking dispositions at Sakarya University. The study reported critical thinking levels ranging between *low* and *moderate*. On the other hand, another study reported low levels of critical thinking disposition levels of primary school teacher candidates at Abant İzzet Baysal University (Zayıf, 2008).

Akar (2007) reported primary school teacher candidates at Afyonkocatepe University to have low critical thinking levels, as measured by means of the Turkish version of the Cornell Critical Thinking Test X.

In a study by Türnüklü and Yeşildere (2005), the adapted Turkish version of the California Critical Thinking Dispositions Inventory and Mathematical Critical Thinking Problems were used to assess pre-service mathematics teachers' critical thinking dispositions and skills, respectively. As regards dispositions, it was found that pre-service mathematics teachers were low in self-confidence and truth-seeking, while they seemed to have positive, but not strong, disposition levels in analyticity, open-mindedness, inquisitiveness and systematicity.

In conclusion, critical thinking levels of teacher education students were more commonly reported to be between *moderate* and *low* when the cognitive dimensions

were tested, but between *moderate* and *above moderate* when the disposition dimension of critical thinking was measured by inventories where responses were based on respondents' self perceptions (Özmen, 2006).

Some studies also investigate the **impact of certain demographic or background variables** of participants' studied on their critical thinking level. It is mainly observed that findings regarding their impacts are not in agreement.

In numerous studies, ***gender*** is reported to have no impact on critical thinking level (Akar, 2007; Dayıoğlu, 2003; Kaloç, 2005; Korkmaz, 2009; Şen, 2009). On the other hand, there are also studies that report gender as a factor creating a difference in critical thinking levels. A study by Yıldırım (2005) reports higher critical thinking levels of Turkish teachers in favour of females. Similarly, Zayıf (2008), who examined the critical thinking dispositions of primary school candidates at Abant İzzet Baysal University, found females to be scoring higher on the California Critical Thinking Dispositions Inventory.

In a study by Korkmaz (2009), all teachers' critical thinking levels fell in the middle level range. However, the secondary school teachers' critical thinking levels were the highest when compared with primary and tertiary level teachers. The lowest was primary school teachers. However, the variance analysis and scheffe test showed that there was no significant impact of ***teaching level*** on critical thinking level (Korkmaz, 2009).

As regards ***major,*** the highest critical thinking level belonged to the teacher candidates majoring in maths-science education, while the lowest belonged to primary school teacher candidates. However, variance analysis and scheffe test results showed no significant variance, indicating that field of major had no significant impact on critical thinking level (Korkmaz, 2009). On the other hand, a study by Dayıoğlu (2003) reported an impact of major areas upon critical thinking level in favour of science students. In another study by Yıldırım (2005), no significant difference was found between Turkish

language teachers and teachers of Turkish literature. Cheung et al. (2002) conducted a study to examine university students' general and specific critical thinking. Components of this concept comprised cognitive skills, motivational disposition, behavioural habit, and ideological belief, which were measured by means of an instrument adapted from various sources. This study revealed that students of humanities and social sciences were consistently higher on various scores of general critical thinking.

Related research shows that there is a relationship between critical thinking level and ***academic achievement*** (Bowles, 2000; Gadzella, Ginther, & Bryant, 1997; Williams, Wise & West, 2001; Wilson & Wagner, 1981). It is reported that critical thinking is both a predictor and an outcome variable in courses (Williams & Stockdale, 2003). This implies that high critical thinkers are more likely than low critical thinkers to achieve better grades in a course, and students achieving higher grades are more likely than students achieving low grades to improve their critical thinking skills. Thus, it can be concluded that low critical thinkers are more likely to get poor grades than high critical thinkers and less likely to improve their critical thinking skills.

However, contrary to these claims, there are also findings of low level critical thinkers earning high CGPAs or course scores, even when there is high emphasis on the critical thinking skill within the course syllabus, explained by low level critical thinkers spending much more effort in studying for their courses than the higher level critical thinkers (Williams, Oliver & Stockdale, 2003).

On the other hand, a study by Ku (2010) found no relationship between academic achievement, indicated by CGPA, and critical thinking performance as measured by HCTAES. Similarly, a study by Zayıf (2008) reported nonsignificant results in relation to the impact of academic achievement with the exception of the *curiosity* dimension in the dispositions inventory he used to measure critical thinking. Akbıyık (2002) investigated the difference between the impact of low and high critial thinking skills upon academic success. Akbıyık used the grade reports as indicators of academic

success and measured critical thinking via a 30-item inventory developed by the researcher. The results showed that high critical thinking skills had a significantly positive impact on academic success in terms of mathematics, sciences (Physics, Chemistry and Biology), Turkish language literature, and social sciences (History and Geography), but showed no significant impact on the academic success in English as a foreign language.

With respect to ***parents' education level,*** either separately or together, no statistical significance was reported of their impact on critical thinking level (Akar, 2007; Dayıoğlu, 2003; Kaloç, 2005; Şen, 2009).

As for the ***type of high school attended,*** again no statistical significance was reported on its impact on critical thinking levels of teacher education students (Akar, 2007; Şen, 2009; Zayıf, 2008;).

Literature includes studies with conflicting results with respect to the relationship between individuals' ***frequency and amount of reading*** and their critical thinking level. While there are studies reporting no significance in the relationship between amount of reading done by the individual and critical thinking (Şen, 2009), there are studies reporting the vice versa. Kaloç (2005) reports a positive relationship between reading books and newspapers regularly and level of critical thinking.

It is also reported that **teachers' attitudes** have an impact on their teaching performance. However, literature is still filled with gaps concerning teachers' attitudes towards teaching for critical thinking.

Descriptive research studies in the area of 'teacher attitude' mainly dwell on examining attitude towards the teaching profession in general or towards a specific subject teaching or course (e.g. teacher attitudes towards teaching science). Teachers' attitudes towards

teaching more specific skills or content have drawn relatively less attention in literature. Teachers' attitudes towards teaching for critical thinking have hardly been examined.

One of the very few studies in this area was conducted by Stapleton (2011) to examine attitudes, defined as beliefs, of high school teachers in Hong Kong towards critical thinking. It was found that high school teachers in Hong Kong found students weak in critical thinking and they believed that it was important to teach them how to think critically; however, despite the fact that they felt they understood the meaning of critical thinking, their notion of the construct was vague and they had a desire to receive training in how to teach critical thinking.

On the other hand, Haas and Keeley (1995) mention that there are many faculty who do not regard critical thinking as an essential value and teach in the way that they themselves have been taught. They assert that there is resistance towards teaching for critical thinking among faculty, which needs to be addressed and for which they suggest some coping strategies. Similarly, Barros and Ellia (1998) believe that most teachers tend to replicate the teaching model by which they were taught.

As for the impact of certain background variables of teacher on their attitudes towards the teaching profession in general, Taşkın and Hacıömeroğlu (2010) found no significant difference in gender and their academic achievements. However, they did report a significant difference with respect to their majors. Taşkın and Hacıömeroğlu indicated that the methodology courses had a positive impact on preservice teachers' attitudes towards teaching. Yet, the variance in their attitudes was attributed to their educators' profile.

Another study by Bulut (2009) evaluated the attitudes of teacher candidates at Dicle and Fırat Universities towards the teaching profession and reported a positive attitude. However, while no significant impact of gender or university was reported, a significant difference in attitude was observed with respect to field of major. The teacher candidates

majoring in the social sciences education department had a significantly more positive attitude towards the teaching profession than those majoring in the science education department.

One other study by Çapa and Çil (2000) investigated the attitudes of teacher candidates at Middle East Technical University towards the teaching profession in terms of three subscales: like-dislike, respect and self-esteem. A significant difference was found between girls and boys when the subscales were taken into consideration. While girls scored a higher mean score indicating a more positive attitude on the respect and like-dislike subscales, males scored higher on the respect subscale. The study also yielded a significant result in terms of the teacher candidates' year at university. The teacher candidates in their third year seemed to have a significantly higher level of positive attitude towards the teaching attitude than those in lower or higher years. Çapa and Çil attribute this to the intensive teaching practice courses in the third year. However, no significance was reported with respect to the ranking order of the teacher education departments in their university entrance preference list, which is consistent with the finding of a study carried out by Tanel, Şengören and Tanel (2007), who examined the attitudes of science teacher candidates at Dokuz Eylül University towards the teaching profession. Tanel, Şengören and Tanel reported no signicant difference in attitudes in terms of the type of high school the teacher candidates had graduated from.

As for **teacher self efficacy**, Wheatley (2005) claims that it is still not clear how teacher efficacy research can be used in teacher education even though it has been stated by Ashton that "a potentially powerful paradigm for teacher education can be developed on the basis of the construct of teacher efficacy" (as cited in Wheatley, 2005, p. 748).

However, it has been noted that teacher efficacy in research can benefit teacher education in general by making use of teacher efficacy for summative and formative evaluations Teacher efficacy has been linked to democratic teaching practices, such as cooperative learning, autonomy support, and a more humanistic approach to classroom

management; thus, focusing on teacher education to develop teachers' sense of efficacy is essential (Wheatley, 2005).

Though not related to teaching for critical thinking, a study by Tarkın and Uzuntiryaki (2012) revealed a significant relationship between preservice teachers' self efficacy beliefs and attitudes toward the teaching profession in general.

A study by Yıldırım (2005) investigated the relationship between critical thinking levels and use of appropriate instructional strategies for teaching critical thinking in Turkish and Turkish literature secondary school teachers. A high positive correlation was found between the two variables. However, it should be noted that the critical thinking instrument constructed and employed by the researcher was a critical thinking inventory instrument, implying that the results reflect the dispositions dimension of critical thinking only and only reflect perceptions of the participants.

2.5. Summary

The aim of this chapter was to review literature on the three primary variables in the study: critical thinking, teacher attitude towards teaching for critical thinking and teacher's self efficacy in teaching for critical thinking. Definitions for the three constructs were provided and information regarding their measurements in terms of method and instruments used was presented. The review ends with a section on descriptions of some research carried out, particularly on the measurement of critical thinking levels of teachers or pre-service teachers. However, since there is limited research on teachers' attitudes towards teaching for critical thinking and teachers' sense of efficacy in teaching for critical thinking, not much could be reviewed in these two areas.

Research on measurement of critical thinking levels of teachers or pre-service teachers tend to report findings of low or moderate level of critical thinking ability. Studies on

the influence of participants' background variables, such as gender, major, academic achievement upon their critical thinking levels report inconsistent findings.

Research on teacher attitude and teacher self efficacy towards teaching in general reports a positive relationship between teacher attitude and student outcomes as well as between teacher self efficacy and student achievements.

CHAPTER III

METHOD

The overall research design, population and the sample, data collection instruments, data collection procedures, data analysis procedures and the limitations of the study constitute the content of this chapter.

3.1. Overall Research Design

The overall research design employed in this study is quantitative in nature. It is descriptive, relational, and causal-comparative (*ex post facto*) in purpose and adopts a cross-sectional survey strategy as a data collection method in which a researcher-developed test and questionnaires are used in order to seek answers to research questions in relation to Turkish pre-service teachers'critical thinking levels, their attitudes towards teaching for critical thinking and their sense of efficacy in critical thinking methodology and critical thinking skills and dispositions.

Descriptive studies aim to *describe* specific characteristics of a group of subjects without manipulating any of the independent variables (McMillan & Schumacher, 2001).

What this study aimed to describe are reflected in the following research questions:

1) What are the Turkish pre-service teachers' critical thinking levels?
2) What are the Turkish pre-service teachers' attitudes towards teaching for critical thinking?
3) What are the Turkish pre-service teachers' self-efficacy levels in critical thinking methodology and critical thinking skills and dispositions?

Once these descriptions are accurately made, relationships between variables can be sought. Correlation studies are based on seeking a relation or association between two or more variables and a relation is found when a systematic variation is observed between these variables. Revealing existing or non-existent relationships enable researchers (i) to make preliminary identification of possible causes of crucial educational outcomes; (ii) to identify variables that need further investigation; and (3) to predict one variable from another (McMillan and Schumacher, 2001). This study is interested in whether there is a relation between Turkish pre-service teachers'critical thinking levels, attitudes towards teaching for critical thinking, and their sense of efficacy in critical thinking methodology and teaching critical thinking skills and dispositions. Thus, the research questions of the correlation component of the study were as follows:

4. Is there a relationship between Turkish pre-service teachers'critical thinking levels, attitudes towards teaching for critical thinking, and their self efficacy level in critical thinking methodology and teaching critical thinking skills and dispositions?

More specifically,

a) Is there a relationship between their critical thinking levels and their attitudes towards teaching for critical thinking?
b) Is there a relationship between their critical thinking levels and their self efficacy levels with respect to performance and outcome efficacy?
c) Is there a relationship between their attitude towards teaching for critical thinking, and their self efficacy levels with respect to performance and outcome efficacy?

Correlation analyses can shed light on associations or relationships; however, they do not reveal causal relationships. One of the non-experimental designs used in order to study causal relationships is the *ex post facto*, or causal-comparative. "The purpose of *ex post facto* research is to investigate whether one or more preexisting conditions have possibly caused subsequent differences in the groups of subjects" (McMillan and

Schumacher, 2001, p. 310). In the current study, whether preexisting certain background variables of Turkish secondary school candidates have an impact upon their critical thinking levels, attitudes towards teaching for critical thinking and their self-efficacy levels in critical thinking methodology and teaching critical thinking skills and dispositions are investigated. To this end, responses to the following research questions were sought:

5. Do Turkish pre-service teachers'critical thinking levels differ in terms of certain background variables?

a) Do their critical thinking levels differ in terms of gender?
b) Do their critical thinking levels differ in terms of major?
c) Do their critical thinking levels differ in terms of academic achievement?
d) Do their critical thinking levels differ in terms of high school background?
e) Do their critical thinking levels differ in terms of their parents' level of education?
f) Do their critical thinking levels differ in terms of reading behaviour?
g) Do their critical thinking levels differ in terms of their teaching motivation?
h) Do their critical thinking levels differ with respect to prior training in critical thinking?

6. Do Turkish pre-service teachers'attitudes towards teaching for critical thinking differ in terms of certain background variables?

a) Do their attitudes towards teaching for critical thinking differ in terms of gender?
b) Do their attitudes towards teaching for critical thinking differ in terms of major?
c) Do their attitudes towards teaching for critical thinking differ in terms of academic achievement?
d) Do their attitudes towards teaching for critical thinking differ in terms of their high school background?
e) Do their attitudes towards teaching for critical thinking differ in terms of their parents' level of education?

f) Do their attitudes towards teaching for critical thinking differ in terms of their reading behaviour?

g) Do their attitudes towards teaching for critical thinking differ in terms of their teaching motivation?

h) Do their attitudes towards teaching for critical thinking differ in terms of prior training in critical thinking?

7. Do Turkish pre-service teachers'self efficacy levels in critical thinking methodology and teaching for critical thinking skills and dispositions differ in terms of certain background variables?

a) Do their self efficacy levels differ in terms of gender?

b) Do their self efficacy levels differ in terms of major?

c) Do their self efficacy levels differ in terms of academic achievement?

d) Do their self efficacy levels differ in terms of their high school background?

e) Do their self efficacy levels differ in terms of their parents' level of education?

f) Do their self efficacy levels differ in terms of the amount of reading they do?

g) Do their self efficacy levels differ in terms of their teaching motivation?

h) Do their self efficacy levels differ in terms of prior training in critical thinking?

Senior students of teacher training departments in the Faculties of Education in Turkey constitute the population of the study. Cluster and convenience sampling were employed. A total of 1091 pre-service teachers from 14 different state universities from the seven geographical regions in Turkey participated in the study.

A total of three instruments and a participant profile form were developed by the researcher to collect data on Turkish pre-service teachers' (i) critical thinking levels, (ii) attitudes towards teaching for critical thinking, (iii) sense of efficacy in critical thinking methodology and teaching critical thinking skills and dispositions and (iv) background variables. Both descriptive and inferential statistical analyses were run using SPSS 20.0.

The schematic representation of the successive stages followed throughout the current study are displayed in Figure 3.1 below.

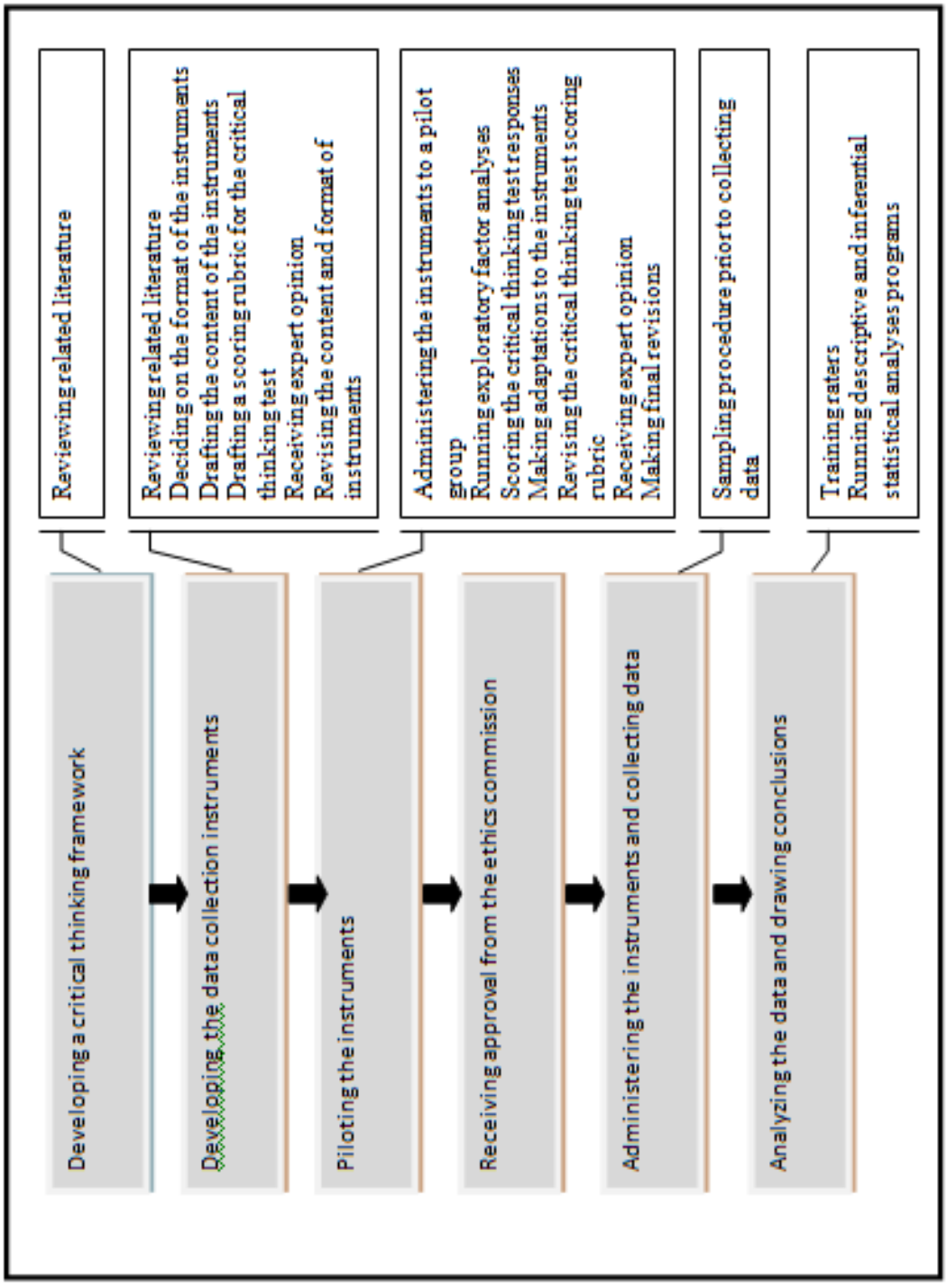


Figure 3.1. Overall Research Design of the Study

3.2. Population and the Sample

Final-year students of teacher training departments in the Faculties of Education in Turkey constitute the population of the study. These departments were categorized according to the type of university entrance score the department required. Three types of university entrance scores were taken into consideration: (1) maths-science weighted university entrance score (MF); (2) Turkish language-social sciences weighted university entrance score (TS) and (3) foreign language weighted university entrance score (YD). The only exception that was made was with the Turkish Language Teacher Education Department. Even though this department required the same score type as departments such as Geography or History education (TS), it was kept as a separate group on grounds that it was a language department in nature and might have a different impact on the data received from the samples of the other departments requiring a TS entrance score. The list of departments within the scope of the current study is presented in Table 3.1.

Table 3.1. *Categorization of Departments Based on Type of University Entrance Score Requirement*

	Departments			
	Group 1	**Group 2**	**Group 3**	**Group 4**
MF score (Maths-Science Weighted University Entrance Score)	Maths Educ. Physics Educ. Biology Educ. Chemistry Educ.			
TS score (Turkish-Social Science Weighted University Entrance Score)		History Educ. Geography Educ. Religion, Culture & Ethics Educ. Turkish Lang. & Literature Educ.		
TS score (Turkish-Social Science Weighted University Entrance Score)				Turkish Language Educ.
YD score (Foreign Language Weighted University Entrance Score)			English Lang. Educ. French Lang. Educ.	

3.2.1. Sampling Procedure

Cluster and convenience sampling strategies were employed in the study. Cluster sampling was used in order to ensure that each geographical region in Turkey was represented in the sample group. In cluster sampling, the total population is divided into groups (or clusters) and a simple random sample of the groups is selected. Then the required information is collected from a simple random sample of the elements within each selected group (McMillan & Schumacher, 2001). However, because of difficulties in receiving permission from the randomly selected universities and departments, convenience sampling was employed rather than simple random sampling in this study.

The state universities were clustered according to the seven regions in Turkey and the universities from which permission could be obtained were included in the study.

Permission to administer the instruments could only be obtained from the various departments of the 14 universities across the seven regions in Turkey. The list of these universities is presented in Table 3.2.

Table 3.2. *Universities Participating in the Study by Geographical Region*

	Region	University
1.	Eastern Anatolia Region	Yüzüncü Yıl University
		Atatürk University
2.	Southeastern Anatolia Region	Gaziantep University
3.	Mediterranean Region	Çukurova University
4.	Aegean Region	Muğla University
		Dokuz Eylül University
5.	Marmara Region	Marmara University
6.	The Black Sea Region	Abant İzzet Baysal University
		Karadeniz Teknik University
7.	Central Anatolia	Gazi University
		Hacettepe University
		Middle East Technical University
		Selçuk University
		Anadolu University

A total of 1235 teacher candidates across 14 universities from the seven regions in Turkey participated in the study. The data collected from 1091 of these participants were considered for analyses. 143 of the respondents had not filled in one or more of

the four instruments. Therefore, they were not considered for analysis. Written consent was received from all participants of the study.

Because random sampling could not be realized from the entire population, the findings of the study can only be generalized to the pre-service teachers in these particular universities, but not to the entire population. The list of universities, departments and number of participants from each department and university is presented in Table 3.3.

3.2.2. Characteristics of Participants

The total number of participants to whom the instruments were administered was 1235. However, 144 of the participants were either from the departments that were not specified in the study or had not responded to at least 80% (8 out of 10 questions) of the questions in the Critical Thinking Test. Thus, they were eliminated. No elimination was done based on missing data in the Attitude or the Self Efficacy Scale as missing data in these instruments did not exceed 5%. Consequently, the initial analyses were based on the responses of 1091 secondary school teacher candidates from a total of 14 universities across the seven regions in Turkey.

As previously mentioned the pre-service teachers were categorized into four groups. The departments that form the four groups can be seen in Table 3.1 under the Population and Sample title of this dissertation. Of the 1091 secondary school teacher candidates, approximately one fourth (27.96%, *n*=302) were from a department in Group 1 (maths, biology, chemistry, physics education departments); more than one fourth (26.95%, *n*=294) were from a department in Group 2 (geography, history, Turkish language and literature, religion, culture and ethics education departments); more than one forth (26.95%, *n*=294) were from a department in Group 3 (English Language and French Language Teaching Departments); and a little less than one fifth (18.42%, *n*=201) were from the Turkish Language Teaching Departments, which made up Group 4. A more detailed depiction of the specific number of participants from each department and university is presented in Table 3.3.

Table 3.3. *Number of Teacher Candidate Participants per Department per University*

		Maths Educ.	Biology Educ.	Chemistry Educ.	Physics Educ.	Geography Educ.	Turkish Literature Educ.	History Educ.	Religion, Culture & Ethics Educ.	English Language Educ.	French Language Educ.	Turkish Language Educ.	Total
1	Yüzüncüyıl University	22	21	15	30		9	37				22	156
2	Gaziantep University											40	40
3	Atatürk University	23		18	17				21			20	99
4	Gazi University	26		18	24	37	12	32		32	26	15	222
5	Middle East Tech. Univ.			2	2					38			42
6	Anadolu University							19		22			41
7	Hacettepe University				9								9
8	Selçuk University	21	23					27	36	9		34	150
9	Abant Izzet B. Univ.									57		63	120
10	Çukurova University									27			27
11	Muğla University									59			59
12	Dokuz Eylül Univ.			1		32		29					62
13	Marmara University	16	3			3						7	29
14	Karadeniz Teknik Uni.	11								24			35
		119 (10.91%)	47 (4.3%)	54 (5%)	82 (7.5%)	72 (6.6%)	21 (1.9%)	144 (13.2%)	57 (5.2%)	268 (24.6%)	26 (2.4%)	201 (18.4%)	1091

As for gender, 63.2 % (*n*=689) were females, while 36.8% (*n*=401) were males. The highest difference in percentage of females and males was observed in the foreign language teacher education group, while the lowest difference in percentage of males and females was observed in the maths-sciences teacher education group. The exact percentages are presented in Table 3.4.

Table 3.4. *Gender Across Groups*

	Male		Female	
Group	*N*	%	*N*	%
Group 1: Maths-Science	148	49	154	51
Group 2: Social-Sciences	92	31.3	202	68.7
Group 3: Foreign Lang.	68	23.1	226	76.9
Group 4: Turkish Lang.	93	46.5	107	53.5

In terms of parents' education level, as can be observed in Table 3.5, the education level of the participants' parents is fairly low. The majority of both the mothers and fathers are primary school graduates; 48.3% (n=527) and 68.7 (n=380), respectively.

Table 3.5. *Percentages of Parents' Level of Education*

	Mother		Father	
Education Level of Parents	*N*	%	*N*	%
No schooling or primary school drop-out	219	20.1	64	5.9
Primary school (1-5th grades) graduate	527	48.3	380	34.8
Secondary school (6-8th grades) graduate	84	7.7	123	11.3
High school (9-11th grades) graduate	180	16.5	264	24.2
University graduate	80	7.3	247	22.6
Postgraduate	1	0.001	13	1.2
Missing responses	1	0.001	1	0.001

The average CGPA mean for the total sample group was 2.90 over 4. The sub group means are presented in Table 3.6. The means and standard deviations for Group1, Group 2, Group 3 and Group 4 are 2.76, 2.93, 2.99 and 2.95, respectively.

Table 3.6. *CGPA Across Groups*

Groups	Mean	N	Std. Deviation
Group 1: Maths-Science	2.76	293	.55
Group 2: Social-Sciences	2.93	289	.43
Group 3: Foreign Lang.	2.99	282	.47
Group 4: Turkish Lang.	2.95	197	.48
Missing responses		30	
Total	2.90	1061	.49

With respect to the type of high school the participants attended, out of 1091 participants, approximately one third had attended (32.8%, n=358) public schools, approximately one fifth (20.9%, n=228) had attended teacher training high schools, almost one fifth (17.5%; n=191) had attended 'Super High Schools', nearly one fifth (16.2%, n=177) had attended Anatolian high schools, almost one tenth (8.7%, n=95) had attended vocational and technical high schools, few (2.7%; n=29) had attended private schools, and very few (0.9%; n=10) had attended science high schools (Table 3.7.).

Table 3.7. *High School Background*

Type of High School	N	%
Public School	358	32.8
Teacher Training High School	228	20.9
Super High School	191	17.5
Anatolian High School	177	16.2
Vocational and Technical High School	95	8.7
Private School	29	2.7
Science High School	10	0.9
Missing	4	0.4

The amount of reading teacher candidates did was measured by the number of books they read per month and how often they read a newspaper per week. As regards reading books other than their textbooks, it was found that a little more than one tenth (13.1%, n=143) did not read any books, more than half of the candidates (65.6%, n=716) read an average of 1 or 2 books per month, a little over one tenth (13.4%; n= 146) read an

average of 3 to 4 books, and less than one tenth (7.1%, n=77) read more than 4 books. As for the frequency of reading newspapers, a little less than one tenth (8.2%, n=89) did not read newspapers at all, approximately one-third (36%, n=393) read a newspaper 1 or 2 times a week, nearly one-fourth (24.5%, n=268) read a newspaper 3 or 4 times a week and almost one-third (30.7%, n=335) read a newspaper every day (Table 3.8.).

Table 3.8. *Reading Behaviour*

Variable	Categories	N	%
Frequency of Reading a Newspaper	Never	89	8.2
	1-2 times a week	393	36.2
	3-4 times a week	268	24.7
	Every day	335	30.9
	Missing	7	0.6
Number of books read per month (excluding textbooks)	None	143	13.1
	1-2 books	716	66.2
	3-4 books	146	13.5
	More than 4 books	77	7.1
	Missing	10	0.9

Teacher candidates' intention to teach and level of motivation to teach displayed some variation. While the majority (80.2%, n=871) reported that they intended to teach, only half of the candidates (48.9%, n=534) reported a high level of motivation to teach. Less than one-tenth (6.2%, n=68) indicated that they did not intend to teach, and little more than one tenth (13.5%, n=147) were not sure about whether they wanted to teach or not. With respect to motivation levels, a little over one-third (38.3%, n=418) had an average level of motivation to teach, one-tenth (10.2%, n=111) had a low level and very few (2%, n=22) had no motivation to teach at all (Table 3.9).

Table 3.9 *Participants' Intention and Level of Motivation to Teach*

Variable	Categories	*N*	*%*
Intention to Teach	Yes	871	80.2
	No	68	6.3
	Maybe	147	13.5
	Missing	6	0.5
Level of Motivation to Teach	High	534	48.9
	Average	418	38.3
	Low	111	10.2
	None	22	2.0
	Missing	7	0.6

As for prior training in critical thinking, the majority (80.4%, n=878) of the participants had not received any training in critical thinking or teaching for critical thinking, while a little less than one-fifth (18.7%, n=204) reported having received a one-term critical reading course.

3.3. Data Collection Instruments

Four instruments were developed by the researcher to collect data on Turkish pre-service teachers'(i) critical thinking levels, (ii) attitudes towards teaching for critical thinking, (iii) self-efficacy levels in terms of performance and outcome efficacy and (iv) certain background variables. These instruments were called (1) The Critical Thinking Test (CTT), (2) Attitude Scale towards Teaching for Critical Thinking (ASTCT), (3) Self Efficacy Scale in Teaching Critical Thinking- Part A (Performance Efficacy) and Part B (Outcome Efficacy) and (4) Participant Profile Form (PPF). The steps followed in the construction of these instruments and a detailed description of the purpose, format, content, reliability and validity of each instrument is described below.

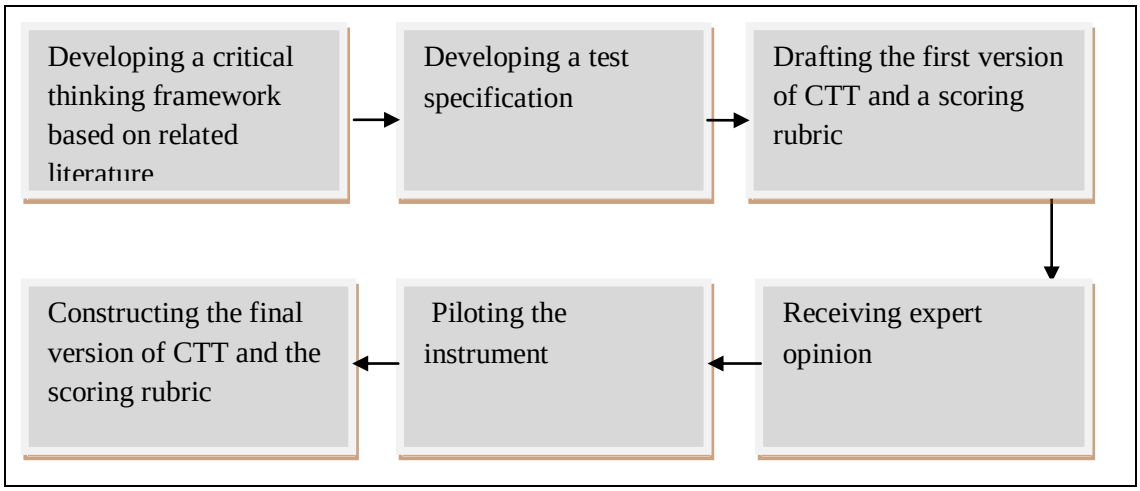
3.3.1. The Critical Thinking Test

The first research question of the study required the measurement of teacher candidates' critical thinking levels. Thus, a critical thinking measurement tool was needed. Initially,

literature on critical thinking measurement was reviewed and the most commonly used instruments were closely examined. Of the commonly used instruments in literature, The Halpern Critical Thinking Assessment Using Everyday Situations (HCTAES) (Halpern, 2007), a computer based test, was favoured over the others owing to its scope and format. HCTAES measures the most widely accepted cognitive and the dispositional dimensions of the critical thinking construct in a combined way and is not based solely on multiple choice items, but primarily on open-ended questions attached to short scenarios in which every day situations are described with a multiple-choice item following each scenario once the open-ended answer is submitted. However, owing to its length, its computer based mode of implementation, and the non-existence of the Turkish version, the researcher decided to construct a new instrument, the format of which was an adaptation of HCTAES.

The stages followed in constructing the Critical Thinking Test (CTT) used in the current study is illustrated in Figure 3.2.

Figure 3.2. *Steps in the Construction of CTT*



3.3.1.1. Development of a Critical Thinking Framework

As the purpose of CTT was to determine the critical thinking levels of the participants, a clear definition and a framework comprised of the components in terms of skills and dispositions was needed to ensure the validity of the instrument. After analyzing and evaluating the definitions and frameworks in related literature, the framework presented in Figure 3.3 was generated, the theoretical foundation of which is explained further on.

3.3.1.1.1. Theoretical Foundation for the Critical Thinking Framework

The conceptualization and assessment of critical thinking are interdependent issues. How critical thinking is defined determines how it is best measured (Kelly, 2009). Thus, the establishment of a Critical Thinking Framework constituted the first step in constructing the Critical Thinking Test. The Critical Thinking Framework adopted in this study is an adaptation and a synthesis of the elements of critical thinking mentioned in related literature. After an in-depth review of related literature, the Critical Thinking Framework was based on four main dimensions: metacognition (Kuhn, 1999; Paul, 2002; Schraw, G., Crippen, K.J., & Hartley, 2006), cognitive skills (Halpern, 1998; Lipman, 1988; Paul, 2002) dispositions (Ennis, 1985; Facione, 2000; Halpern, 1998; Paul, 2002) and ideological and ontological beliefs (Cheung et al., 2002). Despite the abundance of different approaches to the critical thinking construct, there is almost complete consensus that a critical thinker not only exercises cognitive skills but also has a critical spirit. In other words, critical thinking is primarily composed of the cognitive and disposition dimensions (Ennis, 1987; Facione, 1990a; Paul et al., 1989). The cognitive dimension of the Framework has two components since a majority of what is listed boils down to (i) critical reasoning and (ii) critical interpretation, analysis and evaluation (of other people's reasoning), whether it be for problem solving or decision making. The other skills tend to be pre-requisites to these two general cognitive skills for critical thinking.

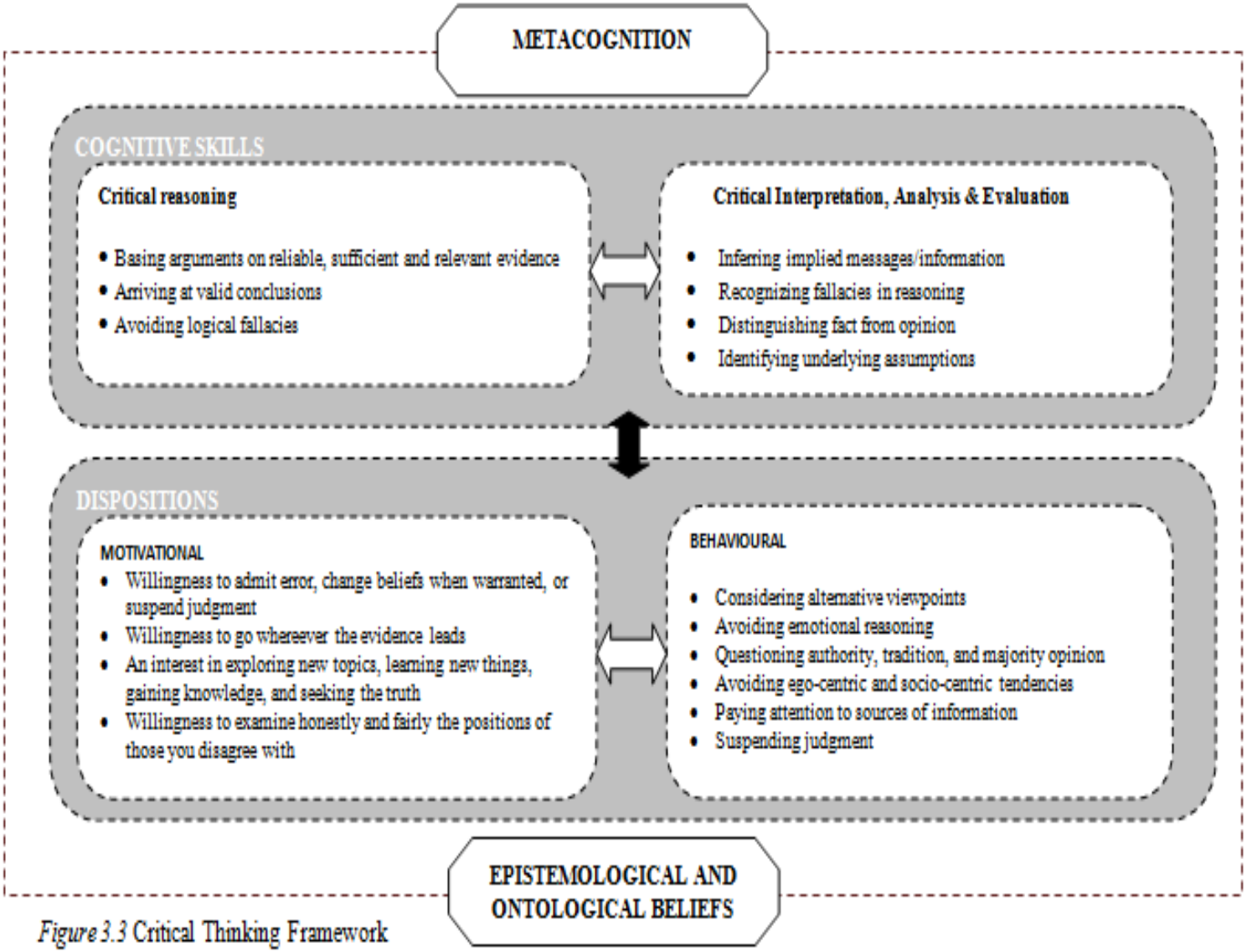


Figure 3.3 Critical Thinking Framework

The Dispositions dimension of the Framework consists of a motivational and a behavioral component, since 'disposition', as defined in literature, focuses on the motivational or the behavioral component, or even both, whether it be explicitly or implicitly. Sternberg (1986) explicitly refers to the motivational dimension by stating that dispositions are "the prerequisites for critical thinking, the motivation or desire to think critically." On the other hand, Norris (1985) focuses more on the habit dimension stating that critical thinking disposition is not simply a desire to thinking critically, but habits to use certain abilities. Both dimensions form the dispositions component in a critical thinking model proposed by Cheung et al. (2002) as motivational dispositions and behavioral habits. The sub-dimensions of the motivational and behavioral dispositions are also derived from the literature.

Though not as commonly cited as the cognitive dimension, the metacognitive dimension does take its place within the critical thinking conceptualization studies. All the critical thinking definitions that include expressions such as "thinking about one's own thinking (process)" are actually referring the metacognitive dimension of the construct. Deanna and David (2003) postulate that the metacognition dimension is essential and define it as "an awareness or management of one's thought" (p. 270). Some scholars even go as far as defining metacognition as 'critical thinking' (Tempelaar, 2006).

Finally the 'epistemological and the ontological beliefs' component is based on the foundation that thinking critically is closely related to how individuals view knowledge and truth, and this notion is gaining increasing attention in literature, though research is still limited. Some scholars refer to this dimension as a cognitive skill as *being aware of one's own underlying assumptions, worldviews and biases* (Paul, 2002). However, "being aware" is viewed in this study as a metocognitive trait, while the beliefs themselves fall within the "epistemological and ontological beliefs" component of the Critical Thinking Framework in subject.

In conclusion, while researcher synthesized the Critical Thinking Framework from literature, she tried to ensure that it was comprehensive in the major components comprising and impacting critical thinking, but not too comprehensive to prevent

overlaps and those skills and traits that may be prerequisites but not exactly a reflection of the 'critical' dimension of the thinking in question. Furthermore, the Framework does not include the contexts or tasks in which critical thinking can be exercised to produce effective outcome. For example, problem-solving, decision-making, and critical reading are just some examples which take place in some definitions or frameworks of critical thinking in literature. However, they are only considered to be the contexts in which critical thinking is exercised by the researcher of the current study.

The Framework serves as a test specification for the Critical Thinking Test; however, only the cognitive and the behavioural disposition components were taken as the dimensions to be measured. The other components, namely metacognitive, motivational dispositions, and epistemological and ontological beliefs were regarded as implicit variables that would have an indirect impact on the other dimensions measured.

3.3.1.2. Format of the Critical Thinking Test and Its Specifications

The Critical Thinking Test specifications derived from the Critical Thinking Framework in Figure 3.1 is presented in Table 3.10. However, the skills and dispositions are not treated in an isolated way, but are measured in a combined way as they have an intertwined impact on each other as reflected in the Framework, and are scored by means of a holistic scoring rubric since critical thinking is viewed as a process that takes into account a holistic perspective of the entire person, including the composition of skills, abilities, beliefs, attitudes, goals, emotions, and experiences. That is, critical thinking involves the ability to view the situation from a holistic perspective (Thurmond, 2006).

CTT measures whether test takers

Reason critically by

Basing arguments/explanations/opinions on reliable, sufficient and relevant information

Basing arguments on non-fallacious reasoning

Arriving at valid conclusions

Critically interpret, analyze and evaluate arguments/information by

Inferring implied ideas/information accurately

Distinguishing between fact and opinion

Recognizing fallacies in reasoning

Identifying underlying assumptions, worldview(s), and biases

And while doing so

Avoids emotional reasoning

Considers alternative viewpoints

Questions authority, tradition, and majority opinion

Avoids ego-centric and socio-centric tendencies

Pays attention to sources of information

Suspends judgment when necessary

Box 3.1. Critical Thinking Test Specification

The researcher decided to use open-ended questions following a short verbal explanation or graphical presentation of problem cases, which were called scenarios. The scenarios were based on and adapted from real-life situations found in newspapers and other written means.

The format of the questions was an adaptation of the Halpern Critical Thinking Assesment Using Everyday Situations (Halpern, 2007) which includes 25 *scenarios* followed by an open-ended question and then a multiple-choice question for each scenario. Halpern's account of her choice in the format of her instrument by asserting that the cognitive and the dispositions dimensions of the critical thinking should not be tested independent of each other as they are interdependent.

The format of the items in CTT constructed in this study is based on the same rationale. Given that the cognitive and the dispositions dimensions of critical thinking have an impact on each other, a holistic approach in assessing critical thinking was adopted.

3.3.1.3. The First Draft of the Critical Thinking Test and the Scoring Rubric

In the first draft of the Critical Thinking Test (CTT), 15 scenarios were drafted. However, after an informal pilot implementation of these 15 scenarios, two of them were eliminated on grounds that they did not measure what was intended to measure. In addition, the first draft of the scoring rubric was designed and submitted to experts, together with CTT, for expert opinion in terms of content and face validity.

3.3.1.4 Expert Opinions for CTT

The initial version of the critical thinking test and its scoring rubric were submitted to five experts for opinion regarding content and face validity. Three of the experts were professors in Curriculum and Instruction; one expert held a Ph.D. degree with a dissertation on critical thinking and finally one of the experts was an English instructor who had undergone a certified training in critical thinking. Based on their feedback, some revisions were made in the wordings of the problem cases to free them of gender bias and to make them more comprehensible. The Scoring Rubric also underwent revisions based on the experts' feedback.

3.3.1.5. Pilot Implementation

The Critical Thinking Test (CTT), which was revised after informal pilot implementation and receiving expert opinion, consisted of 13 items. These items were piloted on 192 Turkish secondary school teacher candidates who were final-year students at three separate universities, namely Middle East Technical University, Abant İzzet Baysal University, and Anadolu University. The implementations were done by the researcher herself.

As a result of the pilot study, three of the items were eliminated from the final version of CTT for two main reasons. First of all, the instruments, CTT specifically, was found to be too long. The total amount of time to complete all the instruments took approximately 80-90 minutes. Secondly, the three items eliminated had performed comparatively less effectively than did the other items on the instrument. The criteria in selecting these three items were what they measured and whether the responses yielded lended themselves to be graded easily based on what they intended to measure.

The grading procedure of the responses yielded from the pilot implementation necessitated a drastic revision in the grading rubric. It was found that the grading rubric initially designed was actually analytical in nature, designed to yield a score on two dimensions of critical thinking (cognitive and dispositions) and was not in consistent with the holistic approach adopted in CTT. Hence, it was almost impossible to grade the responses as cognitive and disposition measures overlapped. Thus, a five-point holistic rubric was designed by adapting the Critical Thinking Holistic Rubric by Facione and Facione (2007). In addition, checklists indicating specific test specifications for each item were used to assist in grading the responses in CTT.

3.3.1.6. Final Version of the Critical Thinking Test and the Holistic Scoring Rubric

After revisions were made based on the pilot study, the Critical Thinking Test (CTT) was submitted for second expert opinion. Based on their comments, further revisions in clarifying language and instructions were made. In addition, ethical concerns regarding one of the items were raised by one of the experts. Therefore, it was replaced by a new item. This new additional item was informally piloted on 20 junior teacher education students before the actual administration of the instrument.

Consequently, the final version of CTT consisted of 10 scenarios, described briefly in the Turkish language, which is the native language of the respondents. The scenarios are based on simple, but insufficiently- or ill-formed descriptions of situations or problems related to educational issues. Each scenario is followed by an open-ended question requiring a justified response of approximately 3-5 sentences. A sample item is presented in Box 3.2.

3. Gazetede çıkan bir haberde, kız-erkek ayrı eğitim yapan liseler ile karma liselerin başarı oranlarının karşılaştırıldığı bir araştırmadan söz edilmektedir. Araştırmanın sonucunda kız-erkek ayrı eğitim yapan liselerin daha başarılı olduğu ifade edilmektedir. Ayrıca haberde, bu araştırma sonucuna dayanarak yetkililerin daha fazla kız ya da erkek liselerinin açılması yönünde adımlar atmayı düşündükleri ifade edilmektedir. **Bu habere dayanarak siz de bu girişimi destekler misiniz? Gerekçelerinizi açıklayınız.**
…… …… …… ……

Box 3.2. Sample CTT Item

3.3.1.7. Reliability and Validity of the Critical Thinking Test

To ensure the reliability of the Critical Thinking Test (CTT) results, the responses of CTT were graded by two raters, who were previously trained by the researcher to ensure that the descriptions on the scoring rubric were comprehensible to them and that they arrived at a common understanding of the constructs with the researcher. The training procedure is explained further in the Data Analysis section of this Chapter. The internal reliability of CTT as measured by Cronbach's alpha proved to be .79.
The content validity of the Test was ensured through its submission for expert opinion.

3.3.2. The Attitude Scale towards Teaching for Critical Thinking

An instrument that measured 'attitude toward teaching for critical thinking' could not be encountered in related literature; therefore, an Attitude Scale towards Teaching for Critical Thinking (ASTCT) was constructed following the steps illustrated in Figure 3.4. The goal of ASTCT was to reveal whether pre-service teachers' attitudes towards teaching for critical thinking were positive or negative.

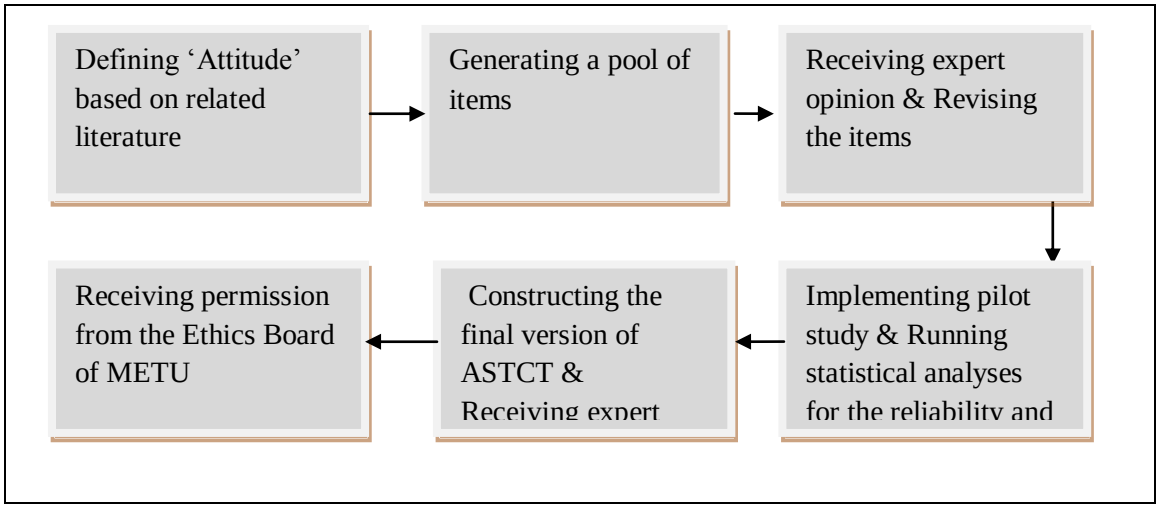


Figure 3.4. Seps Followed in the Construction of ASTCT

3.3.2.1. Definition of Attitude

It is generally accepted that the construct 'attitude' includes three components: the affective, cognitive and behavioural (Triandis, 1971). The affective component refers to the "feelings about the attitude object", the cognitive component are the "beliefs or knowledge about the attitude object" and the behavioural component is the "inclination to act toward the attitude object in a particular way". The 'attitude object' mentioned in these definitions can refer to a physical object or a construct.

3.3.2.2. Generation of a Pool of Items

Based on this definition of the *attitude* construct, the initial list of both positive and negative attitude scale items that expressed feelings, beliefs and behaviours with respect to teaching for critical thinking were generated. These items were generated by (i) implementing to teacher candidates a form that consisted of two sentences to complete, each at a paragraph length and (ii) reviewing related literature. The items in the form are presented in Box 3.3:

1. Teaching for critical thinking **should be/should not be** among the learning outcomes of the National Ministry of Education curriculum for high schools because ……..……...……
2. I would feel **positive/negative** about having to teach for critical thinking in my subject area when I start teaching because ……..……..

Box 3.3. Item Generation Form for ASTCT

The items in the form were expressed in the Turkish language and it was administered to 40 junior teacher candidates at Middle East Technical University students from the following departments: Foreign Language Education Department, Physics Education Department, and Chemistry Education Department. Based on both literature and the answers students provided to the item pool generation form, a total of 65 items were generated.

3.3.2.3. Elimination and Refinement of the Items Before and After Expert Opinions

The 65 items that were initially generated from the sources mentioned in the previous section were closely scrutinized. Some of the items that seemed to overlap with others were eliminated. Some other items that seemed to express self efficacy rather than attitude were also eliminated. The remaining 42 items were revised so that (i) the language was clear and simple, (ii) they expressed either a feeling, belief or behavior, and (iii) they did not measure more than one aspect.

Five experts were consulted for expert opinion for the 42-item Attitude Scale. One of the professors from the psychology department was known to have expertise in construction of attitude scales, while the others were experts in curriculum and instruction. Based on the opinions of the experts, slight revisions were made in the wordings of the items, but no items were eliminated. The 42-item attitude scale was then piloted.

3.3.2.4. Pilot Implementation and Statistical Analyses for Reliability and Validity

The 42-item Attitude Scale towards Teaching for Critical Thinking (ASTCT) was piloted on 192 final-year secondary school teacher candidates across three universities: Middle East Technical University, Abant İzzet Baysal University and Anadolu University.

For purposes of construct validity, an exploratory factor analysis with varimax normalized rotation was performed. The Kaiser criterion (Eigenvalues greater than 1) and the scree plot applications determined the number of factors to retain. Items that loaded 0.40 or higher on a factor were retained. 22 of the items were eliminated as they did not load on any factor or had a loading value below 0.40. The analysis yielded four factors. Subsequent to Varimax rotation, the factor loading values ranged between 0.745 and 0.575 for the first factor, 0.786 and 0.614 for the second factor, 0.731 and 0.477 for the third factor, and 0.776 and 0.476 for the fourth factor. The factors were entitled (i) Attitude towards Critical Thinking, (ii) Biases towards Critical Thinking, (iii) Resistance in Teaching for Critical Thinking, and (iv) Attitude towards Teaching for Critical Thinking (Table 3.10).

Internal consistency of each of the subscales was examined using Cronbach's alpha. The alpha coefficients for each factor, the names of which are stated on the previous page, were, 0.86, 0.80, 0.88 and 0.86, respectively. The alpha coefficient for the entire Scale was found to be 0.89, which indicates a highly reliability coefficient value.

Table 3.10
Factor Loadings of the Items in the Attitude Scale Towards Teaching for Critical Thinking

Items	Factor Loadings*		
Item 2	.745		
Item 10	.652		
Item 5	.645		
Item 9	.605		
Item 7	.575		
Item 6		.786	
Item 14		.778	
Item 13		.614	
Item 8			.731
Item 17			.688
Item 20			.666
Item 18			.477
Item 15			.776
Item 16			.759
Item 11			.748
Item 4			.714
Item 19			.682
Item 3			.548
Item 12			.502
Item 1			.476

*Factor loadings below .4 were suppressed.

3.3.2.5. The Final Version of the Attitude Scale towards Teaching for Critical Thinking

The final version of the Attitude Scale towards Teaching for Critical Thinking (ASTCT) that was employed to collect the data consisted of 20 statements, 65% of which were worded positively and 35% negatively. The instrument was based on a six-point rating scale, ranging from 1-*strongly disagree* to 6-*strongly agree*. The language used in the instrument was Turkish. A sample item for each factor is presented in Box 3.4.

Item 2: Toplumların eleştirel düşünebildiği ölçüde demokratik bir yaşam sürebileceklerine inanıyorum. **(Factor 1)**

Item 17: Öğrencilere eleştirel düşünmeyi öğreterek onların hayata hep şüpheyle bakmalarını istemem. **(Factor 2)**

Item 6: Eleştirel yaklaşan insanların yaptığı tartışmalar temeli olmayan eleştirilere dayanır. **(Factor 3)**

Item 1: Öğrencilerin eleştirel düşünme becerilerini geliştirmede katkıda bulunmak beni mutlu eder. **(Factor 4)**

Box 3.4. *Sample ASTCT Items*

3.3.3. Self Efficacy Scale in Teaching for Critical Thinking

There are some teacher efficacy scales in literature. However, no instrument that measured 'self efficacy in teaching for critical thinking' could be found in literature; therefore, a Self Efficacy Scale in Teaching for Critical Thinking was constructed following the steps illustrated in Figure 3.5. The goal of the Self Efficacy Scale in Teaching for Critical Thinking (SESTCT) was to reveal the extent to which teacher candidates felt efficacious in teaching for critical thinking in terms of performance and outcome efficacy.

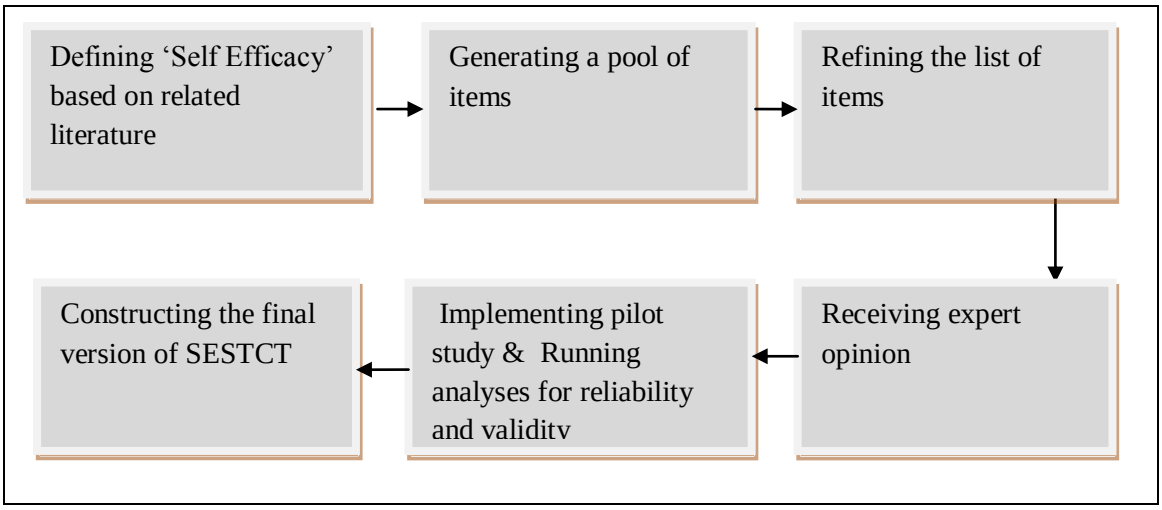


Figure 3.5. Steps Followed in the Construction of SESTCT

3.3.3.1. Definition of 'Self Efficacy'

Self-efficacy is defined as beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments (Bandura, 1997). Thus, it can be inferred that teacher self efficacy in teaching for critical thinking would be beliefs in their capabilities to organize and execute the courses of action required to teach for critical thinking.

3.3.3.2. Generation of a Pool of Items

Based on this definition of the *self efficacy* construct, an initial list of 42 items that expressed can-do statements with respect to critical thinking methodology and 23 questions asking for degree of confidence as regards teaching critical thinking skills and dispositions were generated. These items were generated by (i) implementing to teacher candidates a form that consisted of a sentence that they had to complete by listing what they would do before or during class to teach for critical thinking and (ii) reviewing related literature. The item in the form is presented in Box 3.5.

In order to teach for critical thinking I would do the following before or during class: ……..……...…… ……...…….

Box 3.5. Item Generation Form for SESTCT

The item in the form was expressed in the Turkish language and it was administered to 40 junior teacher candidates at Middle East Technical University students at one of the following departments: Foreign Language Education Department, Physics Education Department, and Chemistry Education Department. Based on both literature and the answers students provided in the item pool generation form, a total of 65 items were generated.

3.3.3.3. Refinement of Items in SESTCT

The 65 items generated were categorized into two subscales with the first subscale focusing on performance and the second on outcome dimensions of self efficacy. However, after eliminating some items that seemed to overlap, the instrument that was to be piloted consisted of a total of 50 items: 26 in subscale 1 (Performance Efficacy), and 24 in subscale 2 (Outcome Efficacy). Special attention was given to revising those items that were not very clear and had more than one focus.

3.3.3.4. Expert Opinions for SESTCT

The initial version of SESTCT, which consisted of can-do statements in both parts of SESTCT to which respondents were asked to mark their degree of agreement on a 6-point scale, was submitted to five experts. Upon the suggestion of the latter, the can-do statements in the second part of the instrument (Part B) was converted to questions asking the respondents to rate the degree of competence they had in teaching for the learning outcomes in the scale on a 5-level percentage scale: 0-20%, 21-40%, 41-60%, 61-80% and 81-100%. These percentage intervals were presented and coded from 1 to 5 respectively.

3.3.3.5. Pilot Implementation and Statistical Analyses for Reliability and Validity

The Self Efficacy Scale in Teaching for Critical Thinking (SESTCT) was piloted on 192 secondary school teacher candidates in their senior years across three universities: Middle East Technical University, Abant İzzet Baysal University and Anadolu University.

For purposes of construct validity, an explanatory factor analysis with varimax normalized rotation was performed. The Kaiser criterion (Eigenvalues greater than 1) and the scree plot applications determined the number of factors to retain. Items that

loaded 0.40 or higher on a factor were retained (Table 3.12). In Subscale 1, 24 of the 26 items loaded on four factors. The factor loadings ranged between 0.828 and 0.409 for the first factor, 0.828 and 0.548 for the second factor, 0.776 and 0.677 for the third factor and 0.699 and 0.469 for the fourth factor. Two items that had a loading value below 0.4 were eliminated. The factors were named as follows:

Factor 1: Personal Efficacy

Factor 2: Self Efficacy in planning for CT instruction

Factor 3: Self Efficacy in CT instruction and assessment

Factor 4: Self Efficacy in overcoming obstacles in CT instruction.

Table 3.11.

Factor Loadings of the Items in SESTCT-Subscale 1(Performance Efficacy)

Items	**Factor Loadings**		
Item 14	.828		
Item 12	.790		
Item 13	.787		
Item 11	.742		
Item 15	.716		
Item 18	.702		
Item 16	.693		
Item 20	.649		
Item 4		.685	
Item 8		.606	
Item 7		.597	
Item 5		.595	
Item 10		.566	
Item 3	.776		
Item 1	.758		
Item 9	.677		
Item 6	.531		
Item 22			.699
Item 21			.661
Item 23			.469

*Factor loadings below .4 were suppressed.

In the internal consistency analysis conducted for subscale 1 (Performance Efficacy), the Cronbach's alphas were 0.93, 0.76, 0.83 and 0.79, respectively for the four factors. The alpha coefficient for Subscale 1 overall was found to be 0.89.

The exploratory factor analysis conducted on subscale 2 (Outcome Efficacy) yielded three factors with loadings above 0.40. Two of the 21 items had loading values below 0.40, so they were eliminated. The loading values ranged between 0.833 and 0.425 for factor 1, 0.842 and 0.546 for factor 2, and 0.851 and 0.790 for factor 3 (Table 3.13). These three factors were entitled as follows:

Factor 1: Outcome efficacy in teaching critical thinking metacognitive skills,

Factor 2: Outcome efficacy in teaching critical thinking cognitive skills, and

Factor 3: Outcome efficacy in teaching critical thinking dispositions.

Table 3.12.

Factor Loadings of the Items in SESTCT- Subscale 2 (Outcome Efficacy)

Items	**Factor Loadings**		
Item 2	.851		
Item 1	.808		
Item 3	.790		
Item 4		.842	
Item 8		.835	
Item 7		.695	
Item 5		.658	
Item 6		.555	
Item 9		.546	
Item 14			.833
Item 12			.828
Item 13			.729
Item 11			.665
Item 15			.622
Item 18			.567
Item 16			.528
Item 19			.524
Item 10			.513
Item 17			.425

*Factor loadings below .4 were suppressed.

The internal reliability analyses, as measured by Cronbach's alpha, yielded alpha coefficients of 0.88, 0.87 and 0.86 for the three factors respectively. The alpha coefficient for Subscale 2 overall was 0.92, indicating a high Cronbach alpha value.

3.3.3.6. Final Version of the Self Efficacy Scale in Teaching for Critical Thinking

The Self Efficacy Scale in Teaching for Critical Thinking (SESTCT) was intended to serve the purpose of gaining insight into pre-service teachers' performance efficacy and outcome efficacy beliefs. Hence, the final version of SESTCT consists of subscales: Subscale 1 (Performance efficacy) and Subscale 2 (Outcome efficacy). Subscale 1 focuses on items related to performance efficacy in teaching for critical thinking and consists of 24 can-do statements requiring the respondents to mark their degree of agreement on a 6-point agreement scale, ranging between 1-*Strongly Disagree* to 6-*Strongly Agree.* A sample item is presented for each factor in Box 3.6.

Item 2: Toplumların eleştirel düşünebildiği ölçüde demokratik bir yaşam sürebileceklerine inanıyorum. **(Factor 1)**
Item 17: Öğrencilere eleştirel düşünmeyi öğreterek onların hayata hep şüpheyle bakmalarını istemem. **(Factor 2)**
Item 2: Toplumların eleştirel düşünebildiği ölçüde demokratik bir yaşam sürebileceklerine inanıyorum. **(Factor 3)**
Item 17: Öğrencilere eleştirel düşünmeyi öğreterek onların hayata hep şüpheyle bakmalarını istemem. **(Factor 4)**

Box 3.6. Sample SESTCT Performance Efficacy Subscale Items

Subscale 2 focuses on outcome efficacy level. More specifically, it measures to what extent teachers feel efficacious in achieving the learning outcomes related to critical thinking skills and dispositions. It consists of 19 items asking respondents to what degree (in percentage) they felt efficacious in teaching a certain critical thinking skill or disposition. The degrees of confidence were presented on a 5-level rating scale of

percentages: 0-20%, 21-40%, 41-60%, 61-80% and 81-100%. A sample item for each factor in this part of the scale is presented in Box 3.7.

Item 2: Öğrencilerin kendi düşüncelerine yön veren dünya görüşlerine ne ölçüde farkındalık geliştirebilirsiniz? **(Factor 1)**
Item 8: Öğrencilerin doğru çıkarımlarda bulunmasını ne kadar sağlayabilirsiniz? **(Factor 2)**
Item 2: Öğrencilerin açık fikirli olmalarını ne kadar sağlayabilirsiniz? **(Factor 3)**

Box 3.7. *Sample Items for SESTCT-Part B (Outcome Efficacy)*

3.3.4. Participant Profile Form

The Participant Profile Form (PPF) aimed to gather information on participants' background variables, their current educational profile, their reading habits, and intention and motivation to teach after graduation. PPF includes a total of 12 questions. The description of the variables in PPF is presented in Table 3.14.

3.4. Data Collection Procedures

Data were collected during the last two weeks of May 2011. The timing rests on the rationale that data should reflect the critical thinking, attitude and self efficacy levels of teacher candidates who are at the point of graduation. The administration of the data collection instruments was on several principles. First, all the administrations were done in the classroom during class time. Secondly, the ordering of the instruments was important. The Critical Thinking Test was administered first without telling the participants the aim of the instrument in order to prevent conscious and artificial effort to think critically while providing the responses.

Table 3.13. *Descriptions of the Variables in Participant Profile Form*

Variable Name	Levels
Gender	(1) Male
	(2) Female
University	Open ended
Department	Open ended
Current CGPA	Open ended
Type of high school attended	(1) Science High School
	(2) Anatolian High School
	(3) Private High School
	(4) Vocational and Technical High School
	(5) Public High School
	(6) Teacher Training High School
	(7) Other
Parents' level of education	(1) Primary school drop-out or non-schooling
	(2) Primary school graduate (1-5th grades)
	(3) Secondary school graduate (6-8th grades)
	(4) High school graduate (9-11th grades)
	(5) University graduate
	(6) Postgraduate
Intention to teach after graduation	(1) Yes
	(2) No
	(3) Maybe
Level of motivation towards teaching	(1) High
	(2) Average
	(3) Low
	(4) Non-existent
Whether or not training in teaching for critical thinking received	(1) Yes
	(2) No
Frequency of reading newspapers	(1) Never
	(2) 1-2 times a week
	(3) 3-4 times a week
	(4) Every day
Number of books read per month	(1) None
	(2) 1 to 2
	(3) 3 to 4
	(4) More than 4

However, the participants were instructed that the purpose of the instrument would be revealed after the completion of the instrument and that they were free to choose not to submit their responses once they were informed about the aim of the instrument.After the Critical Thinking Test was administered, the Attitude Scale, the Self-Efficacy Scale and the Participant Profile Form were administered. All the instruments were in the Turkish language. The duration of each administration ranged between 40-70 minutes.

The instruments were administered by several people: the researcher herself, three colleagues of the researcher, and the instructors or assistants of the classrooms where the administration was carried out. Special care was taken to train all the individuals that administered the instruments without the company of the researcher.

3.5. Data Analyses

The data analyses conducted throughout the study can be categorized as preliminary analyses, which are related to the construction of reliable and valid instruments, and primary analyses to address the research questions of the study. The preliminary analyses for validity purposes include exploratory factor analysis, which was performed using SPSS 18.0, confirmatory factor analyses, conducted by utilizing AMOS for SPSS 20.0. Preliminary analyses for reliability entailed the computation of the Cronbach's alpha coefficients, and Cohen's Kappa to examine the inter-rater reliability.

The primary analyses involved (i) scoring of the Critical Thinking Test responses by two raters; (ii) descriptive statistics analyses; (iii) Pearson's Correlation Analyses and (iv) multivariate analyses of variance (MANOVA).

The raters of the Critical Thinking Test were trained before the grading of the main implementation. Both raters and the researcher independently graded the responses of 30 randomly selected CTTs. It was observed that while rater1 was strict in her grading, rater2 was slightly more lenient, which created a difference of one level in the holistic scoring rubric approximately 30% of the time. After repetitive discussions on the constructs in the rubric, the raters continued scoring the responses independently. The researcher did not continue to score the responses in order to avoid researcher bias.

Descriptive statistical analyses were conducted with the purpose of describing the participants' critical thinking levels, their attitudes towards critical thinking and teaching for critical thinking, and their self efficacy levels in critical thinking methodology and

teaching critical thinking skills and dispositions. Pearson's moment correlation analyses were run to determine whether there were significant relations among these dependent variables. MANOVA was used to investigate whether certain background variables of the participants created significant differences in the dependent variables. MANOVA was preferred against ANOVA because of its advantage of controlling for Type I error.

3.6. Limitations

As with all research, this study is also conditioned by a number of limitations. The greatest limitation rests on the fact that the instruments were all newly constructed. Thus, reliability and validity of the instruments could not be verified by more than one implementation.

The greatest limitations of the study are peculiar to the Critical Thinking Test. The Critical Thinking Test scores could not be validated by means of criterion validity measurements. Another limitation concerning the Critical Thinking Test is derived its being in the written format. Since the data collection instruments are based on collecting written data, the measure of thinking critically while speaking would be missing. The participants might be thinking more effectively when there is no burden of reading and writing.

A limitation in relation to the Attitude and Self Efficacy Scales could be the respondents' tendency to give socially acceptable responses, when in fact their real conceptions or attitudes would be different. When individuals respond to a question, statement, or adjective in a way they think will be socially acceptable to the researcher or when they respond in an acquiescent manner. Acquiescence, in this instance, refers to the tendency of an individual to agree with a question, statement or adjective when they are actually unsure of their response (Dwyer, 1993).

One other limitation is based on the fact that the participants answered the questions within a limited time and space, which may have had an influence on their responses.

Furthermore, loss of subjects was a great threat as the instruments were implemented at a date very close to their graduation. Thus, there was a high rate of absenteeism in the classes where the instruments were administered. Another reason for loss of students was the time it took to complete all four instruments overall. Even though the instruments were shortened after the pilot study to control this threat, it was observed that participants found the instruments too long and approximately 105 out of 1091 (9.2%) respondents had actually not completed filling out the instruments.

An internal threat that deserves to be mentioned is related to the implementation of the instruments. Data were collected from a total of 14 different universities in 11 different cities within the two weeks prior to the end of the academic year. Since the researcher could not be at multiple locations simultaneously, the instruments were sent by mail to an assistant or instructor at 4 universities, and 3 other people assisted in implementing the instruments in 4 universities. Even though all the individuals who assisted in implementing the instruments were cautioned by the researcher about the steps to follow, the instructions to make and points to consider in implementation, there may have been slight variations in implementations.

Finally, one of the greatest limitations of the study rests on the fact that as the sampling is based on non-random sampling, but on cluster and convenience sampling, the generalizability of the findings may be limited to the participants and cannot be generalized to the total population in Turkey.

CHAPTER IV

RESULTS

Chapter IV presents the results of the study. The chapter begins with the description of the data screening procedures carried out before running any analyses and proceeds with the presentation of the results of the preliminary analyses regarding the validity and reliability of the final versions of the data collection instruments developed and employed in the study. Then follows the descriptive statistics results addressing the first group of research questions seeking to reveal pre-service teachers' (i) critical thinking levels, (ii) attitude towards teaching for critical thinking, and (iii) self efficacy beliefs in terms of both performance and outcome efficacy in teaching for critical thinking. Subsequently, the results of the correlation analyses examining the relationship between these variables are presented, addressing the second set of research questions in the study. Finally, the chapter ends with the reporting of the multivariate statistical analyses (MANOVA), addressing the third, fourth and fifth sets of research questions the study seeks to answer. Specifically, these results illustrate whether gender, major, academic achievement, high school background, parents' educational level, reading behaviour, motivation towards teaching, and prior formal training in critical thinking have an impact upon pre-service teachers' (i) critical thinking ability, (ii) attitude towards teaching for critical thinking, and (iii) self efficacy beliefs in terms of both performance and outcome efficacy dimensions.

4.1. Data Screening Procedures

After the data sets were entered into IBM® SPSS® Statistics 20, data cleaning and data recoding were performed. Subsequently, the data sets were checked for missing data and influential outliers.

4.1.1. Data Cleaning

In the current study, the data were cleaned prior to running any analyses for the study. The frequencies for each independent and dependent variable were checked for any data entry errors. The errors that were detected were corrected by referring back to the raw data.

4.1.2. Data Recoding

The Attitude Scale towards Teaching for Critical Thinking and the Self Efficacy Scale in Teaching for Critical Thinking included both positively and negatively worded items. The negatively worded items were reversed by recoding the values 1, 2, 3, 4, 5, and 6 as 6, 5, 4, 3, 2, and 1, respectively.

Another recoding was carried out in relation to CGPA scores. The CGPA scores contained a mixture of both percentages and values over 4. Therefore, the percentage scores were all converted and recoded to present a value over 4. For equivalences, the equivalence table on the website of the Council of Higher Education was referred to

The final recoding was done to convert the CGPA scores from continuous to categorical data. Scores between 3.50-4.00 were coded as '1', those between 3.0-3.5 as '2', those between 2.00-2.99 as '3' and scores below 2.00 as '4'.

4.1.3. Missing Data and Influential Outliers

Data were examined in terms of missing values and influential outliers.

The common concern when dealing with multivariate data with missing values is whether the missing data are missing completely at random (MCAR). Little's Missingness Completely at Random test indicated that the missing data pattern was considered to be completely missing at random, and as the data were missing completely at random, either listwise deletion or imputation of missing value which involves the estimation of the missing data produced from the valid values of other variables (Hair et al., 1998). In the current study, listwise deletion was used to deal with missing values as all the variables had less than 5% missing cases, which was identified by running the 'Missing Value Analysis' in SPSS 20, and the sample size was large enough to accommodate case deletion.

The data set was also checked for outliers, which are observations with a unique combination of characteristics distinctly different from the other observations (Hair et al., 1998). A univariate outlier has an extreme score on a single variable, whereas a multivariate outlier has extreme scores on two or more variables. Box-plots were examined in order to search for univariate outliers. 12 univariate outliers were detected. As MANOVA is a multivariate analysis, multivariate outliers were also sought. In order to examine the data in terms of multivariate outliers, Mahalanobis distance (Mahalanobis D) was used. Mahalanobis D is a measure of distance in multidimensional space of each observation from the mean center of multidimensional centrality (Hair et al., 1998). Only three cases were detected as multivariate outliers. Consequently, the 15 extreme outliers were deleted and the 1091 cases were reduced to 1076.

4.2. Preliminary Analyses for Reliability and Validity of the Data Collection Instruments

It is of utmost importance in research studies to ensure the reliability and validity of the data collection instruments administered in order to reach reliable and valid results. Consequently, results of preliminary analyses and considerations regarding the reliability and validity of the final versions of the Critical Thinking Test (CTT), the Attitude Scale towards Teaching for Critical Thinking (ASTCT), and the Self Efficacy Scale in Teaching for Critical Thinking (SESTCT)- Subscale 1 (Performance Efficacy) and Subscale 2 (Outcome Efficacy)- are dwelled on in this section.

4.2.1. Reliability Analyses for the Critical Thinking Test

Cohen's Kappa, run to determine the inter rater reliability of the Critical Thinking Test (CTT) results, yielded a statistic of 68% agreement, indicating substantial agreement. Landis and Koch (as cited in Steven, 2004) suggest that Kappa values falling within the range of 0.41-0.60 are moderate, and those above 0.60 as substantial. The internal consistency reliability analysis of CTT, as measured by using Cronbach's alpha statistic, yielded a reliability coefficient of .78.

4.2.2. Reliability and Validity Analyses for the Four-Factor Attitude Scale towards Teaching for Critical Thinking

The internal reliabilities of the Attitude Scale towards Teaching for Critical Thinking (ASTCT) overall and of the four factors were measured using the Cronbach's alpha statistic. The alpha value for the total scale was found to be .87. The reliability alpha coefficients for Factor 1 (Attitude towards critical thinking), Factor 2 (Biases towards critical thinking), Factor 3 (Resistance in teaching for critical thinking) and Factor 4 (Attitude towards critical thinking instruction and assessment) were .81,.86, .85 and .84, respectively.

Confirmatory factor analysis using AMOS 20.0 for SPSS was run to confirm the validity of the four-factor model of ASTCT, which was explored previously in an Exploratory Factor Analysis (explained in Chapter 3) with the data obtained from the pilot implementation.

AMOS 20.0 yielded results that indicated a moderately good fit for the four-factor model, with CFI=.085, GFI= .088, NFI= .90 and RMSEA= .080, $\chi^2 = 0.88$ (Figure 4.1). An index of good fit (GFI) is regarded as one above .90 (Marsh, 1995); thus, a GFI of .88 can be regarded as a moderate good fit.

4.2.3. Reliability and Validity Analyses for the Self Efficacy Scale in Teaching for Critical Thinking- Subscale 1 (Performance Efficacy)

The Self Efficacy Scale in Teaching for Critical Thinking (SESTCT) was composed of two subscales: Performance Efficacy Scale and Outcome Efficacy Scale.

The Cronbach's alpha coefficients were computed to provide evidence for the internal reliability of Subscale 1: Performance Efficacy and its four factors. The alpha coefficient for the scale overall was found to be .94. The alpha coefficients for the four factors, namely Performance Efficacy, Efficacy in Planning for Critical Thinking Instruction, Efficacy in Critical Thinking Instruction and Assessment, Efficacy in Overcoming Obstacles in Critical Thinking Instruction were .77, .85, .90 and .73, respectively.

A confirmatory factor analysis was performed using the AMOS 20.0 for SPSS to validate the four-factor model established for SESTCT-Subscale 1 (Performance Efficacy) subsequent to the exploratory factor analysis performed with the data collected from the pilot implementation (explained in Chapter 3). The model proved to be a good fit with indices as follows: GFI: .090, CFI: .092, NFI: .89, RMSEA: .062, $\chi^2 = 683.43$ The factor loadings are presented in Figure 4.2.

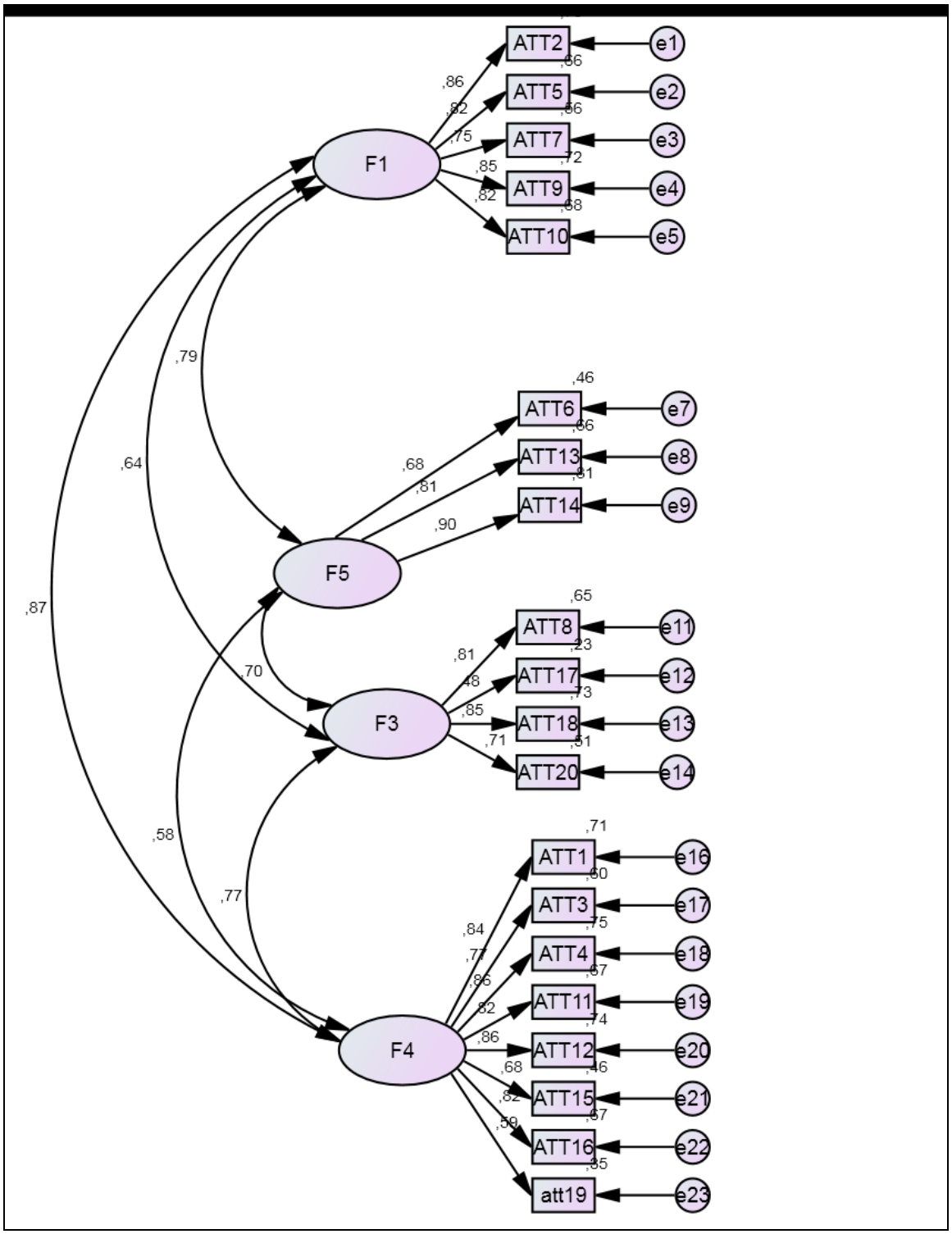


Figure 4.1. *Four-Factor Model of the Attitude Scale towards Teaching for Critical Thinking*

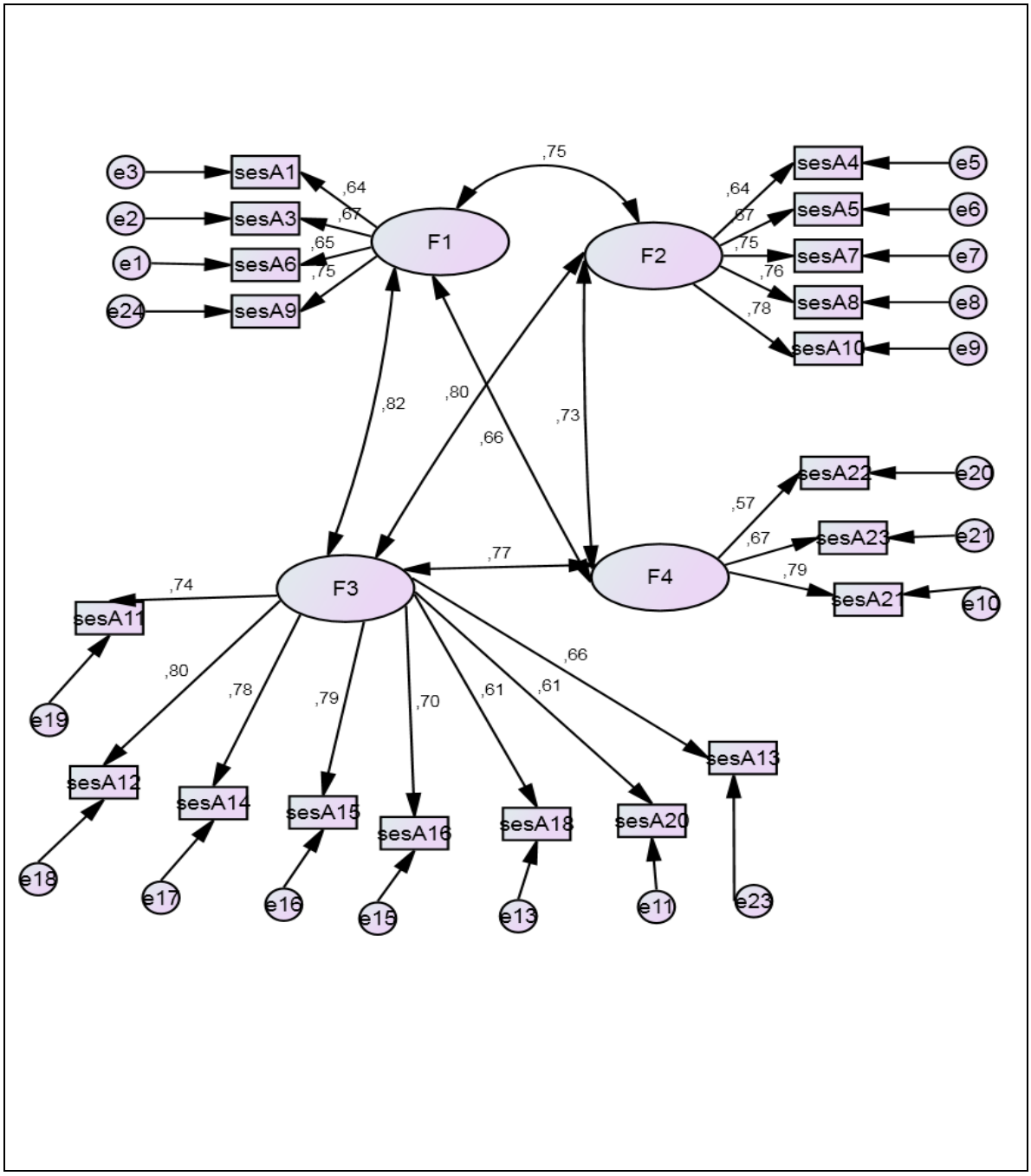


Figure 4.2 *Four-Factor Model of Self Efficacy Subscale 1- Performance Efficacy*

4.2.4. Reliability and Validity Analyses for Self Efficacy Scale in Teaching for Critical Thinking - Subscale 2 (Outcome Efficacy)

The overall alpha value for the overall Self Efficacy Scale in Teaching for Critical Thinking (SESTCT)-Subscale 2 (Outcome Efficacy) was found to be .95. The respective alpha coefficients for the three factors, namely outcome efficacy in teaching for critical thinking metacognitive skills, outcome efficacy in teaching for critical thinking cognitive skills and outcome efficacy in teaching for critical thinking dispositions were found to be .88, .87, and .92.

SESTCT- Subscale 2 had revealed a three-factor model as a result of the exploratory factor analysis run with data collected from pilot implementation (explained in Chapter 3). To confirm this three-factor model with the data collected in the main implementation, a confirmatory factor analysis was conducted using AMOS 20.0, which yielded indices indicating a good fit: CFI: .095, GFI: .092, NFI: .93, RMSEA: .064, χ^2 =808.56. (Figure 4.3.)

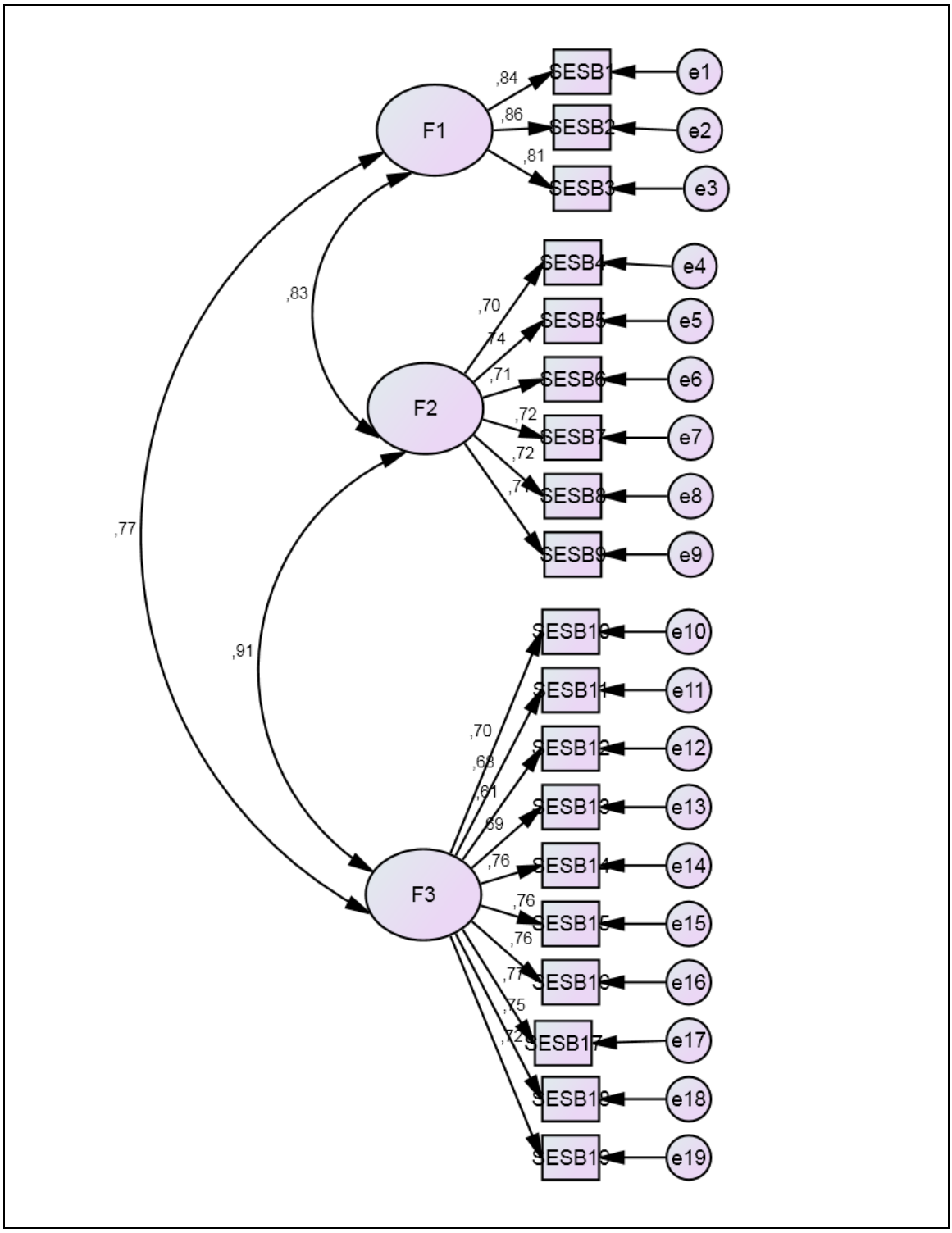


Figure 4.3 *Three-Factor Model of Self Efficacy Subscale 2-Outcome Efficacy*

4.3. Results of the Descriptive Analyses

This section includes the results of the descriptive analyses of the main dependent variables of the study: critical thinking level, attitude towards teaching for critical thinking and self efficacy in teaching for critical thinking - Subscale 1 (Performance Efficacy) and Subscale 2 (Outcome Efficacy).

4.3.1 What are the Turkish Pre-Service Teachers' Critical Thinking Levels?

After computing descriptive statistics of means for critical thinking levels, it was observed that the mean score of the whole sample group fell within the range of 2.0-2.99 over a total score of 5 with 1= *Poor*, 2= *Below Average*, 3= *Average*, 4= *Good*, 5= *Outstanding* [*M*= 2.17, *SD*= .43, *N*= 1076]. A mean score falling within the range of 2.0 and 2.9 indicated a *below-average* level in critical thinking (Table 4.1).

Table 4.1. *Descriptive Statistics for Critical Thinking Test Results*

	M	SD	Min.	Max.	N
Critical Thinking Level	2.17	.43	1.05	4.35	1076

When the mean scores for the groups of participants were compared, it was observed that there was not a significant difference between the means. Despite the very slight differences, the highest mean score belonged to Turkish language teacher candidates [*M*=2.21, *SD*=.42], while the lowest belonged to Maths-Sciences teacher candidates [*M*=2.11, *SD*=.38] (Table 4.2).

Table 4.2. *Critical Thinking Levels Across Groups*

Groups by Major	**M**	**SD**	**N**
Maths-Science	2.11	.38	295
Social Sciences	2.19	.43	291
Foreign Language	2.18	.47	289
Turkish Language	2.21	.42	201
Total	2.17	.43	1076

The task for Scenario No. 1 required participants to interpret, make inferences and derive conclusions from a graph presenting the ranking of the top 10 countries where income of primary school teachers was highest. The source of the graph was not indicated. Thus, the item aimed to test whether respondents questioned the credibility of the information and source of the graph, whether they believed or rejected the information on the graph basing their arguments on justified claims. The mean score for this item was found to be *M*=1.95, *SD*=.79, *N*=977, indicating that the sample group had performed poorly in critical thinking in responding to this item (Table 4.3).

Scenario No. 2 describes a situation in which a group of teachers have written a petition to the school administration for the intelligent students to be assigned to a different class and are asking other teachers to sign the petition as well. Additional information that most teachers have signed the petition is also given. The respondent is asked to make a decision as to whether he/she would sign the petition. This item aimed to test whether respondents questioned majority opinion, that is, whether they could think independently of majority opinion, whether they questioned the meaning or criteria for defining "intelligent student", whether they questioned the aim of the intended action and whether they based their decision on justified arguments. The mean score for this item was observed to be *M*=2.35 *SD*=.74, *N*= 1069, indicating a 'below average' level of critical thinking (Table 4.3).

Scenario 3 depicts a situation in which there is a newspaper article reporting comparative success rates of single-sex and co-education high schools and concluding

that single-sex schools' success rates were higher and that authorities, based on this finding, were intending to increase the number of single-sex schools in the country. The respondents were asked whether they would support the authorities' intentions to increase the number of single-sex high schools. This item aimed to reveal whether respondents questioned the content of the newspaper article, the source of the news or research, how 'success' was defined and whether they based their arguments on justified arguments. The mean score for this item was found to be *M*=2.31, *SD*=.79, *N*= 1064, indicating a 'below-average' level of critical thinking (Table 4.3).

Scenario 4 states that student clubs in a university have promoted their clubs during the first week of education. Subsequently, the highest number of student registrations was observed in the Turkish music club. In light of this information, the respondents were asked to make plausible conclusions. The mean score was observed to be *M*=2.32, *SD*=.90, *N*= 1020, indicating a 'below-average' level in critical thinking (Table 4.3).

In Scenario 5, a dialogue is presented between two hypothetical figures: Adnan and Sema. Adnan advises Sema not to let her children watch films depicting violence. Sema claims that she had read an article in which it was stated that violence on TV did not have any negative impact on children. Adnan claims that this could not be true asserting that if it were so, the commercials on TV would not reach their target. The question following this scenario asked the respondents whose claims they would agree with. The aim was to find out whether the respondents pinpointed the false analogy committed by Adnan, whether they questioned the source of the article Sema was talking about and whether they based their arguments on plausible claims. The mean score for this item was observed to be *M*=1.75 *SD*=.64, *N*=.69, which indicated a 'poor' level of critical thinking (Table 4.3).

Scenario 6 presents an argument made by a writer, who argues that since the onset of the Internet and the increasing number of computers entering homes, people have started to read fewer books, magazines and newspapers, and thus sales of books, magazines and

newspaper have decreased. The respondents are asked whether they agree with the cause raised by the writer concerning the drop in sales of printed sources. This item aimed to determine whether the respondents could base their arguments of agreement or disagreement on plausible reasons. The mean score for the item was observed to be *M*=2.30 *SD*=.73, *N*= 1071, indicating a 'below average' level of critical thinking (Table 4.3).

Scenario 7 talks about a German teacher who makes use of audio-visual aids in the classroom in order to increase student motivation. The teacher observes that the students' grades for the German course were higher than those of their other courses. Based on this observation, the German teacher concludes that making use of audio-visual aids has increased the academic success of the students in the German course. The respondents were asked to draw conclusions from the information presented in this scenario. The aim of this item was to find out whether respondents could draw plausible conclusions by effectively analyzing and evaluating the argument made by the teacher. The mean score for this item was observed to be *M*=1.87, *SD*=.62, *N*=1063, which indicated a 'poor' level of critical thinking (Table 4.3).

Scenario 8 is based on a situation in which a group of students were said to be coming from abroad under the Erasmus programme. However, they decide not to come claiming that Turkey is not a secure country, basing their arguments on a recent experience of meeting a group of Turkish people whom they claim to have displayed racist and unfavourable behaviours. The respondents are asked to evaluate these students' decisions and the claims their decisions are based on. The purpose of this item was to find out whether socio-centric tendencies interfered with the respondents' reasoning skills, and whether they could base their own arguments on plausible claims. The mean score for this item was found to be *M*=2.49, *SD*=.73, *N*=1060, indicating a 'below average' level of critical thinking (Table 4.3).

Scenario 9 depicts a classroom situation in which the respondent is hypothesized to be the teacher. One student is said to be repeatedly interrupting and asserting that what is being explained is actually presented differently in other sources and accuses the teacher of not being competent enough in the subject matter. The respondent is asked about what his/her attitude would be in such a situation by giving reasons. The aim of this item was to observe whether the respondents' ego-centric tendencies interfered with their reasoning skills, and whether they were willing to seek alternative source or viewpoints. The mean score was found to be *M*=2.39, *SD*=.75, *N*= 1061, indicating a 'below average' level of critical thinking (Table 4.3).

Finally, Scenario 10 describes a situation in which a meeting is held on alternative student assessment systems. The aim of the meeting is to arrive at a decision as to whether or not student portfolio assessment should be employed to assess student knowledge and skills more effectively. After for and against opinions are expressed in the meeting, the chair of the meeting asks the members to vote their preference. The majority votes in favour of the student portfolio assessment. The respondents are asked to express their opinions on the decision taken in this meeting and the decision making process by stating their reasons. This item aimed to reveal whether the respondents could question majority opinion and express their own opinions based on plausible reasons. The mean score for this item was observed to be *M*=1.97, *SD*=.77, *N*= 970, indicating a 'poor' level of critical thinking (Table 4.3).

Table 4.3. *Descriptive Statistics for Critical Thinking Test Items*

	Min.	Max.	M	SD	N
Scenario 1	1.00	4.50	1.95	.79	**977**
Scenario 2	1.00	5.00	2.34	.75	1069
Scenario 3	1.00	5.00	2,32	.79	1064
Scenario 4	1.00	5.00	2.32	.90	1020
Scenario 5	1.00	5.00	**1.75**	.64	1069
Scenario 6	1.00	5.00	2.30	.72	1071
Scenario 7	1.00	4.00	1.87	.62	1063
Scenario 8	1.00	4.50	2.49	.73	1060
Scenario 9	1.00	5.00	2.39	.75	1061
Scenario 10	1.00	5.00	1.97	.77	**970**

It can be observed from Table 4.3 that while the first and last items (Scenarios 1 and 10) were the ones that were answered by the least number of respondents, scenario 5 scored the lowest mean. Even though Scenario 1 was the first item on the Critical Thinking Test, it received the second lowest response rate. This could be attributed to the nature of the input presented. Scenario 1 was based on a graphic representation of information related to primary school teachers' salaries. The question aimed to explore whether the participants' could interpret information, question the source of the information or graph, and base arguments on justified claims. The graphic representation may have discouraged the participants from providing a response to the question following the graph. The reason may simply be based on its being the last item (Scenario 10) on the test.

Scenario 5 scored the lowest mean value. This shows that the participants of the study were weakest in identifying false cause-effect relationships and questioning the source of texts and credibility of the ideas. In this sense, it can be concluded that participants may be having difficulty in identifying false cause-effect relationships and may not have the habit of questioning sources of texts and credibility of ideas.

4.3.2. What are the Turkish Pre-Service teachers' Attitudes towards Teaching for Critical Thinking?

The Attitude Scale towards Teaching for Critical Thinking (ASTCT) was administered to reveal Turkish pre-service teachers'attitudes towards teaching for critical thinking. The respondents were asked to mark their level of agreement on a 6-point rating scale ranging from 1-*totally disagree* to 6-*totally agree*.

The mean score average of the total sample group (N=1001) was found to be *M*=4.78, *SD*=.84 for attitude towards teaching for critical thinking. The mean scores for the four factors making up the attitude scale are presented in Table 4.4.

Table 4.4. *Descriptive Statistics for ASTCT*

	M	SD	N
Attitude towards critical thinking	5.21	.71	1062
Biases towards critical thinking	4.37	1.61	1052
Resistance in teaching for critical thinking	4.29	1.41	1060
Attitude towards teaching for critical thinking	5.24	.62	1046
Total	4.78	0.84	

The mean scores indicate that pre-service teachers have a positive attitude towards both critical thinking and critical thinking instruction and assessment, which implies that they value critical thinking and have a positive inclination to the conduct of teaching for critical thinking. However the mean scores for biases towards critical thinking and resistance in teaching for critical thinking are slightly lower, but still within the range of a positive attitude.

4.3.3. What are the Turkish Pre-Service Teachers' Self-Efficacy Beliefs in Teaching for Critical Thinking?

To determine the Turkish pre-service teachers'self efficacy beliefs in teaching for critical thinking (CT), the respondents were administered a self-efficacy scale comprised of two subscales: Subscale 1- Performance Efficacy and Subscale 2 - Outcome Efficacy. The Performance Efficacy Subscale required the respondents to mark their level of agreement on a 6-point rating scale to statements that belonged to one of the four factors verified with confirmatory factor analysis: *performance efficacy in CT instruction, efficacy in planning for CT instruction, efficacy in CT instruction and assessment, and efficacy in overcoming obstacles in CT instruction.*

The descriptive statistics for SESTCT-Performance Efficacy Subscale of the total group [*M*=4.43, *SD*= .71., *N*= 970] indicated *partial agreement* with the can-do statements in relation to *performance efficacy*. With respect to the four factors underlying the

construct of *performance efficacy*, the highest mean score was obtained for *Efficacy in Critical Thinking Instruction and Assessment* [*M*=4.67, *SD*=.75, *N*= 1038], while the lowest mean score was observed for *Efficacy in Overcoming Obstacles for Critical Thinking Instruction* [*M*=4.11, *SD*=.75, *N*= 1056] (Table 4.5).

Table 4.5. *Descriptive Statistics for SESTCT Performance Efficacy Subscale*

	M	**SD**	**N**
Performance Efficacy	4.65	.87	1050
Efficacy in Planning for CT Instruction	4.22	.92	1040
Efficacy in CT Instruction and Assessment	4.67	.75	1038
Efficacy in Overcoming Obstacles for CT Instruction	4.11	.75	1056
Total	4.43	.71	970

In the Outcome Efficacy Subscale, respondents were asked to rate the degree to which they believed they could achieve the critical thinking learning outcomes on the Scale by marking the appropriate percentage interval on a 5-level rating scale, which represented the following percentage intervals: 0-20%, 21-40%, 41-60%, 61-80%, and 81-100%. The percentage intervals were coded from 1 to 5 in an ascending order.

The descriptive statistics for Outcome Efficacy Subscale of the total group [*M*=3.86, *SD*= .71, *N*= 988] produced an efficacy level falling within the range of 41-60%, indicating an average level of outcome efficacy. With respect to the three factors underlying the construct of Outcome Efficacy, the highest mean score was obtained for the third factor, *Outcome Efficacy in Teaching Critical Thinking Dispositions* (*M*=3.90, *SD*=.74), while the lowest mean score was observed for the first factor, *Outcome Efficacy in Teaching Critical Thinking Metacognitive Skills* (*M*=3.75, *SD*=.87, *N*=1065) (Table 4.6).

Table 4.6. *Descriptive Statistics for SESTCT Outcome Efficacy Subscale*

	M	**SD**	**N**
Outcome efficacy in teaching for critical thinking metacognitive skills	3.75	.87	1065
Outcome efficacy in teaching for critical thinking cognitive skills	3.89	.72	1035
Outcome efficacy in teaching for critical thinking dispositions	3.90	.74	1029

4.4. Results of the Bivariate Correlation Analyses among Major Study Variables

Pearson product moment correlation analyses were run to address the fourth research question of the study and its sub-questions as stated below:

Research question no 4:

Is there a relationship between Turkish pre-service teachers' critical thinking levels, attitudes towards teaching for critical thinking and their self efficacy beliefs in teaching for critical thinking?

a) Is there a relationship between pre-service teachers' critical thinking levels and their attitudes towards teaching for critical thinking?
b) Is there a relationship between pre-service teachers' critical thinking levels and their self efficacy beliefs in teaching for critical thinking in terms of performance and outcome efficacy?
c) Is there a relationship between pre-service teachers' attitudes towards teaching for critical thinking and their self efficacy beleifs in teaching for critical thinking in terms of performance and outcome efficacy?

4.4.1. Relationship between Critical Thinking Levels and Attitude towards Teaching for Critical Thinking

A Pearson's correlation analysis was run to examine whether there was a relationship between critical thinking level and attitude towards teaching for critical thinking. As the sample size in this study was greater than 1000, all correlation coefficients exceeding the critical value of .081 given for a sample size of 1000 for two-tailed analyses were regarded as significant, with +1 or -1 being a perfect correlation and values closer to these values indicating stronger correlations.

The possible range on the critical thinking level measure was 1-5, where higher scores indicated a higher level of critical thinking. The possible range on the Attitude Scale toward Teaching for Critical Thinking was 1-6, where scores between 4 and 6 indicated a positive attitude with higher scores indicating stronger positivity and scores ranging between 1 and 3 displayed a negative attitude with lower scores indicating a more negative attitude. There was a significant positive correlation between scores on the critical thinking level measure and those on the attitude to teaching for critical thinking measure, [r = .14, p < .01) with 95% confidence; however, the Pearson's correlation coefficient of .14 is very *weak* and could be considered negligible.

4.4.2. Relationship between Critical Thinking Levels and Self Efficacy Beliefs in Teaching for Critical Thinking

The Pearson's correlation analysis was run to examine the relationship between the critical thinking level measure and the self efficacy beliefs in teaching for critical thinking in terms of (i) performance efficacy and (ii) outcome efficacy. The Pearson's correlation analysis for the relationship between critical thinking level and the variables stated in (ii) and (iii) yielded a significant, but very weak, thus negligible positive correlation coefficients: (i) r = .084, p ‹ .01, and (ii) r = .130, p ‹ .01.

4.4.3. Relationship between Attitude towards Teaching for Critical Thinking and Self Efficacy Beliefs in Teaching for Critical Thinking

The correlation between the mean scores of the Attitude Scale in Teaching for Critical Thinking and those of the Performance Efficacy Subscale yielded a significant positive correlation coefficient of moderate degree [$r = .530$, $p < .01$].

The Pearson's correlation analysis yielded a very weak correlation coefficient [$r = 0.127$, $p < .01$] between the attitude level and outcome efficacy level. Thus, the relationship between these two variables can be considered negligible.

4.5. Results of MANOVA

Multivariate analysis of variance (MANOVA) was run to determine the effect of participants' background variables on the combined dependent variables, namely critical thinking level, attitude towards teaching for critical thinking, and self efficacy level in teaching for critical thinking, which is comprised of two subscales with four factors in the first and three factors in the second subscale. In order to run MANOVA, preliminary analyses were performed to check whether any of the assumptions that MANOVA is based on were violated.

4.5.1. Preliminary Analyses for MANOVA

MANOVA is based on three primary assumptions: (i) that the dependent variables are normally distributed within groups (*multivariate normality*); (ii) that the variances in the different groups of the design are identical (*homogeneity of variances)* and (iii) that the observations were independent of each other (Field, 2005).

4.5.1.1. Univariate and Multivariate Normality

To check for normality, both univariate and multivariate normality tests were performed and the skewness and kurtosis indices together with P-P and Q-Q plots were examined. The skewness indices ranged between -.76 and .68, and kurtosis indices ranged between -2.42 and 1.80. These indices fall within the acceptable range of -3 to 3 for both skewness and kurtosis (Tabachnick & Fidell, 2007). Even though P-P and Q-Q plots showed slight deviations from normality, they were not regarded as violating the normality assumption severely since sample size (N=1076) was large enough to counteract Type I error (Field, 2005).

4.5.1.2. Homogeneity of Variances

Homogeneity of variances is based on the assumption that the dependent variables display equal levels of variance across the variables. Box's *M* tests were used to test for homogeneity of variances.

The Levene's test results have been examined to test the assumption of homogeneity of variance in follow-up ANOVAs.

4.5.1.3. Independence of Observations

Independence of observations was ensured by administering the data collection instruments within the classroom. The respondents were asked to fill out the instruments on their own. The administrators other than the researcher were cautioned to ensure that each respondent filled out the instruments independently.

4.5.2. Results of the Main MANOVA Analyses

A multivariate analysis of variance (MANOVA), which is concerned with examining group differences between groups across multiple dependent variables simultaneously,

was used to explore whether there were any relationship between the participants' background variables and the dependent variables of the study. The alpha level was set at .05 as the critical significance level. The results of MANOVA are presented with the Wilk's Lambda value taken into consideration in the multivariate analyses as it is the most commonly preferred multivariate test statistic (Hair, Anderson, Tatham & Black, 2006). In outputs where significant results were yielded, follow-up ANOVAs were run with the Bonferronni correction being employed as a method for reducing the chances of obtaining type I errors (false-positive errors), which involved dividing the alpha value by the number of comparisons (Field, 2005).

4.5.2.1. Effect of Gender

Multivariate analysis of variance (MANOVA) was run to reveal whether gender created a difference in the main dependent variables (DVs) of the study: (i) pre-service teachers' critical thinking levels, (ii) their attitude towards teaching for critical thinking, (iii) their self efficacy beliefs in terms of performance efficacy in teaching for critical thinking and (iv) their self efficacy beliefs in terms of outcome efficacy in teaching for critical thinking. The analysis did not yield a significant difference across the dependent variables [Wilk's λ= .99, F(4, 995) = 4.99, $p > .05$, η^2=.02.]

MANOVA for the Four Factors of the Attitude Scale Towards Teaching for Critical Thinking (ASTCT) by Gender

MANOVA yielded a significant result for the combined four factors of ASTCT (F_1: Attitude towards critical thinking, F_2: Biases towards critical thinking, F_3: Resistance in teaching for critical thinking, and F_4: Attitude towards teaching critical thinking instruction and assessment) by gender [*Wilk's* λ = .98, $F(4, 995) = 4.99$ $p < .05$, η^2=.02] (Table 4.7).

Table 4.7. *MANOVA for the ASTCT Factors by Gender*

Effect	**λ**	**F**	**df1**	**df2**	**p**
Gender	.98	4.99	4	995	.00*

*p< .05

Therefore, univariate analyses were conducted, during which Bonferroni correction was administered by setting the alpha level at .0125 (.05 divided by the number of DVs) to control for type I error. The results of the univariate analysis indicated that there was a significant difference between the two sexes in favour of females for the first factor (F_1: attitude towards critical thinking) [F(1, 1059)= 9.03, p < 0.0125] and the fourth factor (F_4: attitude towards critical thinking instruction and assessment*)* [F(1, 1043) = 16.50 p < 0.0125], while the results yielded no significant difference between males and females in terms of the other two factors: F_2: biases towards critical thinking [F(1, 1049) = .86, p> 0.01] and F_3: resistance in teaching for critical thinking [F(1, 1057) =.50, p > 0.0125] (Table 4.8).

Table 4.8.
ANOVA for the ASTCT Factors by Gender

		SS	df	MS	F	p
F_1	Between Groups	4.522	1	4.522	9.03	.003*
	Within Groups	530.595	1059	.501		
	Total	535.118	1060			
F_2	Between Groups	2.239	1	2.239	.86	.353
	Within Groups	2719.469	1049	2.592		
	Total	2721.708	1050			
F_3	Between Groups	.982	1	.982	.50	.481
	Within Groups	2084.355	1057	1.972		
	Total	2085.337	1058			
F_4	Between Groups	7.397	1	7.397	19.41	.000*
	Within Groups	397.547	1043	.381		
	Total	404.943	1044			

*p< .01

MANOVA for the Four Factors of the Performance Efficacy Subscale of the Self Efficacy scale (SESTCT) by Gender

MANOVA was also run to investigate the relationship between gender and the factors of the performance subscale of SESTCT. The multivariate Wilks' Lambda test for the four factors of performance efficacy (F_1: Self efficacy in content and learning for CT instruction, F_2: self efficacy in planning for CT instruction, F_3: self efficacy in CT instruction and assessment and F_4: self efficacy in overcoming obstacles in CT instruction) yielded a significant result [Wilks' λ= .98, $F(4, 995) = 4.99$, $p < .05$, η^2=.015]. However, the follow-up ANOVAs did not show significant results for any of the factors of the performance efficacy subscale of SESTCT (Table 4.9).

Table 4.9.

MANOVA for SESTCT-Performance Efficacy Subscale by Gender

Effect	**λ**	**F**	**df1**	**df2**	**p**
Gender	.98	4.99	4	995	.00*

p< .05

MANOVA for the Factors of the Outcome Efficacy Subscale of the Self Efficacy Scale (SESTCT) by Gender

A multivariate analysis was also run to explore the relationship between gender and the three factors of SESTCT-Outcome Efficacy subscale (F_1: Outcome efficacy in teaching for critical thinking metacognitive skils, F_2: Outcome efficacy in teaching for critical thinking cognitive skills, F_3: Outcome efficacy in teaching for critical thinking dispositions) No significant result was yielded [Wilks' λ=.99, $F(3, 983) = 1.15$, $p > .05$, η^2=.004].

4.5.2.2. Effect of Major

In order to determine whether there was any relationship between participants' major and the combined dependent variables (DVs), multivariate analysis of variance (MANOVA) was conducted. Significant differences were found among the four groups of participants from four different groups of major (Maths-Sciences Education, Social Sciences Education, Foreign Language Education and Turkish Language Education), [Wilks' λ=.14, F (9, 993)=6.08, $p < .05$, η^2=.028] (Table 4.10).

Table 4.10.

MANOVA for DVs by Major

Effect	**λ**	**F**	**df1**	**df2**	**p**
Major	7.62	7.62	9	993	.00*

*p<.05

The follow-up univariate analyses (ANOVA) yielded significant F values for (i) attitude towards teaching for critical thinking [F(3, 997)=5.02, p< .0125] and (ii) outcome efficacy in teaching for critical thinking [F(3, 984)=18.91, p< .0125]. No impact of major was observed on the participants' critical thinking level or their performance efficacy beliefs in teaching for critical thinking (Table 4.11).

4.11. *ANOVA for DVs by Major*

		SS	df	MS	F	p
SESTCT-Performance Efficacy	Between Groups	3.79	3	1.26	2.54	.056
	Within Groups	480.65	966	.50		
	Total	484.44	969			
SESTCT-Outcome Efficacy	Between Groups	26.82	3	8.94	18.91	.000*
	Within Groups	465,043	984	.47		
	Total	491.860	987			
Critical Thinking Level	Between Groups	1.435	3	.478	2.60	.051
	Within Groups	197.395	1072	.18		
	Total	198.830	1075			
Attitude	Between Groups	10.38	3	3.46	5.02	.002*
	Within Groups	687.56	997	.69		
	Total	697.93	1000			

*p<.0125

As a follow-up to the significant ANOVA results, post hoc multiple comparison analyses were performed. With respect to attitude towards teaching for critical thinking, a significant difference was observed between (i) maths-science teacher education [*M*=4.45, *SD*=.63, *n*= 241] and social sciences teacher education [*M*=4.40, *SD*=.75, *n*= 236] and between (ii) maths-science teacher education [*M*=4.45, *SD*=.63, *n*= 241] and Turkish language teacher education [*M*=4.33, *SD*=.69, *n*= 168] in favour of maths-sciences teacher candidates. The mean and standard deviations derived from the attitude scale for these groups are presented in Table 4.12.

Table 4.12. *Descriptive Statistics ASTCT by Major*

Major	***M***	***SD***	***N***
Maths-science teacher educ.	4.45	.63	241
Social sciences teacher educ.	4.40	.75	236
Turkish language teacher educ.	4.33	.69	168

As for outcome efficacy level in teaching for critical thinking, the post hoc multiple comparison analyses yielded significant mean differences for all groups by major, with Turkish language teacher candidates scoring the highest [*M*=4.13, *SD*=.73, *n*= 168] and the maths-sciences teacher candidates [*M*=3.64, *SD*=.64, *n*= 241] scoring the lowest mean values among the four groups. The mean and standard deviation values are presented in Table 4.13.

Table 4.13. *Descriptive Statistics for SESTCT- Outcome Efficacy by Major*

Major	***M***	***SD***	***N***
Maths-science teacher education	3.64	.64	241
Social sciences teacher education	3.89	.72	236
Turkish language teacher education	4.13	.73	168
Foreign language teacher education	3.87	.72	255

MANOVA for the Four Factors of the Attitude Scale (ASTCT) by Major

The multivariate *F* test yielded a significant result for the combined four factors of ASTCT by major [Wilk's $\lambda = .91$, $F(12, 999) = 7.78$, $p < .05$, $\eta^2 = .03$] (Table 4.14).

Table 4.14.

MANOVA for ASTCT Factors by Major

Effect	**λ**	**F**	**df1**	**df2**	**p**
Major	.91	7.78	12	999	.00*

*$p<.05$

As a follow-up, a one-way analysis of variance (ANOVA) was conducted with Bonferroni correction. As can be observed in Table 4.15, the analysis resulted in a statistically significant difference between the groups with respect to all four factors (F_1: attitude towards critical thinking; F_2: biases towards critical thinking; F_3: Resistance in teaching for critical thinking; F_4: attitude towards critical thinking instruction and assessment).

4.15. *ANOVA for ASTCT Factors by Major*

		SS	df	MS	F	p
Attitude to critical thinking	Between Groups	12.70	3	4.23	8.57	.00*
	Within Groups	522.45	1058	.49		
	Total	535.15	1061			
Attitude to critical thinking instruction and assessment	Between Groups	8.68	3	2.89	7.60	.00*
	Within Groups	396.53	1042	.38		
	Total	405.20	1045			
Biases towards critical thinking	Between Groups	108.78	3	36.26	14.50	.00*
	Within Groups	2620.25	1048	2.50		
	Total	2729.02	1051			
Resistance in teaching for critical thinking	Between Groups	66.64	3	22.21	11.58	.00*
	Within Groups	2026.48	1056	1.92		
	Total	2093.12	1059			

*$p<.0125$

In order to determine which groups significantly differed from each other, post-hoc multiple comparison tests were performed. The post-hoc tests demonstrated that the mean values of maths-science pre-service teachers for the first factor (attitude towards critical thinking) [*M*= 5.03, *SD*=.70, *n*=292] and the fourth factor (attitude towards critical thinking instruction and assessment) [*M*=5.09, *SD*=.61, *n*=289] were significantly lower than those of all the other three groups: social sciences [F_1: *M*=5.25, *SD*=.69, *n*= 284; F_4: *M*= 5.31, *SD*= .59, *n*= 278], foreign language (F_1: *M*=5.3, *SD*= .76, n= 287; F_4: *M*= 5.29, *SD*=.70, n= 284), Turkish language [F_1: *M*=5.25, *SD*=.66, *n*= 199; F_4: *M*= 5.25, *SD*=.72, *n*= 195] (Table 4.16).

Table 4.16. *Descriptive Statistics for ASTCT Factor 1 and 2 by Major*

	F_1: Attitude Towards Critical Thinking			**F_4: Attitude Towards Teaching for Critical Thinking**		
Major	**M**	**SD**	**N**	**M**	**SD**	**N**
Maths-Science	5.03	.70	292	5.09	.61	289
Social Sciences	5.25	.69	284	5.31	.59	278
Foreign Language	5.3	.76	287	5.29	.70	284
Turkish Language	5.25	.66	199	5.25	.72	195

4.5.2.3. Effect of Academic Achievement

A multivariate analysis (MANOVA) was conducted to investigate the impact of academic success, measured by CGPA on all four dependent variables (DVs). It was found that academic achievement had a significant impact on the combined dependent variables [Wilk's λ=.95, $F(12, 2161)=3.76$, $p < 0.05$, η^2=.018] (Table 4.17).

Table 4.17.

MANOVA for DVs by CGPA

Effect	**λ**	**F**	**df1**	**df2**	**p**
CGPA	.94	3.76	12	2161	.00*

*p<.05

The follow-up univariate analysis (ANOVA) results revealed that CGPA scores created a significant difference in pre-service teachers' attitudes towards teaching for critical thinking [F(3, 971)=6.10, p< .01, η^2 = .026], and outcome efficacy beliefs in teaching for critical thinking [F(3, 959)=6.83, p< .01,η^2 = .023] (Table 4.18).

Table 4.18.

ANOVA for DVs by CGPA

		SS	df	MS	F	p
Attitude	Between Groups	12.69	3	4.23	6.10	.00*
	Within Groups	673.14	971	.69		
	Total	685.83	974			
Performance Efficacy	Between Groups	1.63	3	.54	1.07	.36
	Within Groups	475.73	942	.51		
	Total	477.36	945			
Outcome Efficacy	Between Groups	9.90	3	3.30	6.83	.00*
	Within Groups	463.23	959	.4 8		
	Total	473.12	962			
Critical Thinking Level	Between Groups	1.31	3	.44	2.38	.07
	Within Groups	192.01	1043	.18		
	Total	193.32	1046			

*p<.01

As a follow-up to the significant ANOVA results, post hoc multiple comparison analyses were performed. It was observed that there was a significant difference in mean scores between pre-service teachers with CGPA scores falling within the range of 3.50-4.00 [*M*=4.41, *SD*=.87, *n*=85] and those who held a CGPA score in any of the other three groups of scores with respect to level of attitude towards teaching for critical thinking (Table 4.19).

Table 4.21. *Descriptive Statistics for ASTCT by CGPA*

CGPA	***M***	**SD**	**N**
3.50-4.00	4.41	.87	85
3.00-3.49	4.76	.86	294
2.00-2.99	4.84	.81	416
Below 2.00	4.99	.67	29

A significant difference in mean scores between teacher candidates with CGPA scores falling within the range of 3.50-4.00 [*M*=.4.14, *SD*=.68, *n*=85] and those who held a CGPA score in any of the other three groups of scores was also observed with respect to outcome efficacy level in teaching for critical thinking (Table 4.20).

Table 4.20. *Descripive Statistics for SESTCT-Outcome Efficacy by CGPA*

CGPA	***M***	***SD***	**N**
3.50-4.00	4.14	.68	85
3.00-3.49	3.88	.72	294
2.00-2.99	3.82	.71	416
Below 2.00	3.60	.62	29

MANOVA for the Factors of the Attitude Scale towards Teaching for Critical Thinking (ASTCT)

The multivariate F test yielded a significant result indicating that academic achievement measured by CGPA was, overall, influential on the combined factors of ASTCT [Wilks' λ= .95, F(12, 990)= 4.59, $p < .05$, η^2=.019] (Table 4.21).

Table 4.21

MANOVA for ASTCT Factors by CGPA

Effect	**λ**	**F**	**df1**	**df2**	**p**
CGPA	.95	4.59	12	990	.00*

*p<.05

The follow-up ANOVAs indicated that there were significant differences across the groups in terms of the second and third factors of ASTCT: biases towards critical thinking [F(3, 1020)= 11.20, $p < .0125$] and resistance in teaching for critical thinking [F(3, 1029)= 12.52, $p < .0125$].

4.22. *ANOVA for ASTCT Factors by CGPA*

		SS	df	MS	F	p
F_1	Between Groups	3.58	3	1.19	2.35	.07
	Within Groups	523.70	1029	.51		
	Total	527.29	1032			
F_2	Between Groups	2.67	3	.89	2.29	.08
	Within Groups	393.9	1015	.39		
	Total	396.67	1018			
F_3	Between Groups	85.86	3	28.62	11.19	.00*
	Within Groups	2607.60	1020	2.56		
	Total	2693.47	1023			
F_4	Between Groups	72.56	3	24.19	12.52	.00*
	Within Groups	1987.56	1029	1.93		
	Total	2060.12	1032			

The post-hoc multiple comparisons revealed that there was a significant difference between the first group with a CGPA between 3.50-4.00 [*M*=3.59, *SD*= 1.84, *n*= 98] and all the other groups for *biases towards critical thinking* as can be seen in Table 4.23.

Table 4.23. *Descriptive Statistics for Biases towards Critical Thinking by CGPA*

CGPA	M	SD	N
3.50-4.00	3.59	1.84	98
3.00-3.49	4.26	1.69	379
2.00-2.99	4.52	1.53	511
Below 2.00	4.95	1.07	36

Similarly, there was a significant difference between the first group with a CGPA between 3.50-4.00 [*M*=3.59, *SD*= 1.64, *n*= 99] and all the other groups for *biases towards critical thinking* as can be seen in Table 4.26.

Table 4.24.

Descriptive Statistics for Resistance in Teaching for Critical Thinking by CGPA

CGPA	M	SD	N
3.50-4.00	3.59	1.64	99
3.00-3.49	4.20	1.48	380
2.00-2.99	4.42	1.34	519
Below 2.00	4.87	.89	35

MANOVA for the Factors of the Self Efficacy Scale in Teaching for Critical Thinking (SESTCT)- Performance Efficacy Subscale

The multivariate F test yielded a non-significant result indicating that academic achievement measured by CGPA was not influential on the combined subscales of SESTCT-Personal Efficacy [Wilks' λ= .98, $F(12, 2484)= 1.88$, $p > .05$, $\eta^2=.008$].

MANOVA for Factors of the Self Efficacy Scale in Teaching for Critical Thinking (SESTCT)-Outcome Efficacy Subscale

The multivariate F test yielded a significant result indicating that academic achievement measured by CGPA was, overall, influential on the combined subscales of the Outcome Efficacy subscale of SESTCT [Wilks' λ= .97, $F(9, 1011)= 2.80$, $p < .05$, $\eta^2=.009$] (Table 4.25).

Table 4.25.

MANOVA for SESTCT-Outcome Efficacy Factors by CGPA

Effect	**λ**	**F**	**df1**	**df2**	**p**
CGPA	.97	2.80	9	1011	.003*

$p < .05$

The follow-up ANOVAs indicated that there were significant differences across the groups in terms of all the factors of the Outcome Efficacy subscale of SESTCT (Table 4.26).

Table 4.26.

ANOVA for SESTCT-Outcome Efficacy Factors by CGPA

		SS	df	MS	F	p.
Metacognitive skills	Between Groups	13.18	3	4.39	5.90	.001*
	Within Groups	768.12	1032	.74		
	Total	781.30	1035			
Cognitive skills	Between Groups	10.06	3	3.36	6.61	.00*
	Within Groups	509.93	1005	.51		
	Total	519.99	1008			
Dispositions	Between Groups	9.12	3	3.04	5.67	.01
	Within Groups	534.73	997	.54		
	Total	543.85	1000			

*p<.01

The post-hoc multiple comparisons revealed that there was a significant difference between those who held a CGPA falling between the range of 3.50-4.00 and those who held a CGPA between 2.00-3.00 and below 2.0 for all the factors of the Outcome Efficacy subscales: outcome efficacy in teaching for metacognitive critical thinking skills, outcome efficacy in teaching for cognitive critical thinking skills, and outcome efficacy in teaching for critical thinking disposition.(Table 4.27).

Table 4.27.

Descriptive Statistics for SESTCT-Outcome Efficacy Factors by CGPA

CGPA	M	SD	N
3.50-4.00	4.41	.87	85
3.00-3.49	4.76	.86	294
2.00-2.99	4.84	.81	416
Below 2.00	4.99	.67	29

4.5.2.4. Effect of High School Background

To examine whether high school background, i.e. type of high school attended, made any difference across the dependent variables, analysis of variance (MANOVA) was conducted. It was found that the type of high school attended had a significant effect on the combined dependent variables [Wilk's λ, .97, $F(12, 1024)= 2.50$, $p < .05$, $\eta^2=.016$] (Table 4.28).

Table 4.28.

MANOVA for DVs by High School Background

Effect	λ	F	df1	df2	p
Type of High School	.97	2.50	12	1024	.004*

$p < .05$

The follow-up ANOVA results showed that high school background created a significant difference in mean scores of attitude towards teaching for critical thinking (Table 4.29).

Table 4.29.

ANOVA for DVs by High School Background

		SS	df	MS	F	p
Attitude	Between Groups	14.78	6	2.46	3.59	.02*
	Within Groups	680.25	991	.69		
	Total	695.03	997			
Performance Efficacy	Between Groups	6.02	6	1.00	2.02	.06
	Within Groups	477.16	960	.50		
	Total	483.18	966			
Outcome Efficacy	Between Groups	6,89	6	1,15	2,33	.03
	Within Groups	482.46	978	.49		
	Total	489.35	984			
Critical Thinking Level	Between Groups	1.571	6	.26	1.42	.21
	Within Groups	197.01	1066	.19		
	Total	198.58	1072			

*p<.01

With respect to attitude towards teaching for critical thinking, the follow-up pairwise comparisons indicated that there was a significant mean difference between Super High School graduates and Anatolian or Teacher Training High School graduates. Respondents who had attended Super High Schools scored significantly higher mean scores (*M*=5.02, *SD*=.74, n=176) than those who had attended Anatolian High Schools (*M*=4.67, *SD*=.88, *n*= 163) or Teacher Training High Schools (*M*=4.68, *SD*=.88, *n*=216), which indicates that Super High School graduates have a more positive attitude towards teaching for critical thinking (Table 4.30).

Table 4.30.

Descriptive Statistics for High School Background

Type of High School Attended	M	SD	N
Super High School	5.02	.74	176
Anatolian High School	4.67	.88	163
Teacher Training High School	4.68	.88	216

MANOVA for ASTCT Factors

The multivariate F test yielded a significant result indicating that the type of high school attended was, overall, influential on the combined factors of ASTCT [Wilks' λ= .95, F(24, 3447)= 2.33, $p < 0.05$, η^2=.014] (Table 4.34.)

Table 4.31.

MANOVA for ASTCT Factors by High School Background

Effect	λ	F	df1	df2	p
High School Background	.95	2.33	24	3447	.004*

*$p < .05$

The follow-up ANOVAs indicated that there were significant differences between the groups who had attended different types of high school in terms of biases towards critical thinking [$F(6, 1042) = 5.07$, $p < 0.0125$] (Table 4.32).

4.32.
ANOVA for ASTCT Factors by High School Background

		SS	df	MS	F	p
Attitude towards critical thinking	Between Groups	6.77	6	1.13	2.26	.035
	Within Groups	524.98	1052	.49		
	Total	531.76	1058			
Attitude to critical thinking instruction and assessment	Between Groups	4.29	6	.716	1.85	.086
	Within Groups	400.18	1036	.386		
	Total	404.47	1042			
Biases towards critical thinking	Between Groups	77.06	6	12.84	5.06	.000*
	Within Groups	2640.09	1042	2.53		
	Total	2717.15	1048			
Resistance in teaching for critical thinkling	Between Groups	48.83	6	8.14	4.21	.099
	Within Groups	2028.78	1050	1.93		
	Total	2077.62	1056			

*p<.01

The post-hoc multiple comparisons revealed that there was a significant difference between Anatolian high school graduates (*M*= 4.01, *SD*= 1.85, *n*=172) and Super High School graduates (*M*= 4.62, *SD*= 1.29, *n*=181) with respect to biases towards critical thinking (Table 4.33).

Table 4.33.

Descriptive Statistics for Biases towards Critical Thinking by High School Background

High School Background	***M***	***SD***	**N**
Super High School	4.62	1.29	181
Anatolian High School	4.01	1.85	172

MANOVA for the Factors of SESTCT- Performance Efficacy Subscale

The multivariate F test yielded a nonsignificant result indicating that the type of high attended had no influence over the subscales of performance efficacy [Wilks' λ= .98, $F(24, 3339)= .98$, $p > .05$, $\eta^2=.006$].

MANOVA for the Factors of SESTCT- Outcome Efficacy Subscale

The multivariate F test yielded a nonsignificant result indicating that the type of high attended had no influence over the factors of performance efficacy [Wilks' λ= .97, F(18, 2761)= 1.77, p > .05, η^2=.011].

4.5.2.5. Effect of Parents' Level of Education

A factorial multivariate analysis of variance (MANOVA) was run to reveal whether the level of education of pre-service teachers' mother and father created a difference in their critical thinking levels, their attitude towards teaching for critical thinking, and their sense of performance efficacy and outcome efficacy in teaching for critical thinking. The analysis yielded insignificant results, indicating that the education level of neither the mother [Wilks' λ= .98, F(16, 2481)= 1.28, p > .05, η^2=.006] nor the father [Wilks' λ= .98, F(20, 2694)= .98, p > .05, η^2=.006] created a significant difference across the dependent variables.

MANOVA for ASTCT Factors by Parents' Level of Education

The multivariate F test showed that there was a significant association between the father's education level and attitude towards teaching for critical thinking [Wilks' λ= .96, F(20, 1034)= 1.88, p < .05, η^2=.09], while no significant relationship was found between the mother's education and the ASTCT factors [Wilks' λ= .96, F(16, 1011)= 1.51, p > .05, η^2=.02] (Table 4.34).

Table 4.34.

MANOVA for ASTCT Factors by Parents' Level of Education

Effect	λ	F	df1	df2	p
Mother's Educational Level	.96	1.51	16	1011	.09
Father's Educational Level	.96	1.88	20	1034	.01*
Mother*Father's Educational Level	.92	1.20	68	1013	.12

*p < 0.01

However, the follow-up ANOVAs indicated that there were no significant differences between the father's level of education with respect to the factors of ASTCT.

MANOVA for Factors of SESTCT-Performance Efficacy by Parents' Level of Education

The multivariate F test showed that no significant relationship was found between mothers or fathers' education and the factors of the Performance Efficacy subscale of SESTCT [Wilks' λ= .98, $F(16, 2957)= 1.51$, $p > .05$, $\eta^2=.006$]

MANOVA for Factors of SESTCT-Outcome Efficacy by Parents' Level of Education

The multivariate F test showed that no significant relationship was found between mothers or fathers' education and the subscales of the Outcome Efficacy dimension of SESTCT [Wilks' λ= .96, $F(14, 2876)= 1.23$, $p > .05$, $\eta^2=.004$].

4.5.2.6. Effect of Reading Behaviour

A factorial MANOVA was conducted to examine whether the per-service teachers' reading behaviour created any difference across the dependent variables (DVs). Amount of reading was measured by two factors: frequency of reading newspapers per week and number of books read per month. The analysis yielded a significant result for amount of books read [Wilk's $\lambda = .99$, $F(12, 2153) = .85$, $p < .05$, $\eta^2 = .012$]; however, the frequency of reading a newspaper per week did not yield a significant result, [Wilk's $\lambda = .97$, $F(12, 2153) = 2.42$, $p > .05$, $\eta^2 = .04$] nor did the combined effect of reading books and newspapers [Wilk's $\lambda = .95$, $F(36, 3052) = 1.07$, $p > .05$, $\eta^2 = .012$] (Table 4.35).

Table 4.35.

MANOVA for DVs by Reading Behaviour

Effect	**λ**	**F**	**df1**	**df2**	**p**
Reading newspapers	.97	2.42	12	2153	.12
Reading books	.99	.85	12	2153	.004*
Reading books*newspapers	.95	1.07	36	3052	.012

*p<.05

The follow-up ANOVA indicated that number of books read per month had an impact on (i) attitude towards teaching for critical thinking and (ii) outcome efficacy beliefs in teaching for critical thinking (Table 4.36).

Table 4.36.
ANOVA for DVs by Reading Behaviour

		SS	df	MS	F	p
Attitude	Between Groups	8.07	3	2.690	3.90	.01
	Within Groups	681.48	988	.690		
	Total	689.55	991			
Performance Efficacy	Between Groups	1.57	3	.524	1.05	.37
	Within Groups	476.74	957	.498		
	Total	478.32	960			
Outcome Efficacy	Between Groups	16.86	3	5.622	11.64	.00*
	Within Groups	470.81	975	.483		
	Total	487.67	978			
Critical Thinking Level	Between Groups	.29	3	.098	.53	.66
	Within Groups	197.75	1063	.186		
	Total	198.04	1066			

*p<.01

The follow-up post hoc tests revealed that teacher candidates who read more than 4 books a month had a significantly more positive attitude and a higher level of outcome efficacy in teaching for critical thinking than those who read 1-2 books per month or no books at all (Table 4.16).

Table 4.37. *Descriptive Statistics for ASTCT and SESTCT- Outcome Efficacy by Reading Books*

	Attitude towards Teaching for Critical Thinking			**Sense of Outcome Efficacy in Teaching for Critical Thinking**		
No of books read per month	***M***	***SD***	**N**	***M***	***SD***	**N**
More than 4	4.90	.23	59	4.33	.19	59
3-4	4.80	.14	105	3.93	.12	105
1-2	4.56	.04	570	3.85	.04	570
None	4.32	.09	99	3.56	.08	99

MANOVA for the ASTCT Factors

The multivariate F test yielded a significant result indicating that the number of books read per month was, overall, influential on the combined factors of ASTCT [Wilks' λ= .97, $F(12, 1034)= 2.29$, $p < 0.05$, $\eta^2=.009$] (Table 4.38).

Table 4.38. *MANOVA for ASTCT by Reading Books*

Effect	**λ**	**F**	**df1**	**df2**	**p**
Reading books	.97	2.29	12	1034	.01*

* $p < 0.05$

The follow-up ANOVAs indicated that there were significant differences between those who read more than 4 books, 3-4 books, 1-2 books per month and who did not read any books other than their textbooks in terms of biases towards critical thinking [$F(3, 1039) = 4.54$, $p < .0125$] and resis39nce in teaching for critical thinking [$F(3, 1047) = 4.27$, $p < .0125$] (Table 4.39).

Table 4.39. *ANOVA for ASTCT Factors by Reading Books*

		SS	df	MS	F	p
F_1	Between Groups	1.12	3	.37	.724	.538
	Within Groups	532.47	1049	.51		
	Total	533.59	1052			
F_2	Between Groups	1.92	3	.66	1.707	.164
	Within Groups	399.62	1033	.37		
	Total	401.64	1036			
F_3	Between Groups	34.95	3	11.65	4.539	.004*
	Within Groups	2667.79	1039	2.56		
	Total	2702.75	1042			
F_4	Between Groups	25.00	3	8.33	4.274	.005*
	Within Groups	2041.73	1047	1.95		
	Total	2066.74	1050			

*p<.01

The post-hoc multiple comparisons revealed that there was a significant difference between those who read 3-4 books per month [*M*= 4.62, *SD*= 1.29, n=138] and those who did not read at all [*M*= 4.01, *SD*= 1.85, *n*=139] with respect to biases towards critical thinking (Table 4.40). However, no significant mean difference was yielded for resistance in teaching for critical thinking even though the ANOVA result for this dependent variable was significant.

Table 4.40.

Descriptive Statistics for Reading Books

Number of Books Read/Month	***M***	***SD***	**N**
3-4	4.62	1.29	138
None	4.01	1.85	139

MANOVA for the Factors of SESTCT- Performance Efficacy Subscale

The multivariate F test yielded a nonsignificant result indicating that the number of books read per month was not influential on the factors of SESTCT- Performance Efficacy subscale [Wilks' λ= .98, $F(12, 2524)= 1.27$, $p > 0.05$, η^2=.005].

MANOVA for the subscales of SESTCT- Outcome Efficacy

The multivariate F test yielded a significant result indicating that the number of books read per month was, overall, influential on the combined subscales of SESTCT-Outcome Efficacy subscale [Wilks' λ= .96, $F(9, 2368)= 4.25$, $p < .05$, η^2=.013] (Table 4.41).

Table 4.41.

MANOVA for SESTCT-Outcome Efficacy by Reading Books

Source	λ	F	df1	df2	p
Reading books	.96	4.25	9	2368	.00*

*$p < .05$

The follow-up ANOVAs for number of books read per month revealed significant differences between the groups for all the subscales: (i) outcome efficacy in teaching for critical thinking metacognitive thinking skills [$F(3, 1052)= 8.62$, $p < 0.016$] (ii) outcome efficacy in teaching for critical thinking cognitive skills [$F(3, 1022)= 8.22$, $p < 0.016$] and (iii) outcome efficacy in teaching for critical thinking dispositions [$F(3, 1016)= 10.71$, $p < 0.016$] (Table 4.42).

Table 4.42.

ANOVA for SESTCT-Outcome Efficacy Factors by Reading Books

		SS	df	MS	F	p
metacognitive skills	Between Groups	1918	3	6.39	8.60	.00*
	Within Groups	78147	1052	.74		
	Total	80066	1055			
cognitive	Between Groups	12.62	3	4.20	8.26	.00*
	Within Groups	523.47	1022	.51		
	Total	536.09	1025			
dispositions	Between Groups	17.23	3	5.74	10.74	.00*
	Within Groups	544.68	1016	.53		
	Total	561.91	1019			

*p<.01

The post-hoc multiple comparisons indicated that those who did not read any books scored significantly lower means than those who read 1-2 books, 3-4 books, and more than 4 books for all the factors making up the outcome efficacy subscale of self efficacy in teaching for critical thinking (Table 4.43.).

Table 4.43.

Descriptive Statistics for SESTCT-Outcome Efficacy by Reading Books

		M	SD	N
metacognitive skills	None	3.99	.79	137
	1-2	3.77	.87	703
	3-4	3.87	.88	141
	More than 4	4.01	.79	75
	Total	3.74	.87	1056
cognitive skills	None	3.65	.64	134
	1-2	3.85	.72	683
	3-4	3.92	.75	136
	More than 4	4.10	.62	73
	Total	3.28	.72	1030
dispositions	None	3.36	.67	132
	1-2	3.44	.75	684
	3-4	4.06	.71	134
	More than 4	4.57	.68	70
	Total	3.91	.74	1020

4.5.2.7. Effect of Motivation towards Teaching

MANOVA was run to reveal whether pre-service teachers' level of motivation influenced their critical thinking levels, their attitude towards teaching for critical thinking, and their level of self efficacy in critical thinking in terms of performance and outcome efficacy.

Pre-servie teachers' level of motivation to teach did not have a significant impact upon the dependent variables [Wilk's $\lambda = .99$, $F(6, 1780) = 1.72$, $p > .05$, $\eta^2 = .006$].

MANOVA for ASTCT Factors by Motivation Level

Level of motivation towards teaching [Wilk's λ= .99, $F(12, 2593) = .87$, $p > .0$, $\eta^2 = .004$] did not yield significant differences in the mean scores of the factors of ASTCT.

4.5.2.8. Effect of Prior Formal Training in Critical Thinking

To determine whether prior formal training in critical thinking (CT) created a significant difference on any of the main dependent variables of the study (DVs), a multivariate analysis was conducted. The MANOVA results proved to be significant [Wilk's λ= .98, $F(4, 831) = 4.03$, $p < .05$ with $\eta^2 = .019$] (Table 4.44).

Table 4. 44.

MANOVA for DVs by Prior Training in CT

Source	**λ**	**F**	**df1**	**df2**	**p**
Prior training in CT	.98	4.03	4	831	.006*

*p<.05

The follow-up ANOVA revealed that those who had received instruction in teaching for critical thinking had a significantly higher level of self efficacy in the dimension of performance efficacy [$F(1, 6.37)=13.12$ with $\eta^2 = .015$]. No statistical significance was observed on the other dependent variables (Table 4.45).

Table 4.45. *ANOVA for DVs by Prior Training in CT*

		SS	df	MS	F	p
Attitude	Between Groups	.400	1	.40	.58	.45
	Within Groups	688.49	991	.70		
	Total	688.89	992			
Performance	Between Groups	6.48	1	6.48	13.18	.00*
Efficacy	Within Groups	471.14	959	.49		
	Total	477.62	960			
Outcome Efficacy	Between Groups	1.77	1	1.77	3.57	.60
	Within Groups	483.46	978	.494		
	Total	485.23	979			
Critical Thinking	Between Groups	.00	1	.00	.00	.99
Level	Within Groups	197.56	1065	.19		
	Total	197.56	1066			

*p<.025

When the mean scores of those who had reported having received training [M=3.94, SD=.73, N=169] and those who had not [M=3.84, SD=.71,N=723], it could be observed that those having received training had a slightly higher mean score on the personal efficacy dimension of the self efficacy scale.

4. 6. Summary

Three main analyses were run to answer the research questions of the study: descriptive, bivariate Pearson's correlation and MANOVA.

The descriptive analyses revealed that pre-service teachers had a 'below-average' level of critical thinking. However, their attitude towards teaching for critical thinking was moderately positive and they had an average level of efficacy in teaching for critical thinking.

The correlation between these three variables was examined. There was a positive but weak correlation between critical thinking and the other two variables- attitude and self efficacy towards teaching for critical thinking. On the other hand, the correlation between attitude towards teaching for critical thinking and self efficacy in teaching for critical thinking was positive and at a moderate level.

Finally, MANOVA analyses were performed to examine the relationship between the participants' background variables and their critical thinking levels, attitudes towards teaching for critical thinking and their self efficacy beliefs in teaching for critical thinking. None of the background variables had any influence on the critical thinking variable. However, certain background variables were influential on attitude towards teaching for critical thinking and/or its factors and on performance and/or outcome efficacy in teaching for critical thinking.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

The purpose of the current study was threefold. The primary purpose was to examine Turkish pre-service teachers' critical thinking levels, their attitudes towards teaching for critical thinking, and their sense of performance and outcome efficacy in teaching for critical thinking. Another aim of the study was to seek whether there was an association between these variables. Finally, the study aimed at revealing whether there was any impact of participants' background variables on their critical thinking level, their attitude towards teaching for critical thinking, their performance and outcome self efficacy level in teaching for critical thinking.

After having reported the results of the analyses towards the purposes mentioned above in the previous chapter, this chapter dwells upon conclusions that can be drawn from the results the study yielded. The chapter ends with the implications of the study in terms of practice and further research.

5.1. Conclusions

Conclusions are drawn from the results this study yielded and discussed in line with the research questions.

5.1.1. Pre-Service Teachers' Critical Thinking Levels

The very first research question this study addressed was as follows: *What are the Turkish pre-service teachers' critical thinking levels?* The Turkish pre-service teachers participating in the present study were found to be at a level of *below average* in critical thinking on a five-level rating scale: *outstanding, good, average, below average, poor* (Appendix B: Grading Rubric of the Critical Thinking Test).

Even though instruments used to measure critical thinking and the operational definitions of varying levels of critical thinking may vary across studies, it can be still be concluded that the finding concerning the pre-service teachers' critical thinking levels in this study are reasonably consistent with the findings of similar studies conducted in Turkey, which reported teacher candidates' critical thinking levels to be at a low level (Akar, 2007; Beşoluk & Önder, 2009; Şen, 2009; Zayıf, 2008). On the other hand, studies that report teacher candidates having *moderate* or *average* level of critical thinking also exist (Dutoğlu & Tuncel, 2008; Küçük, 2007). The variation between *low* to *moderate* critical thinking levels reported in literature can be said to derive from how critical thinking is defined and what is tested in connection to the definition. While critical thinking levels of teacher candidates are more commonly reported to be *low* when the cognitive dimensions were of focus in the instrument used to measure critical thinking, they were reported to be at a *moderate* or *average* level when the disposition dimension of critical thinking was measured by means of inventories where responses were based on respondents' self perceptions (Özmen, 2006).

It can be concluded that being at a 'below-average' level, pre-service teachers cannot think critically at a sufficient level. With respect to the cognitive dimension of critical thinking, they tend to be weak in basing their arguments on unjustified opinions or claims, they tend to draw incorrect or unjustified conclusions from the input available, and they can misinterpret arguments, verbal or graphical information. In addition, considering the dispositions dimension of critical thinking, they tend to engage in

emotional, ego-centric and socio-centric reasoning, they are inclined to maintain or defend their own arguments regardless of the evidence or reasons available, they can ignore alternative viewpoints, they tend not to suspend judgment when necessary, they tend to lack the disposition to question majority opinion or credibility of sources, and they do not tend to question meanings of concepts or purposes of actions before expressing a claim, making an argument or decision.

When such is the case, teacher candidates may not be able to solve problems effectively and make correct decisions in their teaching practices. More importantly, it can be concluded that teachers with a 'below average' level of critical thinking ability may not be able to teach for critical thinking effectively since, as stated in literature, there is a close relationship between teacher's critical thinking ability and the level of performance in teaching for critical thinking in view of the fact that an effective critical thinking instruction necessitates the modeling of the critical thinking skills and dispositions by the teacher (Pierce, 2004). Teachers with an insuffienct level of critical thinking ability would not be able to model critical thinking and, thus, could be ineffective in teaching for critical thinking.

The reason why the pre-service teachers participating in the current study have a below-average level of critical thinking can be attributed to their family background and lack of training in formal education.

It was found and reported in Chapter 3 that approximately half of the participants lived in families where at least one of the parents was a primary school graduate. According to Bordieau (1986), educational outcomes can be determined by cultural capital, which refers to the non-financial social assets, such as education, style of speech, intellect etc., which have an influence upon one's 'habitus', as Bordieau calls it to refer to character and way of thinking. According to Bordieau, individuals usually inherit 'way of thinking' from their families through socialization. However, this does not happen instantaneously but over some period of time. From this the following conclusion can be

drawn: as approximately half of the pre-service teachers that participated in this study have one or both parents who are merely primary school graduates, the finding that these pre-service teachers have a 'below-average' level of critical thinking ability is not surprising, which is based on two assumptions: 1) the more educated one is, the more his/her critical thinking ability is developed and 2) individuals 'inherit' ways of thinking from their social surroundings, the most immediate and influential agent being the family (Bordieau, 1984).

It is widely accepted in literature that 'critical thinking' can be taught and developed through training. Thus, it may not be wrong to state that the educational experiences the participants of this study have undergone may have lacked the objective and/or practice of developing students' critical thinking ability.

5.1.2. Pre-Service Teachers' Attitudes towards Teaching for Critical Thinking

The current study indicates that the Turkish pre-service teachers have a moderately positive attitude towards teaching for critical thinking. The mean scores for the overall attitude scale and for (i) attitude towards critical thinking and (ii) attitude towards critical thinking instruction and assessment were very close, indicating that teacher candidates valued the construct of critical thinking and, in parallel, displayed a positive attitude of moderate degree towards teaching for critical thinking. The mean scores for (i) biases towards critical thinking and (ii) resistance in teaching for critical thinking indicate that the teacher candidates do not hold biased feelings towards critical thinking and do not strongly resist teaching for critical thinking; however, the mean scores exhibit borderline average positive attitude, which may suggest that they can be slightly influenced by negatively worded statements and approaches to critical thinking and to critical thinking instruction.

Though at a moderate level, the positive attitude of the pre-service teachers may derive from the fact that critical thinking has become a popular construct in the field of

education and they may feel that they are expected to value and teach it; in other words, their methodology departmental courses may be implicitly or explicitly enabling teacher candidates to value the construct of critical thinking and instilling in them the notion that critical thinking can be and needs to be taught by infusing it into the course or subject they are to teach. Teacher candidates may not be feeling the need to question what critical thinking is, how and by whom it should be taught and whether it really needs to be taught.

However, it is commonly stated in literature that teacher candidates do tend to have positive attitudes towards the teaching profession, but experience a decline in the positivity of their attitudes once they start teaching professionally after graduating from their departments. Thus, even though studies examining prospective teachers' attitudes towards teaching for critical thinking are not abundant in literature, the finding of a positive attitude in this study is consistent with studies that investigate teacher attitudes towards the teaching profession in general and report a positive attitude.

To conclude, having a positive attitude, teacher candidates can be expected to display effort in teaching for critical thinking as literature indicates that there is a close relationship between a positive teacher attitude and high student achievements since teachers with a positive attitude tend to spend more time and put more effort into planning for their lessons. In addition, they are more open to innovations and new approaches.

However, having a positive attitude does not always guarantee that teaching for critical thinking will be carried out as there is also evidence in literature that faculty who have a positive attitude towards teaching for critical thinking do little within the classrooms in the name of teaching for critical thinking (Tsui, 2001). The underlying reasons may be multiple, varying from lack of time, knowledge and competence for critical thinking instruction to being influenced by other teachers' resistance to teaching for critical thinking (Blondy, 2007; Haas & Keeley, 1998). In brief, it can be expected that pre-

service teachers, who report having a moderate degree of a positive attitude towards teaching for critical thinking, will maintain their positivity and pursue critical thinking instruction; however, their level of positive attitude may decline or despite their moderately positive attitude, they may not be able to pursue critical thinking instruction.

5.1.3. Pre-Service Teachers' Sense of Performance and Outcome Efficacy towards Teaching for Critical Thinking

Teachers' sense of efficacy in teaching for critical thinking was measured by means of a Self Efficacy Scale with two subscales. The first subscale measured the participants' performance efficacy level and the second subscale measured the outcome efficacy level.

Teachers' overall sense of performance efficacy in teaching for critical thinking was found to be 'average'. Considering the four subscales of the personal efficacy scale, teacher candidates felt more efficacious in personal efficacy and critical thinking instruction and assessment; however, they felt less capable in planning for critical thinking instruction and handling obstacles for critical thinking instruction. Feeling less efficacious in planning for critical thinking instruction than in (i) critical thinking content and learning and (ii) critical thinking instruction and assessment seem conflicting. The teacher candidates feel that they know or can learn about critical thinking and can implement instructional and assessment strategies in compliance with critical thinking methodology; however, they feel less efficacious in preparing material, lesson plans and assessment tools. In terms of planning, teacher candidates may be feeling insecure about constructing materials and student assessment tools to be used for critical thinking instruction. Implementing instructional strategies and assessing students for critical thinking competency may be considered independent of preparing material and assessment tools.

As for their sense of outcome efficacy, they felt slightly above average in their capability of enhancing students' metacognitive skills, cognitive skills and dispositions in thinking critically. Among the three dimensions of critical thinking, teacher candidates had the highest self efficacy level in teaching for critical thinking dispositions, while they possessed the lowest self efficacy level in teaching for metacognitive skills in critical thinking. More specifically, teacher candidates may believe that they can have a more influential impact on students' tendencies and habits, which make up the dispositional dimension of critical thinking, than on students' self regulatory skills that constitute the metacognitive dimension of critical thinking.

Based on the findings regarding teacher candidates' sense of efficacy in teaching for critical thinking, it can be claimed that teacher candidates do believe that they can pursue instruction for critical thinking; however, their level of self-efficacy is not very high. This can be derived from the fact that they may have some knowledge or idea in teaching for critical thinking, but lack the experience in doing so. Given that "teachers' efficacy beliefs appear to affect the effort teachers invest in teaching, their level of aspiration and the goals they set" (Hoy & Spero, 2005), it can be concluded that the pre-service teachers participating in the current study may put effort into and display intention to teach for critical thinking. However, research evidence also shows that there may be a mismatch between what teachers believe to be critical thinking and their abilities to promote it within the classroom (Adams, 1999; Brunt, 2005; Hickamn, 1993; Mundy & Denham, 2008).

5.1.4. Relationship between Pre-Service Teachers' Critical Thinking Levels, Attitudes, and Self Efficacy Levels in Teaching for Critical Thinking

A moderate correlation was found between pre-service teachers' attitudes towards and the performance efficacy dimension of self efficacy in teaching for critical thinking. This finding is consistent with literature that reports a relationship between teachers' attitudes

and self efficacy levels. The more positive a teacher is towards teaching, the higher self efficacy level he/she holds (Brickhouse, 1990; Özkan et al., 2002; Taşkın & Can, 2005). This implies that teacher candidates with a positive attitude will have a high sense of efficacy, which, in turn, will reflect positively on to teaching practices.

In the current study a significant but weak relationship was found between critical thinking level and the other two variables: attitude and sense of efficacy in teaching for critical thinking. This may suggest that being a high or low level critical thinker does not influence a teacher's attitude or sense of efficacy in teaching for critical thinking. However, this may not imply that there is no relationship between their attitudes and their actual teaching performance in critical thinking instruction.

5.1.5. Conclusions on Factors Impacting Critical Thinking Levels

This study explored the relationship between certain background variables of participants and their critical thinking levels, namely gender, major, academic achievement, high school background, parents' educational level, reading behaviour, level of motivation and intention in carrying out the teaching profession, and prior formal training in critical thinking.

In consistency with related literature, no significant difference was observed in levels of critical thinking across the groups in terms of *gender* in numerous studies (Akar, 2007; Dayıoğlu, 2003; Ekinci, 2009; Korkmaz, 2009; Şen, 2009). However, it conflicts with those studies that report the influence of gender on level of critical thinking with conflicting results. While some studies report effect of gender in favour of females (Srinivasan & Crooks, 2005; Yıldırım, 2005; Zayıf, 2008;), an influence of gender in favour of males is also reported (Çınar, Akduran, Aşkın, & Altınkaynak, 2012). A finding of a higher level of critical thinking in favour of females is justified in literature as females being able to communicate more effectively than males. In other words, females are reported to have more effective verbal reasoning skills than males

(Yıldırım). On the other hand, Wheary and Ennis' (1995) justification for males having higher levels of critical thinking lies in their assertion that critical thinking is sexist in the sense that it entails characteristics that are more likely to be displayed by males, such as rationality and judgment over characteristics such as emotional reasoning, which tends to be coined with female behaviour. These justifications clearly indicate that gender influence can be highly impacted by the skills and dispositions measured in the name of critical thinking and how they are measured.

With respect to *major*, no significant impact on critical thinking level was observed in this study, which is in line with the findings of many other studies in literature (Ekinci, 2009; Korkmaz, 2009; Yıldırım, 2005); however, there are also studies reporting an impact of major, specifically in favour of science students (Dayıoğlu, 2003). On the other hand, higher critical thinking levels of students from Arts and Sciences and Social Sciences have been reported by Eigenberger, Sealander, Jacobs and Shellady (2001) when compared to the critical thinking levels of students majoring in other fields. However, it must be noted that while the critical thinking instrument employed in Dayıoğlu's study (WGCTA) solely measured the cognitive dimension of critical thinking, the study by Eigenberger, Sealander, Jacobs and Shellady measured the dispositions dimension of critical thinking. Consequently, the conclusion that can be drawn is that while students majoring in physical sciences may be scoring higher on the cognitive component of a critical thinking test, those majoring in social sciences may be scoring higher on the dispositions component.

In literature there are reports of both significant and non-significant (Ku, 2009; Zayıf, 2008) relationships between academic achievement and critical thinking. This study revealed a non-significant relationship between academic achievement, as measured by CGPA, and critical thinking level. This could derive from the fact that what is required by students and assessed in their performance throughout their course studies may not require the utilization and demonstration of critical thinking. In other words, course requirements and tasks in student assessment tools may require lower-level thinking

ability. In this case, students who do very well on these types of tasks, but are poor in critical thinking, may still be receiving high scores in their courses.

Similarly, there was no significant difference in the critical thinking levels of teacher candidates participating in this study depending on the *high school they attended.* Akar (2007), Şen, (2009), and Zayıf (2008) also report a non-significant relationship between high school background and level of critical thinking. This could be justified by the fact that, regardless of the type of high school it is, the majority of high schools in Turkey are university entrance exam-oriented and aim to ensure that their students pass the university entrance exam. To this end, instructional practices and student assessment tools most often require answering multiple choice questions requiring lower levels of thinking and mostly rote memorization. As high school success in Turkey is mostly measured by the number of graduate students passing the university entrance examination, a different approach and practice in curriculum and instruction would leave that high school out of the mentioned competition.

No significant association between *mother's educational level, father's educational level or parents' educational level* combined and level of critical thinking was found in the current study, which is consistent with the findings of numerous other studies (Akar, 2007; Dayıoğlu, 2003; Ekinci, 2009; Şen, 2009).

The current study yielded an insignificant relationship between level of critical thinking and *reading* behaviour of pre-service teachers, as measured by number of books read per month and frequency of reading a newspaper. This finding is consistent with the finding reported in the study carried out by Şen (2009). This may indicate that rather than the amount of reading done, how information is processed while reading is important.

Level of motivation and intention in carrying out the teaching profession showed no significant impact upon critical thinking level, indicating that teacher candidates may

have low levels of critical thinking ability but have a high level of motivation towards critical thinking instruction.

Instruction in critical thinking is reported in literature to be effective in enhancing students' critical thinking ability based on the notion that critical thinking can be taught. However, *prior direct training in critical thinking* did not create any significant difference across the groups in this study. This finding can be justified with the notion that critical thinking cannot be enhanced in a short period of time. Literature agrees on the assertion that the development of the critical thinking ability requires a long period of time. The participants in the current study, however, indicated either no training at all or attendance in a one-semester critical reading course.

5.1.6. Conclusions Regarding Impact of Certain Variables on Attitudes towards Teaching for Critical Thinking

Even though the multivariate analysis (MANOVA) had yielded a nonsignificant result regarding the impact of *gender* on pre-service teachers' attitudes towards teaching for critical thinking, MANOVA conducted on the subscales of the Attitude Scale (ASTCT) revealed a relationship between gender in favour of females and attitude towards critical thinking (factor 1) and attitude towards critical thinking instruction and assessment (factor 4). That females have been found to have a more positive attitude towards the construct of critical thinking and teaching for critical thinking is consistent with studies that explore teachers' attitude towards the teaching profession in general and report significant results in favour of females. This finding is not surprising, especially in the context of, but not limited to, the Turkish education because teaching is generally considered a 'female' profession (Ekiz, 2006) In a study carried out by Fidan, İşçi & Yılmaz (n.d.), only 6.8% of the respondents to a survey indicated that teaching was a male profession. More than half of the respondents (53.9%) believed it was solely a female profession, while 39.4% claimed it was both a male and a female profession.

Another significant finding concerns the relationship between pre-service teachers' *major* and their attitude towards teaching for critical thinking. Maths-Science teacher candidates seemed to hold a significantly higher positive attitude in general towards teaching for critical thinking than the social sciences and the Turkish language teacher candidates. However, when the factors of ASTCT were analyzed, there were conflicting findings. Maths-science teachers seemed to score significantly higher on the second (*biases towards critical thinking*) and third subscales (*resistance in teaching for critical thinking*), which indicated that they were not as influenced by the biases and not as resistant to teaching for critical thinking as the pre-service teachers majoring in the other fields (social sciences, foreign language and Turkish language education). On the other hand, they significantly scored lower on the first (*attitude towards critical thinking*) and fourth (*attitude towards teaching for critical thinking*) than the participants from the other groups of major.

One other interesting finding relates to the relationship between academic achievement measured by CGPA and attitude towards teaching for critical thinking. It was found that pre-service teachers with the highest CGPAs (3.5-4.0) had a significantly more positive attitude towards teaching for critical thinking. When the factors of the attitude scale were analyzed, it was observed that teachers with the highest CGPAs (3.5-4.0) had significantly higher mean scores on the second and third factors (*biases towards critical thinking and resistance in teaching for critical thinking*). As the scores were reversed, a high score in both of these subscales showed positivity in their attitude towards teaching for critical thinking. This finding may indicate that the higher level of academic achievement a pre-service teacher has, the more positive an attitude he/she displays toward teaching for critical thinking. However, this was not the case in Sarıkaya's (2004) study in which no relationship was found between academic achievement and attitude towards teaching science. This inconsistency could derive from the differences in the subjects taught or studies could yield inconsistent results depending on the sample group, just as in many other study designs.

High school background, i.e. type of high school attended, also created a significant difference in the participants' attitude towards teaching for critical thinking. The participants who had graduated from Super High Schools had a significantly higher level of positive attitude towards teaching for critical thinking than graduates of Anatolian high schools and Teacher Training High Schools. This finding may be natural when Anatolian high school graduates are concerned since generally Anatolian high school graduates do not aim to become teachers, but tend to end up in the teacher education departments most probably because of a lower university entrance score than expected. Super high school graduates, on the other hand, may be more motivated and may have entered the education department purposefully and willingly.

Another interesting finding is related to the relationship of parents' level of education and attitude towards teaching for critical thinking. Even though the multivariate analysis had yielded insignificant results across the main dependent variables (critical thinking, attitude and self efficacy beliefs towards teaching for critical thinking), a significant result was yielded from the analysis on the factors of ASTCT. The fathers' education level created a significant difference on the second (*biases towards critical thinking*) and the third factor (*resistance in teaching for critical thinking*). It was interesting to observe in the results of the analyses that the lower the father's education level was the lower were the mean scores on biases towards critical thinking and resistance to teaching for critical thinking was. As the scores of these two subscales were reversed, this finding shows that pre-service teachers with fathers having a lower level of education had a higher degree of biases towards critical thinking and resistance to teaching for critical thinking. The father's education level in a family seems to be crucial in determining the child's behaviour and attitude. As mentioned earlier, Bordieau (1986) asserts that educational outcomes and other traits, such as style of speech, behavioural patterns, ways of thinking or the intellect can be determined by *cultural capital*, which refers to the traits that individuals acquire from their families through socialization. Consequently, the finding that pre-service teachers with fathers that have a higher level

of education report a more positive attitude towards teaching for critical thinking is meaningful.

There seemed to be a relationship between the amount of reading teacher candidates did and their attitude towards teaching for critical thinking. This could be accounted for with the claim that people who read relatively more than others may be more open to new ideas and practices. On the other hand, those who do not do much reading may remain more tratidional in their views and practices.

5.1.7. Impact of Certain Variables on Performance and Outcome Efficacy Subscales of Self Efficacy Beliefs in Teaching for Critical Thinking

In the present study, major, academic achievement, high school background and reading behaviour created a significant difference in outcome efficacy, but not in performance efficacy.

One interesting finding of the relationship between pre-service teachers' background variables and their self efficacy beliefs is related to the influence of major. Turkish language teachers seemed to have a significantly stronger sense of self efficacy in the all the subscales of the outcome efficacy subscale. In other words, Turkish teacher candidates felt more efficacious than the other teacher candidates in teaching for metacognitive, cognitive and dispositions dimensions of critical thinking.

One other significant relationship was found between academic achievement and outcome efficacy level. The pre-service teachers who were in the group with the highest CGPA scores (3.5-4.0) held significantly stronger outcome efficacy beliefs on all three subscales: *outcome efficacy in teaching for critical thinking metacognitive skills, outcome efficacy in teaching for critical thinking cognitive skills* and *outcome efficacy in teaching for critical thinking dispositions.*

This may imply that teacher candidates who read more than others may be more sensitive to and more aware of the critical thinking skills and dispositions making up the outcome efficacy factor, which may increase their confidence and make them feel efficacious.

Finally, prior direct training in critical thinking had a significant impact on performance efficacy. This suggests that by means of effective teacher training, teacher candidates can increase their level of efficacy in personal efficacy, planning for critical thinking instruction, implementing critical thinking instructional and assessment strategies and overcoming obstacles in critical thinking instruction.

5.2. Implications for Practice and Further Research

The findings and conclusions drawn from this study have some implications for practice and further research.

5.2.1. Implications for Practice

Improvement in the practice of teaching for critical thinking primarly lies in the hands of teacher education institutions. Experienced teachers' self efficacy beliefs seem to remain stable despite the in-service training and workshops they may attend (Ross, 1994); however, there seems to be considerable amount of agreement on the fact that preservice teachers' self efficacy beliefs are subject to change (Ryang, 2010); thus, paying attention to changing efficacy beliefs in the early years of teacher education would be beneficial since once they are stabilized, teachers display resistance to change (Tschannen-Moran, Woolfolk Hoy & Hoy, 1998).

Developing teachers' critical thinking skills, instilling a positive professional attitude in teaching for critical thinking, and enabling them to hold a high sense of efficacy in

teaching for critical thinking can pave the way for more effective instruction in critical thinking.

In order to effectively teach a course in which critical thinking is infused there is considerable amount of agreement in literature that teachers need to model their own critical thinking ability within the classroom. Yet, to be able to do this, teachers need to possess a sufficient level of critical thinking ability. However, the current study revealed that teacher candidates are at a 'below average' level as regards critical thinking. Thus, this finding has implications for institutions involved in teacher education. However, for effective teacher education in critical thinking, some preconditions need to be met, which are outlined below.

1. Formative and summative evaluations could be conducted to evaluate the effectiveness of teacher education programs in relation to the enhancement of teacher candidates' competence in thinking critically and teaching for critical thinking. Based on the results of these evaluations, necessary reforms could be made. Even though with such initiatives as the Bologna Process, reforms may be taking place on paper, with specific focus on critical thinking, it must be ensured that these reforms are also implemented and taking effect in practice.

2. Another obstacle inhibiting teachers' critical thinking instruction is lack of instruments and knowledge concerning critical thinking assessment. The instruments available in literature are of foreign origin and are varied in scope and what they test. Hence, based on the operational definition that is established either nationwide or at the institutional level, critical thinking assessment tools suitable to the Turkish context and values need to be designed. To this end, teachers need to be trained in constructing assessment tools to assess critical thinking. They can be required to attend in-service training with field specific experts who can train teachers in developing these instruments.

3. Pre-service teachers are found to a moderate degree of a positive attitude towards teaching for critical thinking, but it may decline once they start teaching professionally after graduation due to the fact that the teaching practices in secondary schools in Turkey are geared towards the university enterance exam, which is consisted of multiple-choice questions that require limited critical thought. Therefore, even if teachers are highly efficacious and hold a positive attitude towards teaching for critical thinking, when the university enterance exam or the achievement exams in secondary schools do not include tasks that require critical thinking, teachers are bound to lose their motivation and make no use of their teaching competence. Consequently, for critical thinking instruction to take place, students and teachers should feel the need for it to take place. The immediate necessity can only be felt by assessment of critical thinking in both achievement exams in secondary schools and in the university enterance examination.

4. Even though the results of this study concerning teachers' attitudes towards critical thinking is not highly pessimistic, the factors of the attitude scale, namely biases towards critical thinking and resistance to teaching for critical thinking yielded almost borderline mean scores, indicating that they are almost indecisive about biases towards the critical thinking construct, and almost resistant to teaching for critical thinking. Therefore, teacher education for the establishment of a positive attitude among teacher candidates towards teaching for critical thinking would be beneficial. By changing the attitudes of teacher candidates more towards the positive end of a spectrum, teacher training institutions would be producing a positive impact on the future performance of teacher candidates in teaching for critical thinking.

5. Even though a common curriculum of the Faculty of Education may exist with goals stated for the teaching of critical thinking skills and dispositions, there may not be a strict control mechanism of whether these goals are addressed in each and every course offered in the department. To ensure that they are being addressed, teacher candidates can be required to take a critical thinking test produced and administered by the faculty

at the end of each year. The teacher candidates who do not receive a minimum requirement score set by the faculty administration can be required to receive further training, which can be offered by a critical thinking centre that can be founded by the faculty of education.

5.2.2 Implications for Further Research

1. Since random sampling could not be attained in this study, the results cannot be generalized to the whole population of Turkish pre-service senior teachers. The results are limited with the pre-service teacher populations of the universities participating in the study. Hence, this study could be replicated by random sampling across the nation so that the results can be generalized to the senior pre-service teachers nationwide.

2. The instruments employed in this study to measure critical thinking level, attitude towards teaching for critical thinking, and self efficacy in teaching for critical thinking have been developed by the researcher and used for the first time. Hence, these instruments could be used with different samples for further validity and reliability analyses.

3. The critical thinking levels of the participants in this study were assessed holistically. Further studies could be conducted to measure how much of the variance in critical thinking level is explained by the various dimensions of critical thinking; namely the cognitive and the dispositions dimensions.

4. Even though it has been stated in literature that measuring the subcomponents of critical thinking separately may not actually produce reliable results of the participants' critical thinking level overall, measurements of the subcomponents can be done for diagnostic purposes. By measuring the subcomponents, teacher candidates' area of weaknesses regarding critical thinking can be detected and addressed.

5. Longitudinal studies could be conducted to find out whether teacher candidates with a high sense of efficacy actually can perform effectively in the real setting.

6. Longitudinal studies could be conducted to find out whether teacher candidates tend to underestimate or overestimate their actual capacities in teaching for critical thinking. In other words, teacher candidates' sense of efficacy in critical thinking methodology and instruction in critical thinking dimensions before they graduate and after they starting teaching professionally can be compared.

7. Because there might be a difference in individuals' oral and written performance, evidence in critical thinking may vary in speech and written responses. For this reason, a comparative study where both means of responses are collected from the same sample group for assessment of evidence for critical thinking can be carried out. Alternatively, for the same purpose, subsequent to a written means of assessing critical thinking, follow-up in-depth interviews could be held.

8. To investigate the reasons underlying high and low level critical thinking, follow-up in-depth interviews with a sample group receiving high scores on a written critical thinking test and those receiving a low score can be held.

9. Experimental studies can be conducted to see whether there can be an impact on teacher candidates' critical thinking levels, attitudes to thinking critically and their self efficacy levels by certain interventions.

10. Since a strong self-efficacy belief is a desirable teacher characteristic on grounds that it is closely associated with high student achievement (Gencer & Çakıroğlu, 2007), research into which factors influence the development of a strong sense of efficacy in teacher candidates, specifically in teaching for critical thinking can be of benefit for the improvement of teacher education programs.

11. It is reported in related literature that pre-service teachers have the tendency to hold a positive attitude towards "progressive" practices in education while they are in the teacher education programme, but this tendency is lost once they become regular classroom teachers (Hogben & Lawson, 1984). The findings of the current study are consistent in that the Turkish pre-service teachers participating in the study hold positive attitudes towards teaching for critical thinking, which can be considered as a "progressive" educational approach. However, whether or not there is a negative shift in their attitude towards teaching for critical thinking will continue when they begin to teach after they graduate from their teacher education programme can be studied by conducting longitudinal research.

12. Research to reveal what sources of information teachers base their judgments on when determining their sense of efficacy in critical thinking methodology and critical thinking dimensions can be of benefit for teacher education programs. Based on the information obtained through such studies, teacher education programs can plan to create learning conditions, opportunities and environment for teacher candidates to strengthen their efficacy beliefs in teaching for critical thinking.

REFERENCES

Adams, B. (1999). Nursing education for critical thinking: An integrative review. *Journal of Nursing Education, 38,* 3111-3119.

Adams, M.H., Whitlow, J.F., Stover , L.M., & Johnson, K.W. (1996). Critical thinking as an educational outcome: An evaluation of current tools of measurement. *Nurse Education, 21*, 23-32.

Akbey, B. (2007). Eleştirel düşünmenin öğretiminde öğretmenin rolü. Bilim. *Eğitim ve Düşünce Dergisi, 7*(2), 340-348.

APA - American Philosophical Association. (1990). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction.* In the Delphi Report: Research findings and recommendations prepared for the committee on Pre-College Philosophy.

Akar, C. (2007). *İlköğretim öğrencilerinde eleştirel düşünme becerileri*. Unpublished PHD dissertation. Gazi University, Ankara, Türkiye.

Akkoyunlu, B., Orhan, F., & Umay, A. (2005). Bilgisayar öğretmenleri için "Bilgisayar öğretmenliği için özyeterlilik ölçeği" geliştirme çalışması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 21*, 1-8.

Akbıyık, C. (2002). *Eleştirel düşünme eğilimleri ve akademik başarı*. Unpublished Master's thesis. Hacettepe University, Ankara, Turkey.

Allinder, R. M. (1994). The relationship between efficacy and the instructional practices of special attention teachers and consultants. *Teacher Education and Special Education, 17*, 86-95.

Anderson, L. W. (1981). *Assessing affective characteristics in the schools*. Boston: Allyn and Bacon.

Ashton, P. T. (1988). *Teaching higher–order thinking and content*: *An essential ingredient in teacher preparation*. Gainesville, FL: University of Florida.

Ashton, P. T. & Webb, R. B. (1986). *Making a difference teachers' sense of efficacy and student achievement*. New York: Longman.

Aybek, B. (2006). *Konu ve beceri temelli eleştirel düşünme öğretiminin öğretmen adaylarının eleştirel düşünme eğilimi ve düzeyine etkisi*. Unpublished doctoral dissertation. Çukurova University, Adana.

Bain, K. (2004). *What the best college teachers Do*. Cambridge: Harvard University Press.

Bandura, A. (1997). *Self-efficacy*: *The exercise of control*. New York: Freeman.

Bandura, A. (2001). A cognitive theory: An agentic perspective. *Annual Review of Psychology*, *52*, 1-26.

Bandura,A. (2006). Guide for constructing self-efficacy scales. In F. Pajares & T. Urdan (Eds.). *Self-efficacy Beliefs of Adolescents, 5*, 307-337, Greenwich: Information Age Publishing.

Barros, S.S., & Elia, F.M. (1998). *Physics teachers' attitudes: How do they affect the reality of the classroom and models for change?* Retrieved 23.02.2012 from http://www.physics.Ohio-state.edu

Beşoluk, Ş. & Önder, İ. (2010). Öğretmen adaylarının öğrenme yaklaşımları, öğrenme stilleri ve eleştirel düşünme eğilimlerinin incelenmesi. *İlköğretim Online, 9*(2), 679-693. Retrieved 14.10.2011 from http://ilköğretim–online.org.tr

Bıkmaz, F. (2004). "Sınıf öğretmenlerinin fen öğretiminde öz yeterlilik inancı" ölçeğinin geçerlik ve güvenirlik çalışması. *Milli Eğitim Dergisi,* 161.

Bloom, B. S. (1956). Taxonomy of educational objectives: The classification of educational goals. *Handbook I: Cognitive Domain*. New York: McKay.

Bonnie, P. (2004). Strategies for teaching critical thinking. *Practical Assessment, Research & Evaluation, 4*(3), 220-232.

Bowles, K. (2000). The relationship of critical thinking skills and the clinical judgment skills of baccalaureate nursing students. Journal of Nursing Education, *39*, 373-376.

Brickhouse, N . W. (1990). Teacher beliefs about the nature of science and their relationship to classroom practices. *Journal of Teacher Education, 41*, 53-62.

Brookfield, S. D. (1987). *Developing critical thinkers*. San Francisco: JosseyBass Publishers.

Brookover, W. (1979). *School social systems and student achievement: Schools can make a difference*. New York: Bergin.

Browne, M. N., & Meuti, D. M. (1999). Teaching how to teach critical thinking. *College Student Journal*. June, 1999.

Bulut, İ. (2009). Öğretmen adaylarının öğretmenlik mesleğine ilişkin tutumlarının değerlendirilmesi. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, *14*, 3-24.

Capa, Y. (2005). *Factors influencing first-year teachers' sense of efficacy*. Unpublished doctoral dissertation, The Ohio State University, Columbus.

Çapa, Y., Çakıoğlu, J., & Sarıkaya, H. (2005). The development and validation of a Turkish version of teachers' sense of efficacy scale. *Eğitim ve Bilim*. *30* (137),74-81.

Çapa, Y. & Çil, N. (2000). Öğretmen adaylarının öğretmenlik mesleğine yönelik tutumlarının farklı değişkenler açısından incelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 18*, 69-73.

Cheung, C. et al. (2002). Assessing students' general and specific critical thinking. *College Student Journal*. Retrieved 16.10.2003 from http://www.findarticles.com/cf_0/m0FCR/4_36/96619957/print.jhtml

Czaja-Chudyba, I. (2009). *Attitudes towards critical thinking and classroom behaviour of primary education teachers*. A paper presented at European Research Association, Berlin. Retrieved 20.11.2009 from http://wwwçeera-ecer.eu/ecer-programmes-and-presentations /conference/ecer-2009

Dağlı, T. M. (2008). *Integrating critical thinking skills into planing and implementation of teaching Turkish: A comparative case study of three teachers.* Unpublished doctoral dissertation, Middle East Technical University, Ankara,Turkey.

Dam, G, & Volman, M. (2004). Critical thinking as a citizenship competence: Teaching strategies. *Learning and Instruction*, 14, 359-379.

Dayıoğlu, S. (2003*). A descriptive study on the critical thinking levels of the students at the unit of English preparatory school at Hacettepe University*. Unpublished Master's thesis, Middle East Technical University, Ankara.

Deanna, K., & David, D. (2003). Metacognition: A bridge between cognitive psychology and educational practice. Theory Into Practice, *43*(4), 268-273.

Dellinger, A.B., Bobbett, J.J., Olivier, D.F., & Ellet, C, D. (2007). Measuring teachers' self-efficacy belifs: Development and ise of the TEBS-Self. *Teaching and Teacher Education, 24*, 751-766.

DeMesquita, P. B., & Drake, J. (1994). Educational reform and the self-efficacy beliefs of teachers implementing nongraded primary school programs. *Teaching and Teacher Education, 10*, 291-302.

Dewey, J. (1909). *Moral principles in education*. Boston: Houghton Mifflin.

Dewey, J. (1997). *How we think*. Mineola, N.Y.: Dover Publications.

Diestler, S. (2001). *Becoming a critical thinker*: *A user friendly manual*. (3rd Ed.) New Jersey: Prentice Hall.

Dutoğlu, G. & Tuncel, M . (2008). Aday öğretmenlerin eleştirel düşünme eğilimleri ile duygusal zeka düzeyleri arasındaki ilişki. Abant İzzet Baysal University, *Eğitim Fakültesi Dergisi*, *8*(1), 11-32.

Dwyer, E.E. (1993). *Attitude scale construction: A review of the literature*. Retrieved 11.10.2010 from www.eric.ed.gov./ERICWebPortal

Emmer, E. T., & Hickman, J. (1991). Teacher efficacy in classroom management and discipline. *Educational and Psychological Measurement, 51*, 755-767.

Ennis, R. H., & Wier, E. (1985). *The Ennis–Weir critical thinking essay test*. CA: Midwest Pub.

Ennis, R. H. (1985). A logical basis for measuring critical thinking skills. *Educational Leadership*. 43, 44-48.

Ennis, R. H. (1987). A taxonomy of critical thinking dispositions and abilities. In J. Baron & R. Sternberg (Eds.), *Teaching thinking skills: Theory and practice*. New York: W.H. Freeman. 9-26.

Ennis, R. H. (2002). Goals for a critical thinking curriculum and its assessment. In Arthur L. Costa (Ed.), developing minds (3rd Ed.). Alexandria, VA: ASCD. pp. 44-46.

Ennis, R. H (2003). Critical thinking assessment. In D. Fasko (Ed.), *Critical thinking and reasoning*. Cresskill, NJ: Hampton Press.

Erdoğan, K. & Uşak (2005). Fen bilgisi öğretmen adayları memnuniyet ölçeğinin geliştirilmesi. Gazi University, *Gazi Eğitim Fakültesi Dergisi*, *25*(2), 34-39.

Facione, P. (1990a). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction*. The Delphi Report. Millbrae: The California Academic Press.

Facione, P. (1990b). *The California critical thinking skill test: College Level Technical Report: Experimental Validation and Content Validity*. CA: The California Academic Press.

Facione, P.A. et al. (1996). *The California Critical Thinking Disposition Inventory Test Manual*. Milbrae, CA, California Academic Press.

Facione, P. A. (1998). *Critical thinking: What it is and why it counts*. California: California Academic Press.

Facione, P. A. (2000). The disposition toward critical thinking. Its character, measurement and relation to critical thinking skill. *Informal logic*, *20*(1), 61-84.

Facione, P. A., & Facione N. (2007). Thinking and reasoning in human decision making: The method of argument and heuristic analysis. Millbrae, CA: The California Academic Press.

Freire, P. (1993). *Pedagogy of the oppressed*. London: The Continuum Int. Pub. Comp.

Field, A. (2005). *Discovering statistics using SPSS* (2nd ed.). London: Sage.

Fishbein, M. (1967). Attitudes and prediction of behaviour. In Fishbein, M. (ed.). *Readings in Attitude Theory and Measurement*, NY: John Wiley and Sons, 477-492.

Fisher, A. & Scriven, M. (1997). *Critical thinking: Its definition and assessment*. CA: Edge Press.

Gadzella, B. M., Ginther, D. W., & Bryant, G. W. (1997). Prediction of performance in an academic course by scores on measures of learning style and critical thinking. *Psychological Reports, 81*, 595-602.

Gagne, R. M. (1985). *The conditions of learning and theory of instruction (4th ed.)*. NY: Holt, Rinehart, and Winston.

Gibbs, C. (2002). Effective teaching: exercising self-efficacy and thought control of action. Paper presented at the Annual Conference of the British Educational Research Association, University of Exeter, England, 12-14 September, 2002.

Gibson, S. & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology*, 76, 569-582.

Gülveren, H. (2007). *Eğitim fakültesi öğrencilerinin eleştirel düşünme becerileri ve bu becerileri etkileyen eleştirilel düşünme faktörleri*. Unpublished doctoral dissertation. Dokuz Eylül University, İzmir, Turkey.

Güven, M. & Kürüm, A.D. (2007). Teacher candidates' learning styles and critical thinking disposition. *Elektronik Sosyal Bilimler Dergisi*, 6(21), 60-90, retrieved 23.03.2010 from http://uvt.ulakbim.gov/tr

Gencer, S. A. & Çakıroğlu, J. (2005). Turkish preservice teachers' efficacy beliefs regarding science teaching and their beliefs about classroom management. *Teaching and Teacher Education, 23*(5), 664-675.

Guskey, T. R. (1988). Context variables that affect measures of teacher efficacy. *Journal of Educational Research, 81*(1), 41-47.

Haas, P. F., & Keeley, S. M. (1995). Coping with faculty resistance in teaching critical thinking. *College Teaching, 46*(2), 63-67.

Hackworth, R. M. (2009). Radiation science educators' perceptions of obstacles in the use of critical thinking

Hair, J. F. et al. (1998). *Multivariate data analysis* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Halpern, D. F. (1996). *Thought and knowledge: An introduction to critical thinking* (3rd ed.). N. J.: Erlbaum.

Halpern, D. F. (1998). Teaching critical thinking for transfer across domains: dispositions, skills structure training, and metacognitive monitoring. *American Psychologist*, *53*, 449-445.

Halpern, D. (2003). *Thought & knowledge: An introduction to critical thinking*. London: Laurance Erlbaum Associates Publishers.

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

Henson, J. R. (January 26, 2001). *Teacher self-efficacy. Substantial implications and measurement dilemmas*. Paper presented at the annual meeting of the Educational Research Exchange, Texas A&M University, Texas.

Hoy, W. A. & Spero, B.R. (2005). Changes in teacher efficacy during the early years of teaching: A comparision of four measures. *Teaching and Teacher Education*, 21, 343-356.

Hughes, W., & Jonathan, L. (2004). *Critical thinking: An introduction to the basic skills*. Ontario: Broadview press.

Hugbon, D. and Lawson, M. (1984). Attitude stability and change during teacher training. *The South Pacific Journal of Teacher Education*, 12(2), 34-44.

Johnson, A.P.(2000). *Up and out: Using creative and critical thinking skills to enhance learning.* Boston: Allay & Bacon.

Kaloç, R. (2005). *Orta öğretim kurumu öğrencilerinin eleştirel düşünme becerileri ve eleştirel düşünme becerilerini etkileyen etmenler*. A Master's thesis, Gazi University, Ankara, Türkiye.

Karadeniz, C. (2005). Developing a self-efficacy scale of geography for pre service teachers of social sciences: Its validity and reliability. *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi*, *20*, 63-69.

Kelly, Y. L. K. (2009). Assessing students' critical thinking performance: Urging for measurements using multi-response format. *Thinking skills and Creativity*, 4, 70-76.

Karlinger, N. (1984). *Foundations of behavioral research: Education and psychological inquiry*. NY: Hit Ripehand.

Kiersky, H. J., & Caste, J. N. (1995). *Thinking critically: Techniques for logical reasoning*. MN: West Publishing Company.

Kincheloe, J.L. (2004). Into the great wide open: Introducing critical thinking. In J. L. Kincheloe & D. Weil (Eds.) *Critical thinking and learning: An encyclopedia for parents and teachers.* Greenwood Press: Westport, Connecticut, London.

King, P. M., Wood, P. K. & Mines, R. A. (1990). Critical thinking among colleges and graduates students. *The Review of Higher Education*, 13(2), 167-186.

Korkmaz, Ö. (2009). Öğretmenlerin Eleştirel Düşünme Eğilim ve Düzeyleri. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi* (KEFAD), 10(1), 1-13

Ku, Y.L.K.& Ho, T.I. (2010). Dispositional factors predicting Chinese students' critical thinking performance. *Personality and Individual Differences*, *48*, 54-58.

Kuhn, D. (1999). A developmental model of critical thinking. *Educational Researcher*, *28*, 16-25.

Küçük, G. (2007). Aday öğretmenlerin eleştirel düşünme eğilimleri ile duygusal zeka düzeyleri arasındaki ilişki. Unpublished Master's Thesis. Bolu.

Lai, Y.K. (2008). *Critical thinking of Chinese students: Reconceptualization, assessment, and instruction.* Unpublished doctoral thesis. Retrieved 12.12.2009 from http://sunzi.lib.hku.hk/hkuto/agreement_form.jsp.

Lai, Y.K (2009). Assessing students' critical thinking performance: Urging for measurements using multi-response format. *Thinking Skills and Creativity*, 4(1), 70-76.

Lai Y.K & Ho, I. T. (2010) Dispositional factors predicting Chinese students' critical thinking performance. *Personality and Individual Differences,* 48(1), 54-58.

Lipman, M. (1988). *Philosophy goes to school*. Philadelphia: Temple University Press.

Marsh, H. W. (1995). Confirmatory factor analysis models of factorial invariance: a multifaceted approach. *Structural Equation Modeling, 1*(1), 5-34.

Mangena, A. & Chabeli M. M. (2009). Strategies to overcome obstacles in the facilitation of critical thinking in nursing education. *Nurse Educ. Today, 25*, 291-298.

McGregor, D. (2007). *Developing thinking developing learning: A guide to thinking skills in education.* Open University Press.

McMillan, J. H. & Schumacher, S. (2001). *Research in education. A conceptual introduction*. New York: Longman.

McPeck, 1981. *Critical thinking and education.* NY: St. Martin's Press.

Moon, J. (2007) *Critical thinking: An exploration of theory and practice.* London: Routledge

Moore, N.B. & Parker, R. (1989). *Critical thinking: Evaluating claims and arguments in everyday life.* Kentucky: Mayfield Publishing Co.

Norris, P. S. (1985). Synthesis of research on critical thinking. *Educational Leadership*, 40-45.

Norris, P. S., & Ennis, R. (1989). *Evaluating critical thinking*. Pacific Grove, CA: Critical Thinking Press and Software.

OECD (2009). *PISA 2009 results: Executive summary*. Retrieved 23 January 2011 from www.oecd.org/dataoecd/34/60/46619703.pdf

O'Neill & Stephenson , J. (2012). Exploring Australian pre-service teachers' sense of efficacy, its sources, and some possible influences. *Teaching and Teacher Education, 23*(4), 535-545.

Onweuegbuzie, J. A. (2001) Critical thinking skills: A comparision of doctorial- and mater's-level students, *College Student Journal*. September 2001. Retrieved 16.10.2003 from http://www.findarticles.com/cf_0/m0FCR/3_35/80744661/

Özmen, O. (2006). *Predictors of risk–taking behaviours among Turkish adolescents*. Unpublsihed Master's thesis, Middle East Technical University, Ankara.

Paul, R. et al. (1989). *Critical thinking handbook: 6th- 9th Grades.* CA: Center for Critical Thinking and Moral Critique.

Paul, R. (1990). *Critical thinking*. Rohnert Park, CA: The Center for Critical Thinking and Moral Crituque, Sonoma State University.

Paul, R. (1995). *How to prepare students for a rapidly changing world*. CA: Foundation for Critical thinking.

Paul, R., & Elder, L. (2002). *Critical thinking: Tools for taking charge of your professional and personal life*. NY : Prentice Hall.

Paul, R. & Elder,L. (2006). Critical thinking: The nature of critical and creative thought. *Journal of Developmental Education, 30*(2), 34-35.

Phillips, S. L. (2003). *Contributing factors to music attitude in sixth, seventh, and eighth grade students*. Unpublished dissertation, the University of Iowa, U.S.A.

Pierce, W. (2004). Handbook of critical thinking resources for the year of critical thinking. Retrieved 29.09.2010 from http://academic.pgcc.edu/-wpeirce/MCCCTR/handbook.pdf

Pierce W. (2006). Designing rubrics to assess higher order thinking. Retrieved 22.09.2010 from http://academic.pgcc.edu/-wpeirce/MCCCTR/Designingrubricsassessingthinking.html

Pithers, T.R. (2000). Critical thinking in education: A review. *Educational Research, 42*(3), 237-249.

Poole, M. G. & Okeafor, K. R. (1989). The effects of teacher efficacy and interactions among educators on curriculum implementation. *Journal of Curriculum and Supervision*, *4*(2), 146-161.

Reid, N. (2006). Thoughts on attitude measurement. *Research in Science and Technological Education. 24*(1), 3-27.

Richard, P.; Binker, A. J.A. (ed.) (1990) *Critical thinking: What everybody needs to survive in a rapidly changing world.* Sonoma State University: CA.

Riggs, I. M. &Enochs, L. G. (1990). Toward a development of an elementary teacher's science teaching efficacy belief instrument. *Science Education*, *74*(6), 625-637.

Ross, J. A. (1994). *Beliefs that make a difference: the origins and impacts of teacher efficacy.* Paper Presented at the annual meeting of the Canadian Association for Curriculum Studies, Calgary.

Ruggerio, R.V. (1990). *Teaching thinking across the curriculum*. New York: Harper & Row, Pub.

Rury, John L. (2009). *Education and social change. Contours in the history of American schooling*. NY: Routledge.

Sarris, G. (2000). Storytelling in the Classroom: Crossing Vexed Chasms. In D. Weil & H. K. Anderson (Eds.) *Perspectives in Critical Thinking. Essays by Teachers in Theory and Practice* (pp. 57-74). New York: Peter Lang.

Schmitz, G. S., & Schwarzer, R. (2005). *Perceived self-efficacy and teacher burnout: a longitudinal study in ten schools*. Research paper. Freie Universitat Berlin, Germany.

Schraw, G., Crippen, K.J., & Hartley, K. (2006). Promoting self-regulation in science education:Metacognition as part of a broader perspective on learning. *Research in Science Education*, *36*(1), 111.

Shell, R. (2001). Perceived barriers to teaching critical thinking by BSN faculty. *Nursing Health Care Perspectives, 22*(6), 286-291.

Seferoğlu, S. & Aybıyık, C. (2006). Eleştirel düşünme ve öğretimi. *H. Ü. Eğitim Fakültesi Dergisi*, *30*, 193-200.

Siegel, H. (1988). *Educating reason: Rationality, critical thinking, and education.* London: Routledge.

Smith, N. (1990). *Educational psychology: A developmental approach*. (5th ed.). NY: McGraw Hill.

Stein, M. K. & Wang, M. C. (1988). Teacher development and school improvement: the process of teacher change. *Teaching and Teacher Education, 4*, 171-187.

Stapleton, P. (2011). A survey of attitudes towards critical thinkng among Hong Kong secondary school teachers: Implications for policy change. *Thinking Skills and Creativity,* 6(1), 14-23.

Sternberg, R. J. (1986). *Critical thinking: Its nature, measurements, and improvement*. Washington DC: National Institute of Education.

Swartz, R.J., & Parks, S. (1994). *Infusing the teaching of critical and creative thinking into content instruction*. Pacific Grove, Ca: Critical Thinking Books & Software.

Şen, Ü. (2009). Türkçe öğretmeni adaylarının eleştirel düşünme tutumlarının çeşitli değişkenler açısından değerlendirilmesi. *Journal of World of Turks,* 1(2).

Tabachnick, B. G. & Fidell, L. S. (2007). *Using multivariate statistics*. Boston: Allyn and Bacon.

Tanel, R., Şengören, K. S., & Tanel, Z. (2007). Fizik öğretmen adaylarının öğretmenlik mesleğine ilişkin tutumlarının farklı değişkenler açısından incelenmesi. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, *2*(22), 1-55.

Tarkın, A. & Uzuntiryaki, E. (2012). Investigation of pre-service self-efficacy beliefs and attitudes toward teaching profession through canonical analysis, *Elementary Education Online,* 11(2), 332-341.

Taşkın, Ş. Ç., & Hacıömeroğlu, G. (2010). Fen bilgisi öğretmenliği ve ortaöğretim fen ve matematik alanları (OFMA) eğitimi bölümü öğretmen adaylarının öğretmenlik mesleğine ilişkin tutumları. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi, 11*(1), 77–90.

Taube, K. T. (1997). Critical thinking ability and disposition as factors of performance on a written critical thinking test. *Journal of General Education,* 46, 129-164.

Tavşancıl, E. (2006). *Tutumların ölçülmesi ve SPSS ile veri analizi*. Ankara: Nobel Yayın.

TEDP. Temel Eğitime Destek Projesi. (2006). *Öğretmenlik mesleği genel yeterlikleri*. Milli Eğitim Genel Müdürlüğü.

Tempelaar, D. T. (2006). The role of metacognition in business education. *Industry and Higher Education*, 20(5), 291-297.

Thomson, A. (2002) *Critical reasoning: A practical introduction.* New York, London: Routledge Taylor& Francis Group.

Thurmond, V.A. (2001). The holism in critical thinking: A concept analysis. *Journal of Holistic Nursing*, *19*(4), 375-389.

Thurstone, L. (1931). The measurement of social attitudes. *Journal of Abnormal and Social Psychology*, *26*, 249-269.

Tschannen-Moran, M. & Woolfolk Hoy, A. & Hoy, W. K. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17, 783-805.

Tschannen-Moran, M.& Woolfolk Hoy, A. & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research*, 68, 202-248.

Tsui, L. (2000). Effects of campusc on students' critical thinking. *Review of Higher Education*, 23, 421-441.

Türnüklü, B., E., & Yeşildere, S. (2005). A profile from Turkey: Critical thinking dispositions and abilities of pre-service mathematics teachers of 11-13 Year. *Journal of Faculty of Educational Sciences*, Ankara University, *38*(2), 167-185.

Vaughn, L. (2008) *The power of critical thinking*: *The power of reasoning about ordinary and extraordinary claims.* Oxford: Oxford University Press.

Watson, G. & Glaser, E. M. (1980). *Watson-Glaser Critical Thinking Appraisal*. Cleveland, OH: Psychological Corporation.

Weil, D. & Anderson, K.H., eds. (2000). *Perspectives in critical thinking*. New York: Peter Lang. Publishing.

Weinstein, C. S. (1988). Pre-service teachers' expectations about their first year of teaching. *Teaching and Teacher Education*, *4*(1), 31-40.

Wheary, J. & Ennis, R. H. (1995). Gender bias in critical thinking: continuing the dialogue. *Educational Theory*, *45*(2), 213-224.

Wheatley, F. K. (2005). The case for reconceptualizing teacher efficacy research. *Teaching and Teacher Education, 21*, 747-766.

White, F. W. & Burke, M. C. (2001) Critical thinking and teaching attitudes of preservice teachers. *Education*. *112*(2), 443-450.

Williams, R. L., & Stockdale, R. L. (2003). The relationship of critical thinking to success in college. *Inquiry: Critical thinking Across the Disciplines*, *21*(1), 15-16.

Williams, K., Wise, S.L. & West, R.F. (2001) *Multifaceted measurement of critical thinking skills in college students.* Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA.

Wilson, D. G., & Wagner, E. E. (1981). The Watson-Glaser critical thinking appraisal as a predictor of performance in a critical thinking course. *Educational and Psychological measurement, 41,* 1319-1322.

Wood, D. (1998). *How children think and learn* (2nd ed.). Great Britain: Blackwell Press.

Woolfolk, A.E & Hoy, W. K. (1990). Prospective teachers' sense of efficacy and beliefs about control. *Journal of Educational Psychology, 82*, 81-91.

Yapıcı, M. (2007). Öğretmen tutumları ve yansımaları. *Bilim, Eğitim ve Düşünce Dergisi*, *7*(3).

Yetim, A. A. & Göktaş, Z. (2004). Öğretmen mesleki ve kişisel nitelikleri. *Kastamonu Eğitim Dergisi*, *12*(2).

Yıldırım, A. Ç. (2005). *Türkçe ve Türk dili ve edebiyatı öğretmenlerinin eleştirel düşünme becerilerinin incelenmesi*. Unpublished master's thesis, Karaelmas University, Zonguldak, Turkey.

Yılmaz, M., Köseoğlu, P., Gerçek, C., & Soran, H. (2004). Adaptation of a teacher self-efficacy scale to Turkish. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *27*, 260-267.

Yücel, B. (2008). *An evaluation of needs, design, implementation, and outcomes of development and Learning course enriched with critical thinking based instruction.* Unpublished doctoral thesis, Middle East Technical University, Ankara, Turkey.

Zayıf, K. (2008). *Öğretmen adaylarının eleştirel düşünme eğilimleri*. Unpublished master's thesis. Abant İzzet Baysal University, Bolu, Turkey.

APPENDICES

APPENDIX A

CRITICAL THINKING TEST SAMPLE ITEM

3. Gazetede çıkan bir haberde, kız-erkek ayrı eğitim yapan liseler ile karma liselerin başarı oranlarının karşılaştırıldığı bir araştırmadan söz edilmektedir. Araştırmanın sonucunda kız-erkek ayrı eğitim yapan liselerin daha başarılı olduğu ifade edilmektedir. Ayrıca haberde, bu araştırma sonucuna dayanarak yetkililerin daha fazla kız ya da erkek liselerinin açılması yönünde adımlar atmayı düşündükleri ifade edilmektedir. **Bu habere dayanarak siz de bu girişimi destekler misiniz? Gerekçelerinizi açıklayınız.**
…… …… …… …… …… …… …… ……

APPENDIX B

HOLISTIC CRITICAL THINKING TEST RUBRIC

5 Outstanding	4 Good	3 Average	2 Below Average	1 Poor

The participant does all or most of the following:	*The participant does all or most of the following:*
• Accurately interprets the issues (in arguments, claims, graphs, etc.) • Clarifies meanings of words, constructs, terminologies, etc. • Identifies flaws, vague concepts, fallacies, inconsistencies, distorted information, lack of or inaccurate evidence in arguments • Draws justified, plausible, non-fallacious conclusions • Suspends judgment due to lack of evidence and/or sufficient information • Justifies his/her own claims by basing them on plausible reasons and evidence • Approaches the issue(s) by taking into consideration alternative viewpoints • Follows a systematic and consistent flow of reasoning • Fair-mindedly follows where evidence and reason leads • Avoids emotional reasoning • Avoids ego-centric and soci-centric tendencies • Questions the credibility of sources/claims/information	• Misinterprets the issues (in arguments, claims, graphs, etc.) • Does not realize the flaws, vague concepts, fallacies, inconsistencies, distorted information, lack of or inaccurate evidence in arguments • Does not clarify meanings of words, constructs, terminologies, etc. • Cannot draw justified, plausible, non-fallacious conclusions • Jumps to hasty conclusions • Does not justify his/her own claims or bases claims on inaccurate, insufficient and/or irrelevant reasons/evidence • Ignores or supificially evaluates obvious alternative view points • Displays a confused and/or inconsistent flow of reasoning; reasoning includes fallacious arguments • Regardless of the evidence or easons, maintains or defends views based on pre-formed opinions, beliefs, conceptions • Bases arguments, claims on emotional, ego-centric and/or socio-centric tendencies • Does not question the credibility of sources/claims/information

APPENDIX C

CHECKLISTS FOR CRITICAL THINKING TEST RESPONSES

QUESTION 1

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• questions the source of the graph • suspends judgment due to lack of source/other information					
Cognitive dimension	• interprets the graph accurately • avoids fallacious reasoning • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

QUESTION 2

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• questions the intention behind the action proposed • thinks independently of majority opinion • questions and/or clarifies the meaning of "zeki öğrenciler"					
Cognitive dimension	• avoids fallacious reasoning • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

QUESTION 3

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• questions and/or clarifies the meaning of "başarı" • questions the reliability of the research or the cause-effect relationship					
Cognitive dimension	• avoids fallacious reasoning • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

QUESTION 4

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• avoids strong assertions					
Cognitive dimension	• avoids fallacious reasoning • draws valid conclusions • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

QUESTION 5

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• questions the source of the article					
Cognitive dimension	• avoids fallacious reasoning • identifies the false analogy • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

QUESTION 6

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• questions the cause-effect relationship					
Cognitive dimension	• avoids fallacious reasoning • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

QUESTION 7

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• questions the cause-effect relationship					
Cognitive dimension	• avoids fallacious reasoning • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

QUESTION 8

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• avoids socio-centric tendencies/reasoning					
Cognitive dimension	• avoids fallacious reasoning • identifies the logial fallacy of a hasty generalization • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

QUESTION 9

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• avoids ego-centric tendencies/ reasoning • displays an open-minded approach and willingness to consider alternative viewpoints/sources					
Cognitive dimension	• avoids fallacious reasoning • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

QUESTION 10

	The participant/test taker	**0**	**1**	**2**	**3**	**4**
Affective dimension	• questions majority opinion and/or can think independently of majority opinion					
Cognitive dimension	• avoids fallacious reasoning • bases arguments/claims on relevant, sufficient and plausible reasons (rather than on irrelevant, insufficient and unfounded reasons or personal opinions/pre-supposed conceptions)					

APPENDIX D

ATTITUDE SCALE TOWARDS TEACHING FOR CRITICAL THINKING-SAMPLE ITEMS

Bu ölçeğin amacı, eleştirel düşünme ve öğretimine yönelik tutumunuzu belirlemektir.

Aşağıda yer alan ifadelere ne ölçüde katıldığınızı ya da katılmadığınızı uygun kutucuğu işaretleyerek belirtiniz.

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

	1	2	3	4	5	6
1. Öğrencilerin eleştirel düşünme becerilerini geliştirmede katkıda bulunmak beni mutlu eder.						
2. Öğrencilerin okudukları her şeyi sorgulamaları için teşvik etmek isterim.						

APPENDIX E

Descriptive Statistics for Attitude Scale towards Teaching for Critical Thinking

Item	(1) Totally Disagree	(2) Disagree	(3) Partially Disagree	(4) Partially Agree	(5) Agree	(6) Totally Agree	M	SD	N
	f(%)	*f(%)*	*f(%)*	*f(%)*	*f(%)*	*f(%)*			
Item 1	9(.8)	8(.7)	19(1.8)	50(4.6)	325(30.2)	663(61.6)	5.48	.84	1074
Item 2	8(.7)	9(.8)	31(2.9)	136(12.6)	324(30.1)	568(52.8)	5.29	.94	1076
Item 3	6(.6)	19(1.8)	35(3.3)	158(14.7)	387(36.0)	467(43.4)	5.15	.97	1072
Item 4	6(.6)	6(.6)	24(2.2)	71(6.6)	410(38.2)	555(51.8)	5.37	.82	1072
Item 5	8(.7)	10(.9)	20(1.9)	102(9.5)	338(31.5)	594(55.2)	5.36	.89	1072
Item 6	132(12.3)	123(11.4)	123(11.4)	133(12.4)	285(26.5)	261(24.3)	4.04	1.72	1057
Item 7	7(.7)	29(2.7)	29(2.7)	132(12.3)	448(41.6)	427(39.7)	5.11	.98	1072
Item 8	101(9.4)	99(9.2)	51(4.7)	51(4.7)	197(18.3)	572(53.4)	4.74	1.75	1071
Item 9	10(0.9)	18(1.7)	34(3.2)	125(11.6)	423(39.3)	461(42.8)	5.16	.97	1071
Item 10	7(0.7)	10(0.9)	40(3.7)	171(15.9)	412(38.3)	435(40.4)	5.12	.94	1075
Item 11	5(.5)	7(.7)	11(1.0)	76(7.1)	345(32.1)	627(58.3)	5.46	.79	1071
Item 12	7(0.7)	6(0.6)	15(1.4)	71(6.6)	366(34.3)	603(56.0)	5.43	.81	1078
Item 13	128(11.9)	126(11.7)	49(4.6)	45(4.2)	205(19.1)	520(48.3)	4.52	1.86	1073
Item 14	150(13.9)	90(8.4)	48(4.5)	42(3.9)	221(20.6)	523(48.7)	4.55	1.87	1074
Item 15	13(1.2)	24(2.2)	47(4.4)	226(21.0)	462(42.9)	299(27.8)	4.86	1.02	1071
Item 16	7(0.7)	13(1.2)	29(2.7)	83(7.7)	378(35.1)	563(52.3)	5.33	.90	1073
Item 17	117(10.9)	205(19.1)	180(16.7)	170(15.8)	231(21.5)	168(15.6)	3.65	1.63	1071
Item 18	108(10.0)	98(9.1)	55(5.1)	54(5.4)	266(24.7)	486(45.2)	4.62	1.73	1071
Item 19	18(1.7)	38(3.5)	98(9.1)	223(20.7)	389(36.2)	309(28.7)	4.62	1.17	1075
Item 20	107(9.9)	116(10.8)	139(12.9)	150(13.9)	268(24.9)	293(27.2)	4.15	1.67	1073

APPENDIX F

SELF EFFICACY SCALE IN TEACHING FOR CRITICAL THINKING-SAMPLE ITEMS

Sample Items for Subscale 1 – Performance Efficacy						
i. Hiç katılmıyorum **4- Kısmen katılıyorum** **ii. Katılmıyorum** **5- Katılıyorum** ii. **Kısmen Katılmıyorum** **6- Tamamen katılıyorum**	**1**	**2**	**3**	**4**	**5**	**6**
1. Eleştirel düşünmeyi ölçmeye yönelik alternatif ölçme değerlendirme araçları geliştirebilirim.						
1. Eleştirel düşünme öğretimi konusunda kendimi geliştirebilirim.						

Sample Items for Subscale 2 – Outcome Efficacy					
1-0-%20 **2- %21-40** **3- % 41-60** **4- %61-80** **5-%81-100**	1	2	3	4	5
1. Öğrencilerin kendi düşüncelerine yön veren dünya görüşlerine ne ölçüde farkındalık geliştirebilirsiniz?					
2. Öğrencilerin kendi düşüncelerinin altında yatan varsayımlarına ne kadar farkındalık kazandırabilirsiniz?					

APPENDIX G

Descriptive Statistics for Self Efficacy Scale in Teaching for Critical Thinking - Subscale 1 (Performance Efficacy)

Item	(1) Totally Disagree	(2) Disagree	(3) Partially Disagree	(4) Partially Agree	(5) Agree	(6) Totally Agree	M	SD	N
	f(%)	*f(%)*	*f(%)*	*f(%)*	*f(%)*	*f(%)*			
Item 1	22(2.0)	89(8.3)	125(11.6)	349(32.4)	313(29.1)	173(16.1)	4.27	1.22	1071
Item 2	39(3.60)	104(9.70)	182(16.9)	169(15.7)	361(33.6)	215(20.0)	4.27	1.40	1070
Item 3	8(.7)	22(2.0)	65(6.0)	191(17.8)	468(43.5)	309(28.7)	4.90	1.01	1063
Item 4	35(3.3)	96(8.9)	160(14.9)	326(30.3)	301(28.0)	146(13.6)	4.13	1.27	1064
Item 5	24(2.2)	92(8.6)	144(13.4)	334(31.0)	336(31.2)	135(12.5)	4.19	1.21	1065
Item 6	9(.8)	13(1.2)	55(5.1)	20519.1)	467(43.4)	324(30.1)	4.94	.97	1073
Item 7	16(1.5)	74(6.9)	135(12.5)	125(30.2)	337(31.3)	186(17.3)	4.35	1.19	1073
Item 8	30(2.8)	81(1.5)	163(15.1)	172(34.6)	293(27.2)	132(12.3)	4.13	1.21	1071
Item 9	28(2.6)	65(6.0)	94(.7)	163(15.1)	407(37.8)	315(29.3)	4.68	1.29	1072
Item 10	18(1.7)	60(5.6)	152(14.1)	257(23.9)	389(36.2)	197(18.3)	4.43	1.20	1073
Item 11	8(.7)	10(.9)	37(3.4)	244(22.7)	513(47.7)	258(24.0)	4.89	.89	1070
Item 12	4(.4)	21(2.0)	51(4.7)	232(21.6)	490(45.5)	277(25.7)	4.87	.94	1075
Item 13	7(.7)	22(2.0)	83(7.7)	304(28.3)	441(41.0)	208(19.3)	4.67	.99	1065
Item 14	11(1.0)	45(4.2)	104(9.7)	281(26.1)	444(40.3)	197(18.3)	4.57	1.09	1072
Item 15	13(1.2)	50(4.6)	88(8.2)	241(22.4)	467(43.4)	213(19.7)	4.62	1.11	1071
Item 16	5(.5)	21(2.0)	59(5.5)	258(24.0)	455(42.3)	274(25.5)	4.83	0.97	1072
Item 17	33(3.1)	56(5.2)	109(10.1)	252(23.4)	402(37.4)	221(20.5)	4.49	1.24	1073
Item 18	13(1.2)	35(3.3)	92(8.6)	288(26.8)	455(42.3)	189(17.6)	4.59	1.05	1072
Item 19	12(1.1)	36(3.3)	109(10.1)	334(31.0)	424(39.4)	151(14.0)	4.48	1.04	1066
Item 20	12(1.1)	36(3.3)	95(8.8)	334(31.0)	419(38.9)	179(16.6)	4.53	1.05	1075
Item 21	15(1.4)	23(2.1)	53(4.9)	282(26.2)	470(43.7)	232(21.6)	4.73	1.01	1075
Item 22	25(2.3)	76(7.1)	173(16.1)	357(33.2)	302(28.1)	141(13.1)	4.17	1.20	1074
Item 23	17(1.6)	66(6.1)	127(11.8)	358(33.3)	364(33.8)	139(12.9)	4.31	1.13	1071
Item 24	84(7.8)	250(23.2)	319(29.6)	208(19.3)	145(13.5)	68(6.3)	3.26	1.33	1074

APPENDIX H

Descriptive Statistics for Self Efficacy Scale in Teaching for Critical Thinking - Subscale 2 (Outcome Efficacy)

Item	0-%20 (1)	%21-40 (2)	%41-60 (3)	%61-80 (4)	%81-100 (5)	M	SD	N
	f(%)	*f(%)*	*f(%)*	*f(%)*	*f(%)*			
Item 1	19(1.8)	83(2.7)	314(29.2)	384(35.7)	272(25.3)	3.75	.98	1072
Item 2	15(1.4)	98(1.4)	318(9.1)	395(29.6)	248(36.7)	3.71	.97	1074
Item 3	16(1.5)	100(9.3)	277(25.7)	395(36.7)	283(26.3)	3.77	.99	1071
Item 4	22(2.0)	93(8.6)	271(25.2)	398(26.4)	284(26.4)	3.78	1.00	1068
Item 5	16(1.5)	52(4.8)	253(23.5)	420(39.0)	329(30.6)	3.93	.93	1070
Item 6	19(1.8)	64(5.9)	236(21.9)	432(40.1)	317(29.5)	3.90	.95	1068
Item 7	20(1.9)	81(7.5)	270(25.1)	442(41.1)	256(21.8)	3.78	.96	1069
Item 8	8(.7)	57(5.3)	226(21.0)	435(40.4)	343(32.0)	3.98	.90	1070
Item 9	11(1.0)	63(5.9)	224(20.8)	450(41.8)	322(29.)	3.94	.91	1070
Item 10	16(1.5)	63(5.9)	199(18.5)	399(37.1)	392(36.4)	4.02	.96	1069
Item 11	20(1.9)	94(8.7)	268(24.9)	402(37.4)	288(26.8)	3.79	1.00	1072
Item 12	48(4.5)	104(9.7)	305(28.3)	354(32.9)	256(23.8)	3.62	1.01	1067
Item 13	21(2.0)	88(8.2)	224(20.8)	402(37.4)	328(30.5)	3.87	1.01	1063
Item 14	16(1.5)	76(7.1)	217(20.2)	392(36.4)	370(34.4)	3.96	.98	1071
Item 15	25(2.3)	78(7.2)	253(23.5)	374(34.8)	338(31.4)	3.86	1.02	1068
Item 16	26(2.4)	81(7.5)	251(23.3)	398(37.0)	320(29.7)	3.84	1.01	1076
Item 17	15(1.4)	58(5.4)	253(3.5)	410(38.1)	339(31.5)	3.93	.94	1075
Item 18	12(1.1)	66(6.1)	201(18.7)	405(37.6)	390(36.2)	4.02	.95	1074
Item 19	9(.8)	54(5.0)	171(15.9)	395(36.7)	443(41.2)	4.13	.91	1072

APPENDIX I

PARTICIPANT PROFILE FORM

Sevgili Eğitim Fakültesi Öğrencileri,

Bu bir doktora tez çalışmasıdır. Elde edilen veriler bilimsel çalışma dışında hiçbir yerde kullanılmayacaktır. Bu nedenle cevaplarınızı samimi ve dürüstçe vermeniz bu çalışmanın güvenirliğini ve geçerliğini artıracaktır. Lüften soruları **sırayla** yanıtlayınız.

Katkılarınızdan dolayı çok TEŞEKKÜR EDERİM.

Nihal Akdere
ODTÜ Eğitim Bilimleri
Program Geliştirme ve Öğretim
Doktora Öğrencisi

KİŞİSEL BİLGİ FORMU

1. Cinsiyetiniz: □ Erkek □ Kadın
2. Üniversiteniz: ……
3. Bölümünüz: ……
4. Şu anki not ortalamanız: ……..
5. Mezun olduğunuz lise türü:
   - □Fen lisesi
   - □Anadolu lisesi
   - □ Özel lise
   - □Meslek ve teknik lise
   - □Düz devlet lisesi
   - □Öğretmen Lisesi
   - □Diğer: ……..

6. Annenizin eğitim durumu:
- □ilkokul terk veya gitmedi
- □ilkokul mezunu
- □ortaokul mezunu
- □lise mezunu
- □üniversite mezunu
- □ lisansüstü

7. Babanızın eğitim durumu:
- □ilkokul terk veya gitmedi
- □ilkokul mezunu
- □ortaokul mezunu
- □lise mezunu
- □üniversite mezunu
- □ lisansüstü

8. Öğretmen olduktan sonra öğretmen olarak çalışmayı düşünüyor musunuz? □ Evet □ Hayır □Belki

9. Öğretmen olma motivasyonunuzun derecesini belirtiniz: □ Yüksek □Orta □ Düşük □Hiç

10. Eleştirel düşünme öğretimi konusunda herhangi bir eğitim aldınız mı? □ Evet □ Hayır

Yanıtınız **evet** ise, nerede ve ne kadar süre aldığınızı lütfen belirtiniz.

Nerede……..:…….
Ne kadar süre:…….

11. Haftada kaç kez gazete okursunuz? □ Hiç okumam □ 1-2 kez □ 3-4 kez □ neredeyse her gün

12. Bir ayda kaç tane ders-dışı kitap (örn. roman, kültür kitabı vb.) okuyorsunuz? □ Hiç okumam □ 1-2 □ 3-4 □ 4'den fazla

APPENDIX J

APPENDIX

TEZ FOTOKOPİ İZİN FORMU

ENSTİTÜ

YAZARIN

Soyadı : AKDERE

Adı : NİHAL

Bölümü : EĞİTİM BİLİMLERİ

TEZİN ADI (İngilizce) : Pre-Service Teachers' Critical Thinking Levels, Attitudes towards Teaching for Critical Thinking and Self Efficacy Beliefs

TEZİN TÜRÜ : Doktora

1. Tezimin tamamı dünya çapında erişime açılsın ve kaynak gösterilmek şartıyla tezimin bir kısmı veya tamamının fotokopisi alınsın. ☐
2. Tezimin tamamı yalnızca Orta Doğu Teknik Üniversitesi kullancılarının erişimine açılsın. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) **X**
3. Tezim bir (1) yıl süreyle erişime kapalı olsun. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) **X**

Yazarın imzası ..... Tarih .....

APPENDIX K

HOMOGENEITY OF VARIANCE

Selected Output:

Box's Test of Equality of Covariance Matrices[a]

Box's M	3,605
F	,598
df1	6
df2	2918491,386
Sig.	,732

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + GEN

Box's Test of Equality of Covariance Matrices[a]

Box's M	183,444
F	1,327
df1	130
df2	44688,963
Sig.	,008

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + NEWSP + BKSREAD + NEWSP * BKSREAD

Box's Test of Equality of Covariance Matrices[a]

Box's M	55,352
F	3,056
df1	18
df2	2265664,507
Sig.	,000

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Major

Box's Test of Equality of Covariance Matrices[a]

Box's M	49,316
F	1,602
df1	30
df2	39473,539
Sig.	,020

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + GPA

Box's Test of Equality of Covariance Matrices[a]

Box's M	214,327
F	1,000
df1	190
df2	12199,487
Sig.	,487

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + MOTHED + FATHED + MOTHED * FATHED

Box's Test of Equality of Covariance Matrices[a]

Box's M	29,785
F	1,627
df1	18
df2	59064,957
Sig.	,045

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + GPA

Box's Test of Equality of Covariance Matrices[a]

Box's M	270,719
F	1,295
df1	190
df2	18537,812
Sig.	,004

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + MOTHED + FATHED + MOTHED * FATHED

Box's Test of Equality of Covariance Matrices[a]

Box's M	108,315
F	1,245
df1	80
df2	12043,846
Sig.	,069

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + TEACHINTENT + TEACHMOTIV + TEACHINTENT * TEACHMOTIV

Box's Test of Equality of Covariance Matrices[a]

Box's M	10,123
F	1,676
df1	6
df2	539466,576
Sig.	,122

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + CTEDUC

APPENDIX L

TURKISH SUMMARY

"Değişim dışında hiç bir şey kalıcı değildir" (Heraclitus, M.Ö. 500); ve
"Değişim yaratma ve ona ayak uydurmada en iyi olanağı,
eleştirel düşünme becerileri sağlar"
(Halpern, 2001, s. 284).

TÜRKİYE'DE ÖĞRETMEN ADAYLARININ ELEŞTİREL DÜŞÜNME BECERİLERİ,

ELEŞTİREL DÜŞÜNME ÖĞRETİMİNE YÖNELİK TUTUMLARI VE

ÖZ YETERLİK SEVİYELERİ

GİRİŞ

Hayatın her alanında süreklilik arz eden değişimler, bireyleri, genel amacı sadece toplumdaki değişimlere ayak uydurmak için değil, aynı zamanda değişimler yaratıp toplumu dönüştürmek için bilgi, beceri, tutum, ve davranışlar ile donatmak olan örgün eğitim üzerinde etkilidir. Böylece, toplum ve eğitimin birbiri üzerinde etkisi vardır.

Teknoloji, bilim ve toplumsal çevredeki hızlı değişimlerin yanı sıra öğrenmedeki yeni yaklaşımlar ve kuramların ortaya çıkışı ve gelişimi, bireyler için yeni zorluklar ve

ihtiyaçlar yaratmaktadır. Bu da örgün eğitimin ve öğretim yöntemlerinin sorgulanmasına neden olmaktadır. 20. yüzyılda bilişsel ve yapısalcılık öğrenme kuramlarımlarının gelişmesiyle, sorun çözme ve üst düzey düşünme becerileri önem kazanmıştır. Eğitimin amacı, bilgi aktarımından düşünme becerilerinin öğretimine kaymaştır. Dewey'e göre (McGregor, 2007) okullar, öğrencilerin düşünme becerileri konusundaki ihtiyaçlarına cevap vermelidir. Piaget'ye (1995) göre eğitimin başlıca amacı, bireylere yeni şeyler üretmek için kullanabilecekleri beceriler ile donatmak ve yaratıcı bireyler, mucit ve kaşifler yetiştirmektir. Eğitimin bir başka amacı ise eleştirel düşünen bireyler yetiştirmektir.

Eleştirel düşünme, eğitim reformunun ve tekrar yapılanmanın merkezindedir. Çünkü eleştirel düşünme, 21. yüzyılda meydana gelen değişimlerin merkezindedir. Çağımız, bilgiye ve farklı dünya görüşlerine erişimin kolay olduğu Küreselleşme ve Bilgi Çağı olarak nitelendirilmektedir. Bu nedenle, küresel ve bilgi çağında mücadele edebilmek ve ayakta kalabilmek için bireylere hayat boyu öğrenme ve sorun çözme becerileri geliştirmek gerekir. Bunu sağlayacak olan da eleştirel düşünme becerisidir. Eleştirel düşünerek, bireyler aktif ve etkin hayat boyu öğrenme, sorun çözme ve doğru kararlar verebilme ve otonom düşünme yetisine sahip olabileceğine dair ortak bir görüş mevcuttur (Kincheloe, 2004; Lai, 2009). Ennis (2002)'e göre eleştirel düşünme, neye inanacağına ve ne yapacağına dayalı mantıklı, yansımacı düşünmedir.

Eleşirel düşünme üzerine olan alan yazıda eleştirel düşünme bir çok farklı şekilde tanımlanmaktadır. Ancak çeşitli tanımlara rağmen, dünyada her alanda ve seviyede eğitim, öğrencilerin eleştirel düşünme becerilerini geliştirme misyonunu edinmesi gerektiği konusunda hemfikirdir (Pithers, 2000).

Türkiye'deki eğitim sistemi de çağımızın zorlukları ile başedebilmek için öğrencilerde bazı jenerik beceriler geliştirmeyi amaç edinmiştir. 2005 yılında yapılan Eğitim Reformu ile Milli Eğitim Bakanlığı, öğrenci merkezli bir yaklaşım benimsemiş ve aşağıda sıralanan becerilerin tüm ders programlarında kazanılması hedeflenen jenerik beceriler olarak belirlemiştir:

1. Eleştirel düşünme becerisi
2. Yaratıcı düşünme becerisi
3. İletişim becerisi
4. Araştırma – Sorgulama becerisi
5. Sorun-çözme becerisi
6. Teknolojiyi kullanabilme becerisi
7. Girişimcilik becerisi
8. Türkçe dilini doğru ve etkili kullanma

(MEB, 2007)

Ennis'e (1991) göre, eleştirel düşünme öğretimindeki en önemli unsur öğretmendir. Bir eğitim programı yenilenebilir ve yeni öğrenim kazanımları belirlenebilir. Ancak, programın istekli ve donanımlı öğretmenler tarafından etkili bir şekilde uygulanabilmesi düşünülmesi gereken başka bir boyuttur.

Eleştirel düşünme öğretiminde öğretmenlerin etkili olabilmeleri için üç tür girdiye ihtiyaçları vardır: eleştirel düşünebilme yetisi, eleştirel düşünme öğretimine yönelik olumlu bir tutum, ve eleştirel düşünme öğretimi konusunda güçlü öz yeterlik inancı.

Eleştirel düşünmeyi öğretebilmek için öğretmenlerin de eleştirel düşünme yetisine sahip olmaları gerektiği yönünde alan yazıda ortak bir görüş vardır. Eleştirel düşünmeyi modelleme, eleştirel düşünme öğretimindeki en etkili stratejilerinden biridir (Aslan, 2003; Czaja-Chudyba, 2009; Erdoğan ve Uşak, 2005; Halpern, 1988; Kincheloe, 2004; Yapıcı, 2007; Yetim ve Göktaşı, 2004). Ancak, Seferoğlu ve Akbıyık'a (2006) göre, öğretmenlerin eleştirel düşünme becerileri açısından Türkiye'de durum hiç de iç açıcı değildir. Öğretmenlerin eleştirel düşünme seviyelerini ölçen çalışmalar, öğretmenlerin düşük seviyede eleştirel düşünebildiklerini göstermektedir (Güven & Kürüm, 2007). Durum böyle ise, öğretmen yetiştirme programları, öğretmen adaylarının mezun olmadan önce eleştirel düşünme becerilerini geliştirme sorumluluğunu üstlenmeleri gerekir.

Gibs'e (2002) göre, öğretmen yetiştirme programları, öğretmenlerin bu tür yetilerini geliştirme yönünde yapacağı çalışmalar yeterli olmaz. Çünkü öğretmenlerin bir konuda

bilgi ve beceriye sahip olmaları, onların istenen şekilde öğretim yapmada isteklilik göstermelerini garantilemez. Öğretmenlerin olum bir tutum geliştirmeleri gerekir. O halde, öğretmenlerin öğrencilerinde eleştirel düşünmeyi geliştirmeleri beklenmekteyse, öğretmen yetiştirme programları da öğretmen adaylarında eleştirel düşünme öğretimine yönelik olumlu bir tutum geliştirme sorumluluğunu üstlenmelidir.

Ayrıca Gibs, öğretmen yetiştirme programlarının öğretmen davranışı ile beklenen öğrenim kazanımları arasındaki ilişkiyi sağlamakta, ancak öğretmenlerin kendi yetilerine inanarak (öz yeterlik inancı) bunu sağlama konusuna eğilmemektedirler. Öz yeterlik inancı, bir öğretmenin nasıl davranacağının göstergesidir. Yüksek yeterlik seviyesine sahip olan bir öğretmen, gelecekte yapacakları öğretim konusunda inançları ve güvenleri yüksek olur. Ayırca, güçlü öz yeterlik inançlarına sahip olan öğretmenler yeni öğretim yöntemleri kullanma eğilimi göstermektedirler (Gibson & Dembo, 1984) ve öğrencilerinin daha başarılı olmalarını sağlamaktadırlar (Brookover et al., 1979).
Sonuç olarak, karşılıklı etkileşim halinde olan toplum ve eğitimde meydana gelen değişimler nedeniyle eleştirel düşünme öğretimi önem kazanmıştır. Eleştirel düşünme becerisinin etkili bir şekilde öğretilmesinde öğretmenlerin eleştirel düşünme becerileri, onların eleştirel düşünme öğretimi konusundaki tutumları ve öz yeterlik inançlarının rolü büyüktür. Bu da hizmet öncesi ve hizmet içi öğretmen yetiştirme programlarının dikkate almaları gereken bir husustur.

Çalışmanın Amacı

Bu çalışma, Türkiye'deki öğretmen adaylarının eleştirel düşünme becerilerini, eleştirel düşünme öğretimine yönelik tutumlarını ve eleştirel düşünme öğretimine yönelik öz yeterlik inançlarını incelemeyi amaçlamıştır. Ayrıca bu çalışma, sözü edilen üç değişken arasında bir ilişki olup olmadığını araştırmak, ve öğretmen adaylarının bazı demografik özellikleri ile bu üç değişken arasında istatistiksel açıdan anlamlı bir ilişki olup olmadığını araştırmayı amaç edinmiştir.

Çalışmanın araştırma soruları aşağıdaki gibidir:

(1) Öğretmen adaylarının eleştirel düşünme seviyeleri nelerdir?

(2) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları nelerdir?

(1) Öğretmen adaylarının (i) performans yeterlik ve (ii) kazanım yeterliği açısından eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri nelerdir?

(2) Öğretmen adaylarının eleştirel düşünme, eleştirel düşünme öğretimine yönelik tutumları ve eleştirel öğretimine yönelik öz yeterlik seviyeleri arasında bir ilişki var mıdır?

a) Öğretmen adaylarının eleştirel düşünme ve eleştirel düşünme öğretimine yönelik tutumları arasında bir ilişki var mıdır?
b) Öğretmen adaylarının eleştirel düşünme ve eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri arasında bir ilişki var mıdır?
c) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları ve öz yeterlik seviyeleri arasında bir ilişki var mıdır?

(3) Öğretmen adaylarının eleştirel düşünme becerileri bazı demografik değişkenler açısından farklılık göstermekte midir?

a) Öğretmen adaylarının eleştirel düşünme becerileri cinsiyet açısından değişkenlik göstermekte midir?
b) Öğretmen adaylarının eleştirel düşünme becerileri ana dalları açısından değişkenlik göstermekte midir?

c) Öğretmen adaylarının eleştirel düşünme becerileri akademik başarı açısından değişkenlik göstermekte midir?

a) Öğretmen adaylarının eleştirel düşünme becerileri mezun oldukları lise açısından değişkenlik göstermekte midir?
b) Öğretmen adaylarının eleştirel düşünme becerileri anne, babanın eğitim düzeyleri açısından değişkenlik göstermekte midir?
c) Öğretmen adaylarının eleştirel düşünme becerileri okuma alışkanlıkları açısından değişkenlik göstermekte midir?
d) Öğretmen adaylarının eleştirel düşünme becerileri öğretmenlik mesleğine yönelik motivasyon düzeyleri açısından değişkenlik göstermekte midir?
e) Öğretmen adaylarının eleştirel düşünme becerileri daha önce eleştirel düşünme öğretimi konusunda eğitim görüp görmemelerine göre değişkenlik göstermekte midir?

(4) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları, bazı demografik değişkenler açısından farklılık göstermekte midir?

a) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları, cinsiyet açısından değişkenlik göstermekte midir?
b) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları, ana dalları açısından değişkenlik göstermekte midir?
c) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları, akademik başarı açısından değişkenlik göstermekte midir?
d) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları, mezun oldukları lise açısından değişkenlik göstermekte midir?
e) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları, anne, babanın eğitim düzeyleri açısından değişkenlik göstermekte midir?
f) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları, okuma alışkanlıkları açısından değişkenlik göstermekte midir?

g) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları, öğretmenlik mesleğine yönelik motivasyon düzeyleri açısından değişkenlik göstermekte midir?
h) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları, daha önce eleştirel düşünme öğretimi konusunda eğitim görüp görmemelerine göre değişkenlik göstermekte midir?

(5) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri, bazı demografik değişkenler açısından farklılık göstermekte midir?

a) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri, cinsiyet açısından değişkenlik göstermekte midir?
b) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri, ana dalları açısından değişkenlik göstermekte midir?
c) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri, akademik başarı açısından değişkenlik göstermekte midir?
d) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri, mezun oldukları lise açısından değişkenlik göstermekte midir?
e) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri, anne, babanın eğitim düzeyleri açısından değişkenlik göstermekte midir?
f) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri, okuma alışkanlıkları açısından değişkenlik göstermekte midir?
g) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri, öğretmenlik mesleğine yönelik motivasyon düzeyleri açısından değişkenlik göstermekte midir?
h) Öğretmen adaylarının eleştirel düşünme öğretimine yönelik öz yeterlik seviyeleri, daha önce eleştirel düşünme öğretimi konusunda eğitim görüp görmemelerine göre değişkenlik göstermekte midir?

Çalışmanın Önemi

Değişen dünya koşulları nedeniyle öğretmenlerin öğrencilerine hayat boyu öğrenmeleri, etkili bir şekilde sorun çözebilmeleri, doğru kararlar verebilmeleri ve sağduyulu bireyler olarak yetişmeleri için onların eleştirel düşünme becerilerini geliştirmeleri beklenmektedir (Facione, 1996; Brookfield, 1987; Sternberg, 1986).

Eleştirel düşünme becerisi, Milli Eğitim Bakanlığı'nın eğitim programlarında öğretilmesi beklenilen jenerik bir beceri olarak listelenmesi, ulusal düzeyde eleştirel düşünme becerisine değer verildiğini gösterir (MEB, 2011). Ancak, bireysel düzeyde, Türkiye'deki öğretmenlerin eleştirel düşünmeye değer verip vermedikleri, eleştirel düşünme yetisine sahip olup olmadıkları ve kendilerinin ne derece eleştirel düşünebildikleri araştırılması gereken hususlardır.

Bir şeyi etkili bir şekilde öğretebilmek için öğretmenlerin istekli olmaları ve öğrettikleri konu hakkında olumlu bir tutuma sahip olmaları gerekir (Barros & Ellia, 1998).

Ayrıca, güçlü öz yeterlik inançlarına sahip olan öğretmenlerin yaygın olarak olumlu öğretmen davranışları ve öğrenim kazanımları ile ilişkilendirilir (Henson, 2001). Yüksek yeterlik inancına sahip olanlar yeni öğretim yöntemleri denerler, daha iyi öğretim yöntemleri ararlar ve yeni öğretim materyalleri denerler (Allinder, 1994; Guskey, 1988; Stein & Wang, 1988).

O halde, hizmet öncesi öğretmen adaylarının tutumları ve öz yeterliklerini anlamak, öğretmen yetiştirme programları için önemlidir.

YÖNTEM

ARAŞTIRMA DESENİ

Bu çalışmada Türkiye'deki öğretmen adaylarının eleştirel düşünme seviyeleri, eleştirel düşünme öğretimine yönelik tutumları, ve eleştirel düşünme öğretimine ilişkin özyeterlik inançlarını belirlemeyi amaçlanmıştır. Ayrica, bu üç değişken arasındaki korelasyonu incelemk ve öğretmen adaylarının bazı demografik özelliklerinin bu üç değişken üzerindeki etkisini incelemek amaçlanmıştır.Bu amaç doğrultusunda araştırma deseni olarak tarama yöntemi kullanılmıştır. Çalışmada ondört il'den 1091 öğretmen adayına ulaşılmış ve bu adaylara araştırmacı tarafından hazırlanan dört adet veri toplama aracı uygulanmıştır.

EVREN VE ÖRNEKLEM

Çalışma evrenini Türkiye'de Eğitim Fakültesi son sınıf öğretim gören son sınıf öğrencileri oluşturmaktadır. 2010-2011 yılına ait Öğrenci Seçme Merkezi'nin ilan ettiği Eğitim Fakültesi Bölümlerine ait öğrenci sayıları dikkate alınarak Türkiye'nn her bölgesinde en çok Eğitim Fakültesine sahip olan üç tane devlet üniversitesi belirlenmiştir. Bu üniversitilere , Eğitim Fakültesi son sınıf öğrencilerinden veri toplamak için başvurulmuştur. İzin alınabilen üniversiteler şunlardır:
Ortadoğu Teknik Üniversitesi, Hacetepe Üniversitesi, Gazi Üniversitesi, Selçuk Üniversitesi Anadolu Üniversitesi , Çukurova Üniversitesi,Marmara Üniversitesi, Karadeniz Teknik Üniversitesi,Gaziantep Üniversitesi, Abant İzzet Baysal Üniversitesi, Yüzyüncü Üniversitesi, 9 Eylül Üniversitesi,Muğla Üniversitesi, Atatürk Üniversitesi

ÖRNEKLEM ÖZELLİKLERİ

Bu çalışma yedi bölgeden on dört devlet üniversitesinden 1235 son sınıfta okuyan öğretmen adayının katılımı ile yürütülmüştür. 140 öğretmen adayı uygulanan veri

toplama araçlarını tam olarak doldurmadıkları için çalışma dışı bırakılmıştır. Özetle, bu çalışma analizleri 1091 öğrenciden gelen veriler üzerinden yapılmıştır.

Çalışmaya katılan öğretmen adaylarının % 27,96'sı (*n*=302) matematik, biyoloji, kimya, ve fizik eğitim bölümlerinin birinde eğitim görmektedir. (Grup 1) : %26,95 coğrafya, Tarih, Türk dilli ve edebiyatı, ve din ,kültür ve ahlak eğitimi bölümlerin birinde eğitim görmektedir. (Grup 2): %26,95 (*n*=294) Ingilizce Dilli ve Fransızce Dilli eğitim bölümlerinin birinde eğitim görmekteydi; ve %18,42 (*n*=201) Türk Dilli eğitimi bölümünde okumaktaydı.

Öğretmen adaylarının %63,2'si (n=689) bayan, %36,8'si (*n*=401) erkek öğrencilerinden oluşmaktaydı.

Öğretmen adaylarının anne ve babalarının eğitim durumları tablo 1.1 gösterilmiştir:
Öğretmen adaylarının kümülatif not ortalamalrı 4 üzerinden 2,9'dur. Gruplara göre kümülatif not ortalamaları Tablo 1.2'de sunulmuştur.Öğretmen adaylarının mezun oldukları lise türüne gelince %32.8 'i (*n*=356) Devlet okulu, %20,9'u (*n*=228) öğretmen yetiştirme okulları, %17,5'i (*n*=191) Süper lise, 16,2'si (*n*=177) Anadolu Lisesi, 8,7'si (*n*=95) Meslek ve Teknik Lise, 2,7'si (*n*=29) Özel Lise ve 0,9'su (*n*=10) Fen Lisesi mezunuydu. 0,4'ü hangi liseden mezun olduklarını belirtmemişlerdi.

Bu adaylardan %7,1'i (*n*=77) ayda dört kitapdan fazla, % 13,4'ü 3-4 kitap arası, %65,62'si (*n*=716) ortalama 1-2 kitap, %13,1'i (*n*=143) hiç kitap okumadıklarını belirtmişlerdir. Gazete okuma sıklığına gelince %39 (*n*=335) haftada her gün, %27,7'si (*n*=268) haftada 3-4 kez, %36,2'si (*n*=293) haftada 1-2 kez ve 8,2'si (*n*=89) hiç gazete okumadıklarını belirtmişlerdir.

Öğretmen adaylarının öğretmenlik mesleğine yönelik motivasyonlarına gelince %38.3'ü (*n*=418) orta düzeyde, %10,2'si (*n*=111) düşük seviyede ve %2'si (*n*=22) hiç motivasyonlarının olmadığını belirtmişlerdir.

Daha önce eleştirel düşünme öğretimi konusunda eğitim görme durumlarına gelince %80,4'ünün (*n*=878) hiç eğitim almadıkları, %18,7'sinin (*n*=204) ise bir dönemlik eleştirel okuma dersi aldıkları görülmüştür.

Veri Toplama Araçları

Araştırmacı tarafından dört adet very topalam aracı geliştirilmiştir: (1) Eleştirel Düşünme Testi, (2) Eleştirel Düşünme Öğretimine Yönelik Tutum Ölçeği, (3) Eleştirel Düşünme Öğretimine İlişkin Öz Yeterlik Ölçeği ve (4) Katılımcı Bilgi Formu.

Tüm veri toplama araçlarının içerik geçerliğini sağlamak için araçlar, pilot çalışması öncesi ve sonrası 5 kişilik bir uzman grubunun görüşüne sunulmuştur. Uzmanların değerlerindirmeleri ve görüşleri sonucunda gerekli düzeltmeler yapılmıştır.

Eleştirel Düşünme Testi

Eleştirel düşünme testi, toplamda 10 senaryodan oluşmaktadır. Senaryolar, 4-5 cümle, karşılıklı konuşma veya bir grakif sunumu ile tarif edilen bir duruma dayalı olup içlerinde bir mantık hatası veya çözüm gerektiren bir sorun veya karar verilmesi gerekilen bir durum içermektedirler. Her senaryodan sonra bir açık uçlu soru bulunmaktadır. Bu sorunun 4-5 cümle ile yanıtlanılması beklenilmektedir.

Pilot uygulama ve uzman görüşlerinin alınması ile gerekli düzeltmeler yapılmıştır. Test'in güvenirlik alfa katsayısı, pilot uygulamada .79, asıl uygulamada ise .78 olduğu gözlenmiştir.

Eleştirel Düşünme Öğretimine Yönelik Tutum Ölçeği

Eleştirel Düşünme Öğretimine Yönelik Tutum Ölçeği, toplam 20 maddeden oluşmaktadır, ve 1- *Hiç katılmıyorum*, 2- *Katılmıyorum*, 3-*Kısmen Katılmıyorum*, 4-*Kısmen Katılıyorum*, 5-*Katılıyorum* ve 6-*Tamamen Katılıyorum* şeklinde 6'lı dereceleme ile cevaplanmaktadır.

Pilot uygulama ve uzman görüşleri doğrultusunda içerik ile ilgili gerekli düzeltmeler yapılmıştır. Pilot uygulamada yapılan faktör analizi sonucunda ölçeğin maddeleri, 4 faktör altında toplanmıştır ve faktörler şöyle adlandırılmıştır:

Faktör 1: Eleştirel düşünmeye yönelik tutum
Faktör 2: Eleştirel düşünmeye yönelik ön yargılar
Faktör 3: Eleştirel düşünme öğretimine yönelik direnç
Faktör 4: Eleştirel düşünme öğretimi ve değerlendirmesine yönelik tutum

Ana uygulamada doğruylayıcı faktör analizi ile bu model doğrulanmıştır.

Tüm test'in iç güvenirlik Cronbach alfa katsayısının, pilot uygulamada .89, asıl uygulamada ise .87 olduğu görülmüştür. Alt boyutların güvenirlik katsayıları ise sırasıyla pilot uygulamada 0.86, 0.80, 0.88 ve 0.86, asıl uygulamada ise .81,.86, .85 ve .84 olarak hesaplanmıştır.

Eleştirel Düşünme Öğretimine İlişkin Öz Yeterlik Ölçeği

Bu ölçek, iki alt ölçekten oluşmaktadır: *Performans Öz Yeterlik Alt Ölçeği* ve *Kazanım Öz Yeterlik Alt Ölçeği*. Performans Öz Yeterlik Alt Ölçeği, toplam 24 maddeden oluşmaktadır, ve 1- *Hiç katılmıyorum*, 2- *Katılmıyorum*, 3-*Kısmen Katılmıyorum*, 4-*Kısmen Katılıyorum*, 5-*Katılıyorum* ve 6-*Tamamen Katılıyorum* şeklinde 6'lı dereceleme ile cevaplanmaktadır.

Pilot uygulama ve uzman görüşlerinin alınmasıyla içerikte gerekli düzeltmeler yapılmıştır. Pilot uygulama sırasında yapılan faktör analizinde maddeler 4 faktör altında toplanmıştır ve aşağıdaki gibi isimlendirilmişlerdir:

Faktör 1: Kişisel yeterlik

Faktör 2: Eleştirel düşünme öğretimi için plan yapma

Faktör 3: Eleştirel düşünme öğretimi ve değerlendirme

Faktör 4: Eleştirel düşünme öğretimindeki zorlukların üstesinden gelme

Performans Öz Yeterlik Alt Ölçeğinin iç güvenirlik Cronbach alfa katsayısı, tüm ölçek için hem pilot hem asıl uygulamada .89 olarak hesaplanmıştır. Ölçeğin faktörlerine ait iç güvenirlik alfa katsayı değerleri ise sırasıyla pilot uygulamada 0.93, 0.76, 0.83 ve 0.79, asıl uygulamada ise .77, .85, .90 ve .73 olarak hesaplanmıştır.

Kazanım Yeterlik Alt Ölçeği toplam 19 maddeden oluşmaktadır, ve 1- *%0-20* oranında yapabilirim, 2- *%21-40* oranında yapabilirim, *%41-60* oranında yapabilirim, *%61-80* oranında yapabilirim ve *%81-100* oranında yapabilirim şeklinde 5'li dereceleme ile cevaplanmaktadır.

Pilot uygulama ve uzman görüşlerinin alınmasıyla içerikte gerekli düzeltmeler yapılmıştır. Pilot uygulama sırasında yapılan faktör analizinde maddeler 3 faktör altında toplanmıştır ve aşağıdaki gibi isimlendirilmişlerdir:

Faktör 1: Eleştirel düşünme metabilişsel becerilerinin öğretimi

Faktör 2: Eleştirel düşünme bilişsel becerilerinin öğretimi

Faktör 3: Eleştirel düşünme tutumlarının öğretimi

Kazanım Öz Yeterlik Alt Ölçeğinin iç güvenirlik Cronbach alfa katsayısı, tüm ölçek için pilot uygulamada .92, asıl uygulamada .95 olarak hesaplanmıştır. Ölçeğin faktörlerine

ait iç güvenirlik alfa katsayı değerleri ise sırasıyla pilot uygulamada .88, .87 ve .86, asıl uygulamada ise 88, .87, ve .92 olduğu görülmüştür.

Katılımcı Bilgi Formu

Katılımcı Bilgi Formu, çalışmaya katılan öğretmen adaylar hakkında şu bilgileri elde etmek için uygulanmıştır: üniversitede eğitim gördükleri bölümleri, kümülatif not ortalamaları, mezun oldukları lise türü, anne ve babalarının eğitim durumları, kitap okuma alışkanlıkları, eleştirel düşünme öğretimine yönelik motivasyon düzeyleri, ve daha önce eleştirel düşünme eğitimine yönelik ders alıp almadıkları.

Veri toplama Süreci

Bu çalışmada araştırmacının kendisi ve veri toplama süreci konusunda eğittiği 3 ilave kişi, veri toplamak üzere Türkiye'nin yedi coğrafi bölgesinden toplamda 14 üniversiteye giderek veri toplama araçlarını belirlenen Eğitim Fakültesi bölüm ve snıflarına girerek uygulamışlardır.

Data Analizi

Bu çalışmada kullanılan başlıca analizler, tanımlayıcı, korelasyon ve çok yönlü varyans analizleridir.

BULGULAR

Çalışmada kullanılan tanımlayıcı, korelasyon ve çok yönlü varyans analizi (MANOVA) yapılmadan önce veri girişinde yapılan hataların saptanıp düzeltilmeleri, kayıp veri miktarının saptanarak kayıp verilere ilişkin yönteme karar verilmesi ve verilerdeki uç noktaların saptanarak analizlerden çıkartılmaları amacıyla veri taraması yapılmıştır.

Veri taraması tamamlandıktan sonra veri toplama araçlarının geçerlik ve güvenirlik çalışmaları yapılmıştır.

Eleştirel Düşünme Öğretimine Yönelik Tutum Ölçeği ve Eleştirel Düşünme Öğretimine İlişkin Öz Yeterlik Ölçeğinin pilot uygulamasından sonra faktör analizi ile elde edilen faktörlerin yapı geçerliğini onaylamak amacı ile AMOS 20.0 programı kullanılarak onaylayıcı faktör analizi yapılmıştır.

Bu çalışmanın ilk üç araştırma sorusu, örneklemi oluşturan öğretmen adaylarının (i) eleştirel düşünme seviyeleri, (ii) eleştirel düşünme öğretimine yönelik tutumları ve (iii) eleştirel düşünme öğretimine ilişkin öz yeterlik inançlarının performans ve kazanım öz yeterlik inançları açısından tanımlanmasına ilişkindir.

Çalışmanın bu ilk üç sorusuna ilişkin analizler sonucunda, öğretmen adaylarının eleştirel düşünme becerilerinin orta-alt düzeyde olduğu tespit edilmiştir. Eleştirel düşünme öğretimine yönelik tutumları orta derecede olumlu, öz yeterlik inaçları ise yine orta derecede güçlü bulunmuştur.

Çalışmanın dördüncü araştırma sorusu, eleştirel düşünme, eleştirel düşünme öğretimine yönelik tutum ve eleştirel düşünme öğretimine ilişkin öz yeterlik inançları arasındaki ilişkinin Pearson korelasyon analizi ile araştırılmasını gerektirmiştir. Eleştirel düşünme öğretimine yönelik tutum ile eleştirel düşünme öğretimine ilişkin öz yeterlik inancının performans yeterliği boyutu arasındaki ilişki orta derecede anlamlı çıkmıştır [$r = .530,\ p < .01$].. Diğer değişkenler arasındaki ilişkinin zayıf çıkmıştır.

Çalışmının son üç sorusu, öğretmen adaylarının bazı özellikleri ile eleştirel düşünme düzeyleri, eleştirel düşünme öğretimine yönelik tutumları, ve eleştirel düşünme öğretimine ilişkin öz yeterlik inançları arasındaki ilişkinin araştırılmasına dayanmaktadır. MANOVA kullanılarak elde edilen bulgularda, bağımsız değişkenler ile eleştirel düşünme becerisi arasında anlamlı bir ilişki bulunmamıştır. Eleştirel düşünme

öğretimine yönelik tutumları ile öğrenim gördükleri bölümleri, kümülatif not ortalamları, mezun oldukları lise, babanın eğitim durumu ve okuma alışkanlıkları arasında ilişki olduğu tespit edilmiştir. Eleştirel düşünme öğretimine ilişkin öz yeterlik inançları açısından bakıldığında ise, performans öz yeterliği ile adayların daha önce eleştirel düşünmeye dayalı bir ders alıp almamaları arasında anlamlı bir ilişki, kazanım öz yeterliği ile de öğretmen adaylarının eğitim gördükleri bölüm, kümülatif not ortalamaları ve okuma alışkanlıkları arasında anlamlı bir ilişki olduğu gözlenmiştir.

TARTIŞMA

Bu çalışmada, öğretmen adaylarının eleştirel düşünme becerilerinin orta-alt düzeyde olduğu saptanmıştır. Bu bulgu alan yazındaki bir çok çalışmanın bulguları ile tutarlıdır (Dutoğlu & Tuncel, 2008; Küçük, 2007). Bir çok çalışmada ise öğretmen adaylarının eleştirel düşünme becerileri açısından düşük düzeyde oldukları ifade edilmektedir (Akar, 2007; Beşoluk & Önder, 2009; Şen, 2009; Zayıf, 2009). Bu çalışmaların sonuçları arasındaki farklılık, çalışmalarda eleştirel düşünmenin hangi alt boyutlarının ölçüldüğünden kaynaklanmaktadır. Sadece eleştirel düşünmenin bilişsel boyutu dikkate alınarak değerlendirme yapılan çalışmalarda öğretmen adaylarının düşük seviyede, eleştirel düşünmenin tutum boyutunu dikkate alan ve öğretmen adaylarının algılarını temel alan ölçme araçları kullanılan çalışmalarda öğretmen adaylarının orta düzeyde eleştirel düşünebildikleri ifade edilmektedir (Özmen, 2006).

Bu çalışmanın bulgularından bir diğeri, öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumlarının orta derecede de olsa olumlu olmasıdır. Öğretmen adaylarının eleştirel düşünme kavramına ve öğretimine belli bir ölçüde inandıkları ve değer verdikleri söylenebilir. Ancak, bu olumlu tutumun mesleklerini icra etmeye başladıklarında da süreklilik göstereceği ya da eleştirel düşünme öğretimine önem verecekleri anlamına gelmez. Tsui'nin (2011) yaptığı bir çalışma ile eleştirel düşünme

öğretimi konusunda olumlu tutuma sahip öğretmenlerin sınıflarında eleştirel düşünme öğretimi konusunda çok bir şey yapmadıkları gözlemlenmiştir.

Bu çalışmaya katılan öğretmen adaylarının eleştirel düşünme öğretimine ilişkin öz yeterlik düzeyleri ise performans yeterliği açısından orta düzeyde, kazanım yeterliği açısından ise orta düzeyin az üstü seviyede oldukları saptanmıştır. Bu bulgulara dayanarak, öğretmen adaylarının kendilerini eleştirel düşünme öğretimi konusunda yüksek düzeyde yeterli görmedikleri söylenebilir. Öğretmen adaylarının yeterlik algılarının öğretim performanslarını etkileyebileceği (Hoy & Spero, 2005) göz önüne alınırsa, kendilerini orta seviyede yeterli gören öğretmen adaylarının eleştirel düşünme öğretimi konusundaki yeterlikleri de orta seviyede olacağı beklenebilir.

ÖNERİLER

Kuram ve uygulamaya yönelik öneriler aşağıda özetlenmiştir:

1. Öğretmen yetiştirme programları, öğretmen adaylarının eleştirel düşünme becerileri, eleştirel düşünme öğretimine yönelik tutumları ve eleştirel düşünme öğretimine ilişkin öz yeterlik düzeyleri açısından değerlendirilmeli ve öğretmen adayalarının bu üç açıdan ihtiyaçları belirlenebilir. Öğretmen adaylarının ihtiyaçları belirlendikten sonra, öğretmen yetiştirme programları, programlarında gerekli iyileştirmeleri yapabilir. Bunun sonuncunda, eleştirel düşünmeleri daha yüksek, eleştirel düşünme öğretimine yönelik tutumları daha olumlu ve öz yeterlik düzeyleri daha güçlü olan öğretmen adayları yetiştirilebilir.

2. Eleştirel düşünme üzerine olan alan yazında yer alan eleştirel düşünmeyi ölçme araçları, çoğunlukla batı kökenlidir. Ayrıca mevcut olan araçlar, kapsam ve ölçtükleri alt beceri ve tutumlar açısından değişkenlik göstermektedir. Bu nedenle, gerek ulusal düzeyde gerekse kurumsal düzeyde eleştirel düşünme kavramının tanımlanması ve alt becerilerinin saptanmasından sonra ihtiyaca

uygun eleştirel düşünme araçları geliştirme çalışmaları yapılabilir. Ayrıca öğretmen adaylarına veya öğretmenlere kendi öğrencilerinin eleştirel düşünme becerilerini ölçme yöntemleri ve uygun ölçme araçları geliştirme konusunda hizmet öncesi veya hizmet içi eğitimler verilebilir.

3. Öğretmen adaylarının eleştirel düşünme öğretimine yönelik tutumları ve öz yeterlik inançları yüksek olsa da öğretmenliğe başladıktan özellike lise öğretmenlerinin tutumlarında ve öz yeterlik inançlarında düşüş görülebilir. Bunun nedeni ise lise öğrencilerinin daha çok üniversite giriş sınavına hazırlık eğitimi için çoktan seçmeli sorular çözme odaklı çalıştıkları ve eleştirel düşünmeyi geliştirici etkinliklere karşı ilgi duymadıklarına dayanır. O halde, üniversite giriş sınavında eleştirel düşünmeyi gerektirecek sorular eklenerek öğrencilerin eleştirel düşünmeyi geliştirici etkinliklere ihtiyaç ve ilgi duymaları sağlanabilir.

4. By çalışmada öğretmen adaylarının eleştirel düşünmeye yönelik tutumları orta derecede olumlu bulunmuştur. Öğretmen yetiştirme programları, öğretmenlerin eleştirel düşünme konusunda sadece bilgi ve öğretimdeki performanslarını değil tutumlarını da değerlendirebilir. Böylece öğretmen adaylarının eleştirel düşünme öğretimine olan olumlu tutumları düşük veya olumsuz bulunursa, bunun nedeni araştırılarak öğretmen adaylarının eleştirel düşünme öğretimine değer vermeleri ve olumlu bakmaları sağlanabilir. Ancak bu sağlanırsa, öğretmen adaylarının mesleklerini icra etmeye başladıklarında eleştirel düşünmeyi öğretme konusunda gerekli çabayı sarfedecekleri umut edilebilir.

5. Bu çalışmada, öğretmen adaylarının eleştirel düşünme becerilerinin orta-alt düzeyde oldukları bulunmuştur. Öğretmen yetiştirme programlarında, her yılın sonunda öğretmen adaylarının eleştirel düşünme düzeyleri, uygun görülen bir ölçme değerlendirme sistemi ile, belirlenebilir ve öğretmen adaylarının eleştirel

düşünme konusundaki ihtiyaçları doğrultusunda bir sonraki yılın programı tekrar düzenlenebilir.

6. Bu çalışmada random sampling yapılamadığından çalışma sonuçları, Türkiye'deki tüm öğretmen adaylarına genellenememektedir. Bu nedenle, aynı çalışma random sampling yapılarak tekrarlanabilir Türkiye'deki tüm öğretmen adaylarına genellenebilir.

7. Bu çalışmada kullanılan eleştirel düşünme testi, eleştirel düşünme öğretimine yönelik tutum ölçeği ve eleştirel düşünme öğretimine ilişkin öz yeterlik ölçeği araştırmacı tarafından geliştirilmiştir. Bu araçlar farklı örneklemlere uygulanarak güvenirlik ve geçerlikleri konusunda çalışmalar yapılabilir.

8. Bu çalışmada öğretmen adaylarının eleştirel düşünme becerileri holistik olarak değerlendirilmiştir. Diğer bir deyişle, eleştirel düşünmenin alt beceri ve tutumları dikkate alınmış ancak ayrı ayrı puanlanmamışlardır. Bu nedenle, öğretmen adaylarının eleştirel düşünme düzeylerinin düşük olduğu saptanmış, ama hangi alt boyutlarda daha zayıf ya da düşük oldukları saptanmamıştır. O halde, bu konuda çalışmalar yapılabilir. Öğretmen adaylarının eleştirel düşünme becerileri, eleştirel düşünme alt boyutlarına göre değerlendirilebilir ve adayların hangi boyutta daha güçlü ya da zayıf olduğu belirlenebilir.

9. Uzun vadeli çalışmalar yapılarak eleştirel düşünme öğretimine ilişkin öz yeterlik düzeyi ile gerçek sınıf ortamındaki eleştirel düşünme öğretimindeki başarı arasındaki ilişki araştırılabilir.

10. Uzun vadeli çalışmalar yapılarak öğretmen adaylarının öz yeterlikleri düzeyleri konusundaki algılarının gerçekteki yeterlikleri ne ölçüde örtüştüğü belirlenebilir.

11. Bu çalışmada öğretmen adaylarının eleştirel düşünme düzeyleri, eleştirel düşünme testindeki sorulara verdikleri yazılı yanıtlara dayanarak belirlenmştir. Ancak, bireylerin yazma ve konuşma performansları eşit düzeyde olmayabilir. Bu nedenle, eleştirel düşünme düzeylerini ölçmeye dayanan çalışmalarda yazılı ve konuşma becerisinin ne ölçüde etken olduğunu araştırmak için karşılaştırmalı çalışmalar yapılabilir. Aynı örneklemden hem yazılı hem sözlü yanıtlar elde edilerek, karşılaştırmalar yapılabilir.

12. Bu çalışma, öğretmen adaylarının sadece eleştirel düşünme düzeylerini ölçmüş, ancak adayların orta düzeyin altında kalan eleştirel düşünme düzeylerinin altında yatan unsurları araştırmamıştır. Bu çalışma deseni tekrarlanarak, örneklem arasından yüksek ve düşük eleştirel düşünmeye sahip olan öğretmen adayları ile görüşmeler yapılarak eleştirel düşünme etki eden unsurlar tespit edilebilir.

APPENDIX M

CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Akdere, Nihal

Nationality: Turkish (TR)

Date and Place of Birth: 28 November 1968, Ankara

Phone: +90 312 210 3944

Fax: +90 312 210 7978

E-mail: nihalcan@metu.edu.tr

EDUCATION

Degree	Institution	Year of Graduation
MA	METU, English Language Teaching	1996
BA	METU, Foreign Language Teaching	1990
High School	Pascoe Vale Secondary College, Melb.	
	Anadolu Atatürk Lisesi	1986

WORK EXPERIENCE

Year	Place	Enrollment
1991-Present	METU Modern Languages Dep.	Lecturer