CRITICAL THINKING SKILLS OF PROSPECTIVE TEACHERS: FOREIGN LANGUAGE EDUCATION CASE AT THE MIDDLE EAST TECHNICAL UNIVERSITY

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Approval of the Graduate School of Social Sciences

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ABSTRACT

CRITICAL THINKING SKILLS OF PROSPECTIVE TEACHERS: FOREIGN LANGUAGE EDUCATION CASE AT THE MIDDLE EAST TECHNICAL UNIVERSITY

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This research examined the critical thinking (CT) skills and conceptions of prospective teachers studying at Foreign Language Education Department at Middle East Technical University. In this way, the study intended to contribute to the field of curriculum and instruction by pointing to the currents status while constituting a basis for further actions in teacher education in terms CT.

In this research, data analysis was carried out through both quantitative and qualitative analysis. A survey, including Student Information Form, and Watson and Glaser Critical Thinking Appraisal- Form YM Turkish version were utilized for data gathering. Data were collected from 103 prospective teachers in the junior and senior level during the Spring Semester of 2007- 2008 Academic Year.

Results demonstrated that the critical thinking (CT) levels of prospective teachers assessed by WGCTA are in medium level. In addition, WGCTA-YM cannot be predicted from reported regular reading activity, CGPA, and gender. Besides, results showed that, prospective teachers make rudiment or vague statements about critical thinking activities and do not point to a common instructional activity. In terms of critical thinking definitions, prospective teachers mostly perceive CT as a cognitive skill. Furthermore, there is a common sense view of CT rather than an understanding based on literature.

The results revealed that prospective teachers are short of the essential CT skills and the CT comprehension to be able to raise individuals with CT ability. Therefore, curriculum renovation movements, projects, and research studies to improve critical thinking skills in teacher education should be developed and implemented.

Keywords: Critical Thinking, Watson- Glaser Critical Thinking Appraisal-Form YM, Mixed Method, Teacher Education, Prospective Teacher.

ÖZ

ÖĞRETMEN ADAYLARININ ELEŞTİREL DÜŞÜNME BECERİLERİ: ORTA DOĞU TEKNİK ÜNİVERSİTESİ YABANCI DİL ÖĞRETMELİĞİ ÖRNEĞİ

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Bu çalışma ile Orta Doğu Teknik Üniversitesi Yabancı Dil Eğitimi Bölümü'nde öğrenim gören öğretmen adaylarının eleştirel düşünme seviyeleri ve tanımları incelenmiştir. Bu araştırma ile mevcut durumun ortaya konması ve öğretmen yetiştirme alanında eleştirel düşünme ile ilgili olarak yapılabilecek çalışmalara bir temel oluşturulması, bu sayede program geliştirme ve öğretim alanına katkı sağlanması hedeflenmiştir.

Çalışma kapsamında, veri analizi, hem nitel ve hem de nicel veri analizi yöntemleri kullanılarak gerçekleştirilmiştir. Verilerin toplanmasında Watson-Glaser Eleştirel Akıl Yürütme Ölçeği (WGEAGÖ) form YM'nin Türkçe versiyonu ile öğrenci bilgi formundan oluşan bir anket kullanılmıştır. Veriler, 2007-2008 Akademik Yılı Bahar Dönemi'nde, Yabancı Dil Eğitimi Bölümü 3. ve 4. sınıflarında öğrenim gören 103 öğretmen adayından toplanmıştır.

Çalışma sonuçları, öğretmen adaylarının WGEAGÖ ile ölçülen eleştirel düşünme seviyelerin orta düzeyde olduğunu göstermiştir. Ayrıca, analiz

sonuçları, bildirilen okuma alışkanlığı, akademik başarı ve cinsiyet değişkenlerinin öğretmen adaylarının WGEAGÖ ile ölçülen eleştirel düşünme seviyeleri üzerinde bir etkisi olmadığını göstermiştir. Ayrıca, sonuçlar, öğretmen adaylarınıın ortak bir eleştirel düşünme aktivitesine işaret etmediklerini ve eleştirel düşünme aktiviteleri ile ilgili olarak basit ve belirisiz açıklamalar yaptıklarını göstermiştir. Katılımcıların eleştirel düşünme tanımları incelendiğinde, eleştirel düşünmenin genellikle bir bilişsel beceri olarak algılandığı görülmüştür. Ek olarak, sonuçlar eleştirel düşünmenin tanımıyla ilgili olarak alanyazına dayanan bir algılamadan daha çok genel geçer bir bakış açısı olduğunu göstermiştir.

Çalışma sonuçları, öğretmen adaylarının, eleştirel düşünebilen bireyler yetiştirebilmek için gerekli olan, eleştirel düşünme anlayışına ve becerilerine sahip olmadıkları biçiminde yorumlanabilir. Bu nedenle, öğretmen yetiştirme programlarında eleştirel düşünmenin geliştirilmesi için, program yenileme faaliyetleri, projeler ve araştırma faaliyetlerinin geliştirilmesi ve uygulanması uygun bir alternatif olacaktır.

Anahtar sözcükler: Eleştirel Düşünme, Watson- Glaser Eleştirel Akıl Yürütme Gücü Ölçeği, Karma Metod, Öğretmen Yetiştirme, Aday Öğretmen.

To my parents

and

to my better half

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TABLE OF CONTENTS

LIST OF TABLES

TABLES

LIST OF FIGURES

FIGURES

ABBREVIATIONS

CT: Critical thinking

CTD: Critical Thinking Disposition

WGCTA-YM: Watson and Glaser Critical Thinking Appraisal- Form YM

FLE: Foreign Languages Education

GPA: Grade Point Average

CGPA: Cumulative Grade Point Average

ÖSS: Öğrenci Seçme Sınavı

METU: Middle East Technical University

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The world is getting both more technical and more complex day by day, that is why the necessity for education increases for each growing generation (Halpern, 2003). Due to this fact, countries all over the world search for ways of developing better school systems to be able to answer the high expectations both socially and economically (OECD, 2005). Individuals in the society should have responsive thinking skills to deal with the results of the rapid change in the world. In addition, individuals should be willing to evaluate and reform their thinking under these circumstances. Therefore, critical thinking (CT) is crucial economically, socially, and environmentally (Paul, Elder, & Bartell, 1997, p. 103).

The ability to think critically is often considered to be one of the main goals of instruction at each level. Moreover, in a variety of courses mainly in social sciences and science, critical thinking is accepted as the “desirable outcome” (Watson & Glaser, 1964, p. 9). In the same way, Turkish Ministry of Education introduced new curriculum for primary level in 2005. Furthermore, critical thinking is emphasized to be one of the eight desired outcomes of the new curriculum (Primary school 1-5 Curriculum Handbook, 2005, p. 7). However, the problem of raising capable teachers to meet the requirements of the curricular needs remains. At this point, the faculty of education holds a vitally important role. Paul, Elder and Bartell (1997) reflect the importance of

faculty of education by underlining the requirement of teachers who are able to think critically and who have abilities of problem solving to raise students who are capable of thinking critically as well as capable of solving problems (Paul, Elder & Bartell, 1997, p. 1).

Therefore, the area of concern for this study is to examine the status of Faculty of Education at METU in terms of CT, by investigating the critical thinking skills of prospective teachers, who are the subjects of teacher training, in terms of their levels and their conceptions of critical thinking.

1.2 Statement of the Problem

There is a substantial amount of literature about critical thinking, especially in terms of predictors of critical thinking and relationships of critical thinking with other variables like IQ or learning style. Also, there are other studies examining the instructional methods' effectiveness on critical thinking of students. Although the number of studies examining CT increases rapidly, these studies have mostly been quantitative investigations (Aybek, 2006; Akar, 2007; Dayıoğlu, 2003).

The new trends in education often refer to critical thinking. The changing world of information requires people who are able to search for data and who are able to adapt it. As raising students with critical thinking ability gains more importance, the examination of teachers, who are the ones to teach critical thinking are worth examining in terms of their own thinking skills. Facione (1990) notes the significance of teachers in CT by emphasizing that effective CT is only possible if the teacher demonstrate CT and the proper use of CT skills in every phase of instruction (Facione, 1990, p. 17).

In the world, governments employ national projects in order to increase teachers' and students' effectiveness of critical thinking. For instance, California Commission on Teacher Credentialing reports research findings and policy recommendations as a result of the study conducted on teacher preparation for instruction in critical thinking (Paul, Elder, & Bartell, 1997).

In Turkey, the curriculum implemented recently emphasizes the importance of critical thinking and involves critical thinking as a one of the main skills in the curriculum (Curriculum Handbook, 2005). However, there is no announced program, lesson or activity that intends to educate prospective teachers about critical thinking, yet. To be able to start from any point, studies examining the position of educational institutions and educators views of critical thinking to portray the current picture in order to find new ways of solutions and implement them for improvement are required.

The definition of critical thinking in not clearly set in literature. On the other hand, as Hunter (1991) points, there is a requirement of identifying critical thinking skills that are significant and functional for a particular discipline to teach critical thinking (Hunter, 1991, p. 4). Therefore, in order to build and implement any tangible critical thinking movement in education, firstly the conception of critical thinking and the source of that understanding should be set and clarified.

In Faculty of Education at METU, there is no separate must course for improving thinking skills (METU Academic Catalog). Additionally, the implicit efforts in order to improve critical thinking skills of prospective teachers are obscure. Moreover, the students' awareness about these efforts is in a recondite position. From this point of view, this study aims to shed light on students' positions in terms of their

critical thinking levels, their source of critical thinking, and their critical thinking definitions of CT.

1.3 Purpose of the Study

The significance of manipulating knowledge rather than memorization is emphasized in the primary school curricula released by Turkish Ministry of Education in 2005 (Curriculum Handbook, 2005). Indeed, critical thinking is recognized as one of the common skills to teach in Turkish primary school curriculum. Since prospective teachers will own the role of applying curricular activities and guide students to gain critical thinking skills, there is a need to investigate the prospective teachers' critical thinking levels and critical thinking conceptions. We have to explore if and how critical thinking is handled in the teacher education programs. With this in mind, the main aim of this study is to explore the critical thinking levels and the critical thinking conceptions of prospective English Language Teachers studying at Faculty of Education at Middle East Technical University. In this way, the study intends to contribute to the field of curriculum and instruction by pointing to the status of prospective teachers in terms of their critical thinking perception and levels while constituting a basis for further actions in teacher education.

1.4 Research Questions

The following research questions and sub questions are posed, in order to achieve the purpose of the study:

1. What are the critical thinking levels of prospective teachers measured by WGCTA-YM?

2. Are prospective teachers' critical thinking skill levels measured by WGCTA-YM correlated with their reported regular reading activity, CGPA, and gender?
3. How accurately can critical thinking scores of prospective teachers measured by WGCTA-YM be predicted from a linear combination of reported regular reading activity, CGPA, and gender?
4. Does Faculty of Education at METU provide any activity aiming to improve critical thinking skills of prospective teachers?
    4.1. Is there any teaching activity reported by the students which aim to improve critical thinking skills offered by different departments of Faculty of Education?
    4.2. Is there any course reported by the students in which the concept of critical thinking is covered in Faculty of Education?
5. What are prospective teachers' conceptions about critical thinking ability?

1.5 Significance of the Study

The new educational programs, which have been put into practice by Ministry of Education since 2005, perceive critical thinking as a key skill in the first place. That is why prospective teachers should be trained so that they can engage in the teaching of critical thinking. However, although the importance of critical thinking is underlined in primary and secondary level curricula, the status of teacher education programs in terms of critical thinking is kept uncertain.

Therefore, this study mainly aims to contribute to the literature by illustrating how critical thinking is perceived by prospective teachers, as well as giving an idea about the levels of critical thinking of prospective teachers. In addition this study aims to provide information about explicit and implicit efforts of teaching of critical thinking in teacher education programs at METU and how those efforts are perceived. In this way the findings of this study will contribute to the improvement of teacher education programs towards increasing awareness in teaching of critical thinking among prospective teachers. As a final point, it is expected that this study will guide and motivate researchers for further study in critical thinking and teacher education research areas.

1.6 Assumptions

It is assumed that the participants of the study responded the questions properly, accurately, and objectively. Moreover, the participants of the study were able to read, comprehend and respond to the written instructions provided in this study.

1.7 Delimitations of the Study

For the current study, time and budget limitations were taken into account. Furthermore, the accessibility of the population and the sample for the researcher is considered. As a result, this study is delimited to a sample of prospective teachers studying in Foreign Language Education (FLE) Department at METU Faculty of Education.

Individuals studying in the Faculty of education attend pedagogical courses forming the basis for the teacher education. The students at Faculty of Education become more of prospective teachers as they complete their pedagogical coursework. Consequently, this study is deliberately limited to senior and junior students.

1.8 Limitations of the Study

This study is limited to the data gathered from 3rd and 4th year Foreign Language Education (FLE) students attending Faculty of Education at METU in the Spring Term of the Academic Year 2007-2008.

The current study uses WGCTA-YM as a measurement instrument. Although the literature includes various sub skills of critical thinking, the instrument used in this study only encompasses the five different dimensions of the critical thinking (inference, recognition of assumption, deduction, interpretation and evaluation of arguments). Therefore, the findings of this study are only limited to this test.

Because of time, budget and scope limitations, the currents study is does not embrace faculty members' and instructors' perspectives. Therefore, this study is limited to the students' perceptions and reflections of critical thinking at METU Faculty of Education.

During data gathering process, in some sections, in class administration was not possible because of the time limitations. In those sections test were administered, they were completed outside classroom and brought back by the participants. Consequently, the validity is limited to the honesty of the subject's responses to the instruments used in study.

Moreover, after data gathering period, the data are examined in terms of distribution of participants according to department. As the departmental distribution does not allow healthy statistical analysis for the other departments, the data is limited to Foreign Language Education department.

1.9 Definition of Terms

Critical Thinking: Critical thinking is a composite of attitudes, knowledge and skills. This composite includes: (1) attitudes of inquiry that involve an ability to recognize the existence of problems and acceptance of the general need for evidence in support of what is asserted to be true; (2) knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight or accuracy of different kinds of evidence are logically determined; and (3) skills in employing and applying the above attitudes and knowledge. (Watson & Glaser, 1964, p. 10)

Critical Thinking Abilities: (1) The ability to define a problem. (2) The ability to select pertinent information for the solution of a problem. (3) The ability to recognize stated and unstated assumptions. (4) The ability to formulate and select relevant and promising hypotheses. (5) The ability to draw conclusions validly and to judge the validity of inferences. (Watson & Glaser, 1964, p. 10)

WGCTA-YM: Watson–Glaser Critical Thinking Appraisal (Form YM) which is translated into Turkish by Assoc. Prof. Dr. Nükhet Çıkrıkçı Demirtaşlı (Çıkrıkçı, 1993).

Critical Thinking Level: The students' total scores obtained from Watson-Glaser Critical Thinking Appraisal Test.

CHAPTER 2

REVIEW OF THE LITERATURE

In this chapter, the literature about critical thinking is presented in accordance with the aim and research questions of the current study. The literature review was carried out for constructing the fundamental knowledge about critical thinking by investigating what information was previously documented about the topic. In this part, the literature is documented to ascertain the meaning of critical thinking. Furthermore, critical thinking is discussed in relation to problem solving and creative thinking. Besides, the discussions regarding discipline specific critical thinking and teaching of critical thinking are covered. Additionally, previous research conducted in Turkey is presented. Specifically, the review of literature sought to reveal information related to the research questions of the study.

The literature review is organized under twelve main sections: (1) thinking vs critical thinking, (2) definition of critical thinking, (3) the characteristics of a critical thinker, (4) dispositional aspect of critical thinking, (5) critical thinking and Bloom's Taxonomy, (6) critical thinking and other thinking skills, (7) predictors and correlates of critical thinking, (8) discipline-specific critical thinking, (9) teaching and critical thinking, (10) testing in critical thinking, (11) teacher education and critical thinking, and (12) the summary of the review of literature.

2.1 Critical Thinking vs. Thinking

The meaning of thinking and critical thinking should be examined thoroughly in the literature. For instance, Chaffe (1988), points out that the concept of thinking is viewed as a commonplace term. He claims that “after all practically everyone can do it to some extent; and it is so taken for granted by most people that it is rarely thought of or mentioned in any direct fashion” (Chaffe, 1988, p. 5). Apart from explaining the lack of direct emphasis on thinking, Chaffe (1988) clearly states the relationship between thinking and critical thinking by giving their definitions. According to Chaffe (1988), “thinking is our active, purposeful, organized efforts to make sense of the world” whereas “critical thinking is making sense of our world by carefully examining our thinking, and the thinking of others, in order to clarify and improve our understanding” (p. 5).

In addition to Chaffe’s approach, in her book, Halpern (2003) defines thinking as: “the manipulation or transformation of some internal representation” (p. 84). According to her, once we start thinking, we use our knowledge to achieve some objective. Yet, when it comes to critical thinking, in order to achieve objectives one should think intentionally (Halpern, 2003, p. 43).

Dewey points out the relation between thinking and critical thinking from another perspective. Dewey (1998) states that “Critical thinking is clearly something to do with thinking, but again it is not all the process of thinking. Like reflection, it implies more detail than the generic term of thinking” (1933 as cited in Moon, 2008, p. 25).

In the light of information provided, one can conclude that critical thinking and thinking are not equal terms. On the other hand, critical thinking is a form of thinking which is “purposeful” and “intentional”.

2.2 Definition of Critical Thinking

The term critical thinking has several definitions based on philosophy and psychology; on the other hand, none of the definitions is generally accepted (Akar Vural & Kutlu, 2004). According to Reid (2000), to include the various aspects of critical thinking, many definitions are required. Similarly, Pascarella and Terenzini (1991) believe that critical thinking has numerous definitions and measured in many ways (as cited in Rudd, Baker, & Hoover, 2000). Therefore, in this part of the literature, to be able to construct any understanding of the term critical thinking, the various definitions from the leading figures of the critical thinking will be covered from multiple perspectives.

Critical thinking from a historical perspective

If we look at historical bases of critical thinking, Chaffe (1990) explains the etymological roots of critical thinking “The word *critical* comes from a Greek word, ‘krinein’, meaning 'to separate,' 'to choose'; it implies conscious, deliberate inquiry, and the word “kritikos”, which means to question, to make sense of, to be able to analyze” (as cited in Dayıoğlu, 2003, p. 16).

Likewise, Paul, Elder, and Bartell (1997) recognize the historical roots of critical thinking and state that: “the intellectual roots of critical thinking are as ancient as its

etymology, traceable, ultimately to the teaching practice and visions of Socrates 2500 years ago who discovered by a methods of probing questioning that people could not rationally justify their confident claims of knowledge" (p. 2).

Critical thinking from a purposefulness and awareness perspective

When defining critical thinking, Paul (1995 as cited in Rudd & Baker, 2000) emphasizes the purposefulness attribute. He notes that critical thinking is a unique and purposeful form of thinking that is practiced systematically and purposefully. Furthermore, according to Paul the critical thinker imposes standards and criteria on the thinking process and uses them while taking the charge of one's own thinking (p. 135). Likewise, Halpern (2003) calls attention to the purposefulness attribute of critical thinking and she mentions that critical thinking is a cognitive skill or strategy increasing the likelihood of a conclusion which is reasoned and goal directed (p. 43).

One of the leading figures in the field of education, Dewey (1928 as cited in İrfaner, 2002), reflect the importance of awareness in critical thinking and defines critical thinking as "… active, persistent, and careful consideration of any belief supposed form of knowledge in the light of grounds that support it; and the further conclusions to which it tends" (p. 15). By the same token, Ennis (1989) points out the importance of one's decisions and defines critical thinking as "reasonable reflective thinking focused on deciding what to believe or do, a concept I have elaborated elsewhere "(p. 4).

Critical thinking from skills and abilities perspective

According to Pascarella and Terenzini (1991), critical thinking characteristically occupies the individual's ability to recognize central issues and assumptions in an argument, identify important relationships, make proper inferences from data, infer conclusions from information or data provided, deduce whether conclusions are warranted on the basis of the data given and, evaluate evidence or authority (as cited in Rudd, Baker, & Hoover, 2000).

On the other hand, Watson and Glaser (1964) perceive critical thinking as being more than a specific set of cognitive skills; it is also a composite set of skills knowledge and attitudes. The authors list components of critical thinking as:

> (1) attitudes of inquiry that involve an ability to recognize the existence of problems and an acceptance of the general need for evidence in support of what is asserted to be true; (2) knowledge of the nature of valid inferences, abstractions and generalizations in which the weight or accuracy of different kinds of evidence are logically determined; (3) skills in employing and applying the above attitudes and knowledge (Watson & Glaser, 1964, p. 10).

The definition of CT changes according to the approaches towards the term. Moon (2008) classify those approaches under the headings of “logic, listing of components-skills and abilities, pedagogy, ways of being, developmental approaches, and approaches that take an overview” (p. 38). Consequently, being aware of the various approaches and definitions of CT, having knowledge about the critical thinking approaches and constructing an understanding of critical thinking of own is essential.

2.3. The Characteristics of a Critical Thinker

The literature reveals that, not only the definition of critical thinking but also the views on the ideal critical thinker descriptions vary. Scholars in the area list the characteristics of a critical thinker in an effort clarify the definitions of critical thinking as from own perspective. As it is the case for the definition for critical thinking, many of critical thinking characteristics either overlap or resemble to each other. In this part of the review of literature, some views on those characteristics will be presented.

In their report, Paul, Elder, and Bartell (1997) give explanations about the attributes of the critical thinkers. According to the writers, critical thinkers are the people who are courageous enough to examine what others accept with no doubt. Also, they have “dispositions” and “value commitments” which caused them to think critically (Paul, Elder, & Bartell, 1997, p. 13). According to Ennis (1985) the characteristics of a critical thinker are listed as:

- Seek a clear 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
- Try to remain relevant to the main point
- Keep in mind the original and/or basic concern
- Look for alternatives
- Are open-minded
- Consider seriously other point of views than one’s own
- Reason from premises with which one disagrees- without letting the disagreement interfere with one’s reasoning
- Withhold judgment when the evidence and reasons are insufficient

- Take a position (and change a position) when the evidence and reasons are insufficient
- Seek as much precision as the subject permits
- Deal in an orderly manner with the parts of a complex whole
- Are sensitive to the feelings, level of knowledge, and degree of sophistication of others. (as cited in Paul, Elder, & Bartell, 1997, p. 13)

Similarly, Paul and Elder (2005), detail the characteristics of a critical thinker and note that "critical thinkers strive to develop essential traits or characteristics of mind" (p. 5). Paul and Elder list the characteristics of a critical thinker as:

- Raises vital questions and problems, formulating them clearly and precisely;
- Gathers and assesses relevant information, using abstract ideas to interpret it effectively;
- Comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- Thinks open-mindedly within alternative systems of thought , recognizing and assessing as need be, their assumptions, implications, and practical consequences;
- Communicates effectively with others in figuring out solutions to complex problems. (Paul & Elder, 2005, p. xxiii)

Brookfield (1987, as cited in Simpson & Courtney, 2002) delineates the term critical thinking by explaining the critical thinkers as individuals who are engaged in productive and positive activity, who are active in the life. According to Brookfield (1987, as cited in Simpson & Courtney, 2002), critical thinkers perceive themselves creative in all portions of their personal, professional and political lives in addition to

viewing their thinking as a process in spite of viewing it as an outcome. In the same way, Beyer (1987) emphasizes the requirements for critical thinking as a set of skills and approaches. He believes that a critical thinker should be able to:

- Distinguishing between verifiable facts and value claims,
- Distinguishing relevant from irrelevant information, claims, and reasons;
- Determining factual accuracy of a statement;
- Determining credibility of a source;
- Identifying ambiguous claims or arguments;
- Identifying unstated assumptions;
- Detecting bias;
- Identifying logical fallacies;
- Recognizing logical inconsistencies in a line of reasoning;
- Determining the strength of an argument or claim. (1987, as cited in Rudd, Baker & Hoover, 2000, p. 4)

Watson and Glaser (1964), also discuss the abilities of a critical thinker:

- The ability to define a problem.
- The ability to select pertinent information for the solution of a problem
- The ability to recognize stated and unstated assumptions
- The ability to formulate and select relevant and promising hypotheses
- The ability to draw conclusions validly and to judge the validity of inferences. (Watson & Glaser,1964, p. 10)

2.4 Dispositional Aspect of Critical Thinking

Traditionally, the ability to think critically has been described as a set of predominantly cognitive skills (1995 as cited in Clifford, Boufal, & Kurtz, 2004). However, recently, theorists in education have proposed that individual differences in

critical thinking result from a combination of cognitive ability and personality dispositions (Clifford, Boufal, & Kurtz, 2004; Ennis, 1987; Facione et al., 1995; Halpern, 1997).

John Dewey (1993 as cited in Facione et al., 2000) describes the dispositional aspect of thinking as "personal attributes" (p. 6). Facione et al. (2000) explain dispositions by stating that "a human disposition is a person's consistent internal motivation to act toward, or to respond to persons, events or circumstances in habitual, and yet potentially malleable, ways" (p. 4). Similarly, Halpern (2003) addresses the need for the dispositional aspect of critical thinking by defining it as "an essential component of critical thinking is developing the attitude or disposition of a critical thinker" (p. 15). For Halpern, good thinkers have a motivation and willingness to apply the efforts intentionally, for collecting information, working in an organized way, conforming for accuracy and enduring efforts as the answer is obscure as well as it involves various stages. She also lists the dispositions or attitudes that a critical thinker will demonstrate:

(1)Willingness to plan, (2) Flexibility, (3) Persistence, (4) Willingness to self correct, admit errors and change your mind when the evidence changes, (5) Being mindful, (6) Consensus seeking (Halpern, 2003, p. 15).

The literature reveals that scientists' views regarding critical thinking dispositions are formed in two ways: the first is the view of dividing the definition of critical thinking into two, as skills and dispositions which is called "two factor theory" and the second is the view of including the dispositional dimension as a part of the definition of critical thinking. Ennis (1985 as cited in Clifford, Boufal, & Kurtz, 2004) an early supporter of the two-factor theory underscores that, in order to analyze critical

thinking for curricular purposes, teaching and evaluation; the first step to be taken is to break up critical thinking into dispositions and abilities. On the other hand, Facione (2000) points out that, "some theorists, like Paul, Tavris and Wade, include the disposition to use critical thinking skills as a part of their definition of critical thinking" (p. 3).

Scientists agree on the idea of fostering of the disposition towards critical thinking, in order to have an intact approach to develop college students into good critical thinkers (Facione et al., 1995). Likewise, the critical thinking definition of Watson and Glaser who describe critical thinking as "a composite of attitudes, knowledge and skills" (Watson & Glaser, 1964, p. 10) reflects the view of including disposition as a part of a critical thinking definition.

2.5 Critical Thinking and Bloom's Taxonomy

In an attempt to "arrange educational objectives from simple to complex," Bloom, forward six major classes which are given from simple to complex: knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956, p. 18). Bloom (1956) also argues that, to be able to reach an upper level, a person must be superior in the previous level (See Figure 1).

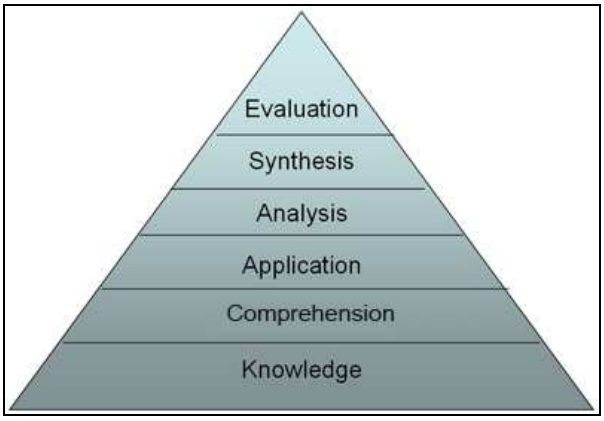

Figure 1. Bloom's Taxonomy of Educational Objectives (Adapted from Bloom, 1956).

Many authors refer to Bloom's work to portray the critical thinking (Dam & Volman, 2004). With the purpose of teaching critical thinking, there appears a need for the teacher to concentrate on the last three levels of Bloom's taxonomy, which are analysis, synthesis, and evaluation so as to assist learners apply results to their own situation, requiring reflection (İrfaner, 2002).

Similarly, Ennis (1993) underscores that "The upper three levels of Blooms' taxonomy of educational objectives (analysis, synthesis, and evaluation) are often offered as a definition of critical thinking. Sometimes the next two levels (comprehension and application) are added." On the other hand Ennis presents arguments against accepting this conception. He explains that structure developed by Bloom has some limitations in defining the mechanisms of cognitive aspect of critical thinking, since levels of thinking processes are, rather than being hierarchical, are mutually dependent (Ennis, 1981 as cited in Ennis 1993). Furthermore, the concepts put

forward in the Bloom's taxonomy are not clear enough to lead us to improve and to form an opinion about the assessment of critical thinking (Ennis, 1993).

Bloom (1956) states that "we have been primarily concerned with the cognitive domain…" (p. 19). On the other hand, experts on the critical thinking area report their views in the "Delphi Report" by stating that "critical thinking… should be furthering students in the development of their cognitive skills and affective dispositions" (Facione, 1990, p. 14). The review of literature reveals that, although Bloom's taxonomy serves as a foundation for the researches in critical thinking equating it with critical thinking will be misleading.

2.6 Critical Thinking and Other Thinking Skills

It is difficult for both scientists and practitioners to define the terms of thinking skills, reasoning, critical thought, and problem solving. Lewis and Smith (1993), recognize that, diverse definitions of critical thinking is used to refer to problem solving, evaluation or judgement and both a combination of evaluation and problem solving in the literature (Lewis & Smith, 1993, p. 134).

On the contrary, Facione (1990), consider the diverse forms of higher order thinking like problem-solving, decision making and creative thinking, different from critical thinking. Facione (1990) claims that, although, different forms of higher order skills are closely related, their connection has not been examined adequately yet (p. 5). Therefore, in this part of the literature review, the relationship between critical thinking creative thinking and problem solving are presented.

2.6.1 *Critical Thinking and Problem Solving*

Some writers used the critical thinking and problem solving as identical terms in the earlier period (Lewis & Smith, 1993). However, critical thinking and problem solving are defended as different terms by many scholars in the literature. For instance, Paul, Elder and Bartell (1997), discriminate critical thinking problem solving without neglecting their relationship and state that: “problem solving is a major use of critical thinking and critical thinking is a major tool in problem solving and therefore that the two are best treated in conjunction rather than in disjunction” (p. 3). According to writers, critical thinking is required while solving problems. Moreover, if critical thinking is clearly formed in mind it would, consistently provide for problem solving (Paul, Elder & Bartell 1997, p. 3).

Similar to Paul, Elder and Bartell’s position, Hedges (1991) differentiates critical thinking and problem solving. Hedges (1991) points out that, problem solving is a linear process of evaluation whereas critical thinking is an complete set of abilities which makes a researcher to complete each stage of the linear problem-solving process properly (as cited in Lundy et al., 2002). Hedges (1991) characterizes his views on critical thinking and problem solving by comparing them, his comparison is presented in Figure 2.

Critical Thinking	Problem Solving
1. The ability to identify and formulate problems, as well as the ability to solve them	1. Recognizing a problem situation.
2. The ability to recognize and use inductive reasoning, as well as the ability to solve them.	2. Defining the problem
3. The ability to draw reasonable conclusions from information found in various sources, whether written, spoken, tabular, or graphic, and to defend one's conclusions rationally.	3. The ability to comprehend, develop, and use concepts and generalizations.
4. The ability to comprehend, develop, and use concepts and generalizations	4. Testing hypotheses and gathering data.
5. The ability to distinguish between fact and opinion	5. Revising hypotheses and testing revised or new hypotheses.
	6. Forming a conclusion.

Figure 2. Critical Thinking vs. Problem Solving (Critical Thinking: A Literature Review, 2002)

Accordingly, it can be inferred from the literature that, problem solving forms a smaller set of abilities which is enclosed by critical thinking. Moreover, one should be aware of the interrelated nature of critical thinking and problem solving without equalizing those terms.

2.6.2 *Critical Thinking and Creative Thinking*

Creative thinking is another term which is an adjacent term of critical thinking. Young (2002) recognizes the classification of thinking in literature under two main categories: critical and creative (p. 49). According to Young, critical thinking is named as "logico-analytic thinking" advocates rational thought process, whereas creative

thinking which is named as “intuitive-synthetic thinking,” hinges on inventive processes. Besides, Young (1992) believes that critical and creative thinking are completing each other (p. 49).

Apart from Young’s perspective on creative thinking Halpern (1997) reflects her view in relation to problem solving and states that: “creative thinking is multistage process that consists of identifying a problem, deciding what is important about the problem, and arriving at a novel way of solving it” (p. 247). Halpern (1997) explains the personal factors that are result in the “novel” side of thinking which forms creativity. According to her, creative people do not need for conformity, they are not resistance to change, they have self motivation, they get satisfaction in creative processes, they have ability to take risks, they can tolerate ambiguity, and they have ability to deal with failure (p. 253). In addition to the personal factors mentioned by Halpern, Friedel and Rudd (2005) refer to the Guilford and Torrance’s work. According to Friedel and Rudd (2005) The Torrance Test of Creative Thinking and list the traits that test measures:

> More specifically the TTCT measures creative thinking capabilities including: fluency, flexibility, originality, elaboration, abstractness of title, resistance to closure, emotional expressiveness, articulateness, movement or action, expressiveness, synthesis or combination, unusual visualization, internal visualization, extending or breaking boundaries, humor, richness of imagery, and fantasy. (p. 201)

Baker, Rudd and Pomeroy (2001) conducted a research to find out if there exists any relation between critical thinking and creative thinking by using the California Critical Thinking Disposition Inventory and The Torrance Test of Creative Thinking. Consequently, the results revealed no significant relationship between the critical thinking and creative thinking of students (as cited in Friedel & Rudd, 2005, p. 201).

The review of literature about creative thinking in relation to critical thinking reveals that critical thinking perceived as a more of a cognitive process whereas creative thinking is perceived by means of personal traits.

2.7 Predictors of Critical Thinking

The review of literature reveals that several variables are examined in relation to critical thinking such as age, gender, critical thinking disposition, intelligence, GPA, program effectiveness, learning style, and language ability. In this part of literature review, previous research in relation to correlated variables and predictors, those most relevant to the current study, of critical thinking are examined.

The literature review demonstrated that investigation of the relationship of critical thinking with age, bring about dissimilar results. For instance, Lundy et al. (2002) claim that, age has no significant difference or relationship in most of the research conducted. In the same way, Adams et al. (1999) report no significant relationship with WGCTA scores and age in their longitudinal study conducted with sophomore-level and senior level students (as cited in Dayıoğlu, 2003). On the contrary, Kürüm (2002) reports significant difference in critical thinking of teacher candidates in relation to age. Additionally, she reports higher critical thinking score with smaller age in teacher candidates (p. 127). Keeping the variety of outcomes regarding the age and critical thinking relationship in the literature, age should be investigated in further research for a better understanding of cause and effects for the curricular activities.

Gender is another variable which is generally examined in research studies. Dayıoğlu (2003) investigates the difference in the students' critical thinking levels in

accordance with gender and she found no significant difference as a result of the t –test conducted (p. 104). On the other hand, Rudd et al. (2000) report significant gender difference at α=0.3 level as a result of the study conducted with undergraduate agriculture students. In the same way, Lundy et al (2002) notes the bilateral result regarding gender in the literature; some of them report significant relationships, whereas others not. Similar to the position of critical thinking with age in, gender constitutes another variable worth investigating in critical thinking studies.

Academic achievement (GPA) is another variable that is examined in relation to critical thinking. Reid (2000) examines forty studies conducted and reports ten of them in correlation correlations with GPA. Furthermore, Reid (2000) emphasizes a positive correlation between critical thinking scores and GPA as a result of the study she conducted with nursing students Additionally, Torres and Cano (1995) report 13 percent of variance in senior students' critical thinking abilities which was resulted from GPA, gender and age variables as a result of the study conducted with senior students in the College of Agriculture. Likewise, Lundy et al. (2002) reports a relaitonship as a result of the study conducted by using California Crtical Thinking Dispositions Inventory. Lundy (2002) explain: "students with higher GPAs were more likely to apply Open mindedness, Analycity, Systemacity, and Maturity, honors students in this study tended to apply these constructs more frequently than did non-honors students."

To sum up, the controversial results of predictors demonstrate that each study should be conducted covering predictors in order to comprehend and clarify the condition on the context of that study.

2.8 Discipline-Specific Critical Thinking

Although there is an agreement on some issues regarding critical thinking, there is still a major disagreement on whether the definition of critical thinking should be discipline specific or general (Reid, 2000, p. 20). The disagreement is mentioned with different names in the literature: “Critical Thinking as General versus Discipline Specific Process (Reid, 2000), critical thinking as domain specific knowledge (Facione, 1990) or subject specificity in critical thinking (Ennis, 1980); they all refer to the same critical question of how critical thinking should be thought?

While critical thinking skill and disposition can be defined as separate entities, both are thought to be open to educational influence, particularly when meaningfully, contextually bound (Brown 1997, as cited in Ricketts & Rudd, 2003).

Young (1992) states that “Although most researchers believe that thinking skills instruction should be fused with content areas (the integrated approach), some prefer that it be thought in isolated courses (as subject matter-free course approach), or perhaps even as a combination (the separate and integrated approach)” (p. 48).

Ennis (1989) emphasizes the same problem and states that a very important unanswered conjectural problem is “whether critical thinking is subject-specific” (p. 3). Ennis (1989) sums the perspectives towards the subject specificity problem, in his paper named “Critical Thinking and Subject Specificity”: According to him, the different approaches regarding subject specificity can be listed as:

> The General Approach: In this approach, critical thinking abilities and dispositions are aimed to teach in a manner that critical thinking is disjointed from the content of existing subject matter, and the only rationale is teaching critical thinking. According to this method instruction of critical thinking takes place in a separate course of instructional units.

Infusion and immersion: Infusion refers to deep, thoughtful and well understood subject matter instruction in which students are encouraged to think critically in the subject. In infusion approach critical thinking principles and dispositions are made "explicit". On the other hand, immersion refers to the kind of subject matter instruction where critical thinking abilities and dispositions are not made explicit, although students are motivated to think deeply about the subject.
The mixed approach: In this approach the general approach is mixed either with immersion or infusion approach. Any course aiming to teach general principles of critical thinking as well as including any subject specific critical thinking instruction can be evaluated under the mixed approach (Ennis, 1989, p 4-5).

The properties of the approaches defined by Ennis are summarized in Figure 3.

	Makes General Principles Explicit?	Uses Content?	Uses Only Standard Subject-Matter Content?	Uses Standard Subject-Matter and Other Content?
General				
Abstract (only)	Y	N	N	N
Concrete (also)	Y	Y	N	Perhaps both
Mixed	Y	Y	N	Y
Infusion	Y	Y	Y	N
Immersion	N	Y	Y	N

Figure 3. The General, Mixed, Infusion and Immersion Approaches to Teaching Critical Thinking (Ennis, 1989, p. 4-5)

Facione (1990) clarifies the standing point in The Delphi Report in terms of subject specificity about critical thinking by stating that:

> The experts do not regard critical thinking as a body of knowledge to be delivered to students as one more school subject along with others. Like reading and writing, CT has applications in all areas of life and learning. Also as with reading and writing, CT instruction can occur in programs rich with discipline-specific content or in programs which rely on the events in everyday life as the basis for developing one's CT. (p. 5)

Facione (1990) also reports that “Although the identification and analysis of CT skills transcend, in significant ways, specific subjects or disciplines, learning and applying these skills in many context requires domain-specific knowledge” (p. 5).

The review of literature reveals that, there is no unique approach that suits for all regarding the subject specificity of CT. Diverse distinctive characteristic of CT are fostered by diverse disciplines (Cross & Steadman, 1996, as cited in Ricketts & Rudd, 2003).

2.9 Teaching and Critical Thinking

The literature about CT in relation to teaching tries to answer many significant questions starting from whether CT is teachable to the question of what kind of teaching methods should be employed for promoting CT skills. In this part, literature aiming to shed light to on those questions will be reviewed.

Ruggiero (1988) reflects his vision about teaching and CT by defending that the high school instructors’ efforts are lacking aiming promote thinking in skills in the classroom environment because either teachers do not believe that thinking is teachable or some of students are not adequate intellectually and this cannot be changed, and the value of students is lowering gradually and this is inevitable. Because of these reasons, any activity regarding teaching thinking is not the responsibility of teachers therefore; teaching of thinking doesn’t take place within a course. On the other hand, the literature include large amount of study aiming to contribute to the teaching and thinking fields (as cited in Hunter, 1991, p. 73).

From a similar perspective, Halpern (2003) argues for the teachability of CT by pointing to the substantial amount of study, which refer to the separate thinking skill courses' and embedded thinking skills instruction's constructive effects and their transferability to other circumstances (Halpern, 2003, p. 10).

Accepting that CT is teachable, debates on how to teach critical thinking and how to identify instructional methods to foster critical thinking remain to be continued. At this point, Halpern (2003) argues that when students are instructed with methods, in a specific manner, to promote and transfer thinking skills to varying circumstances and domains of knowledge, it is likely that education be used for improving the CT ability.

On the other hand, Tsui (1999) points out that research about the types of courses that effectively improve students' ability to think critically mainly pays attention to exclusively designed CT courses in addition to the disciplinary major. As the confusion regarding the meaning of CT prolong so as the confusion about the teaching methods to be employed to foster CT. Consequently, Hager and Kaye (1991) emphasize the need for additional experiential research on examining the effectiveness of teaching methods on CT.

In Delphi report, Facione (1990) presents valuable information regarding the teaching of critical thinking and explain that:

> Skills, particularly critical thinking cognitive skills, can be taught in a variety of ways, such as by making the procedures explicit, describing how they are to be applied and executed, explaining and modeling their correct use, and justifying their application. Teaching cognitive skills also involves exposing learners to situations where there are good reasons to exercise the desired procedures, judging their performance, and providing the learners with constructive feedback regarding both their proficiency and ways to improve it. Instruction might start with situations that are artificially simple, but should culminate in situations that are realistically complex. In the case of critical thinking, the learners must contribute a

> solid measure of personal effort. Particularly in the case of critical thinking, the learners must contribute a solid measure of personal effort, attention, practice, desire, and, as they learn how, self-monitoring. Teaching skills involves motivating learners to achieve higher levels of proficiency and, particularly in the case of critical thinking, independence. It also involves coaching learners on how they can achieve those goals. (Facione, 1990, p. 15)

Tsui (1999) highlights more precise information regarding the effectiveness of some commonly offered college courses and routinely employed teaching methods by using a self reported growth in CT. As a result of the study he conducted with 4th year college and university students, he reports that students self reported growth in CT is positively affected with having a paper critiqued by an instructor, working on an independent research project, taking an essay exam, working on a group project, and giving a class presentation whereas it is negatively affected by taking a multiple choice exam.

Özgür (2007) documents the methods and techniques to promote CT in classroom environment. Making students write term papers, media analysis, discussion, and asking open ended questions contribute to promoting CT in classroom environment. She also emphasizes the role of questioning in classroom by stating that "The teachers have a great role on students by asking questions which will help students to think, question, analyze and support their views referring to the works" (Özgür, 2007, p. 16).

2.10 Testing in Critical Thinking

The literature reveals that assessment in CT is as controversial as the definition of critical thinking. Ennis (1993) claims, it is not enough to have a justifiable and detailed definition of CT to be used to choose, criticize, or develop a test; there is also a

need to have an apparent idea of the rationale for using any CT test. In addition there is no suitable assessment procedure appropriate for diverse measurement purposes. Reid (2000) also supports this view and adds that "Assessors must be aware of the strengths and weakness of the assessment approaches they choose" (p. 26). In addition, Facione (1990) offers recommendations regarding CT assessment in the Delphi Report:

> CT assessment should occur frequently, and it should be used diagnostically as well as summatively. Different kinds of instruments should be employed, depending on which aspect of CT is being targeted and where students are in their learning -- the introductory stage, the practice stage, the integration stage, or the generalized transfer stage. Although the veteran CT instructor is able to assess students continuously, CT assessment should be made explicit to reinforce its worth in the eyes of the students, their families, and the public. It should be made explicit to support the goals of educators seeking to improve the curriculum. And it should be made explicit to properly inform educational policy formation. (p. 17)

Erwin (2000) categorizes assessment of CT. According to him, assessment of CT has two forms: direct "constructed response" and indirect "multiple-choice" measurement (p. 4). Erwin (2000) explains that "Indirect assessments involve an estimate of the examinee's probable skill level based on observations of knowledge about skill level… Indirect assessments are exemplified by many of the standardized, commercially available tests."

Regarding the ways of assessing CT, Facione et al. (2000) list the ways of assessing CT as employing "performance appraisals, rating forms, rubrics and portfolios" (p. 20). In addition, Ennis (1993) claims that multiple-choice tests can be used for diagnosis purposes, for feedback and motivation, for measuring the impact of teaching as well as for research purposes. Erwin (2000) puts forward that multiple-choice tests are more reliable also tend indirect assessment instruments have higher

"predictive validity" with a range of outcome measures (p. 4). Besides, Haldyna (1994) defend the use of multiple choice tests and stated that "Research on psychological and educational testing indicates that well crafted multiple choice tests can validly and reliably measure higher order cognitive skills" (as cited in Facione et al., 2000, p. 20).

Conversely, Ennis (1993), notes the need for open-ended assessment techniques for inclusive assessment only if suitable multiple-choice tests are not improved (p. 185). In addition, Halpern (1993) makes another recommendation regarding assessment by emphasizing the need for depending on an operational definition for any kind of CT assessment.

However, the review of literature conducted for this study reveals that there is no assessment instrument developed for especially preservice teachers. Therefore WGCTA-YM, which is a widely used standardize test, is used in this study for assessment purposes. More explanation regarding the WGCTA-YM is given in the "Data Collection Instruments" section.

2.11 Teacher Education and Critical Thinking

The importance of critical thinking is emphasized frequently in the literature. For instance, Paul (1990) underlines the importance of critical thinking by stating that "critical thinking is vitally important in the personal and civic life of all members of the society" (p. 13). On the other hand, although the importance of CT is widely emphasized, the role and position of teachers in critical thinking is not handled adequately. Moon, Butcher and Bird (2000) underline the lack of emphasis on the teacher education of critical thinking and state that:

> Scholars and policy-makers have considered for example, how to help students to develop deep understandings of subject matter, situate students' learning in meaningful contexts and create learning communities in which teachers and students engage in rich discourse about important areas. Less attention has been paid to teachers either to their roles in creating learning experiences consistent with reform agenda or how they themselves learn new ways of teaching. (p. 11)

Correspondingly, Hager and Kaye (1991) point to value of teacher education by claiming that critical thinking should be given significance in teacher education programs, in the event that it carries significance in reality as the supporters of critical thinking claim. Similarly, Özmen (2006) underlines the significance of critical thinking in teacher education by pointing to a difficulty: "the challenge is to construct teacher education programs that will promote dispositional characteristics, cognitive skills, and information retrieval associated with critical thinking."

Aston (1980) proposes "To improve student performance on critical thinking tests, schools of education must improve teacher training. They must teach cognitive skills to preservice teachers before training them to teach these skills in the classroom" (as cited in "Critical Thinking Skills and Teacher Education" p. 3).

In Turkey, there are studies examining CT in teacher education context. For instance, Kürüm (2002) prepared a master's thesis aiming to examine the CT abilities of teacher trainees studying at Anadolu University Faculty of Education in the 2000-2001 Academic Year. She investigated the relationship between the level of CT ability and the levels of thinking abilities that constitute this ability in addition to the factors of age, gender, secondary school type, ÖSS score, ÖSS score type, department, grade level, level of family education, level of family income, and self development activities' effect on the CT of teacher trainees.

For the study, she gathered data from a total of 1047 teacher candidates from 1st, 2nd, 3rd and 4th year students from 11 different teacher training programs. She also gathered personal information about the students via a personal information form in addition to that Watson Glaser Critical Thinking Skills Test Turkish Version.

The survey design was used as a research model in the study. Independent T- test and one way ANOVA statistical methods were employed in order to interpret the data. The results demonstrate that teacher candidates have an average level of CT ability. Additionally, regarding the other factors taken in the account in the study, gender is found to be not a discriminating factor for CT ability. On the other hand, the results of the study revealed that; age, gender, secondary school type, ÖSS score, ÖSS score type, department, grade level, level of family education, level of family income and self development activities have an effect on the CT of teacher trainees. The results of the study portrays that, Anatolian High School graduates have a higher CT ability than the other high school graduates. In addition, CT is positively affected as the mother education level, and family income increases. Contrary to the international literature findings, the results of the study revealed that younger teacher candidates have a higher CT ability than the older ones.

In another work, Aybek (2006) conducted a doctoral study in which she examined the effects of teaching with Edward De Bono's skill based Cort1 thinking program in social studies subject on prospective teachers' critical thinking disposition and level. In her experimental study, she employed content based critical thinking program. As a result she reported significant results in favor of experimental groups in

terms of CT levels. In addition she reposted no significant relationship between GPA and CT levels of prospective teacher.

Consequently, teacher education stands in a key position in both learning and teaching process of students and teachers. On the other hand, the critical thinking in teacher education is a huge research area with many gray parts. Therefore further study in teacher education and critical thinking is indispensable both theorically and practically.

2.12 Summary

This study the will address the prospective teachers understanding of the critical thinking as well as their critical thinking levels within the Faculty of Education. Review of the literature about CT points out that the area is controversial as it includes various approaches and perspectives. There are several definitions of critical thinking as well as common misconceptions. Rather than sticking to one solid definition of critical thinking, the area requires awareness about the different views and a constructed understanding consequently. Besides, one’s being aware own thinking stands as a key point in the literature.

The literature about the teaching of critical thinking is revealed to be highly dependent on the understanding of critical thinking. Although, critical thinking is mostly acknowledged to be teachable in the literature, the ways of teaching critical thinking is not definite. The literature suggests variety of approaches, instructional methods, and strategies to promote critical thinking. At this point, the decision of whether to employ discipline specific or mixed method approaches in addition to the decision of applying

critical thinking in teacher education programs pertains to constructing a basis perspective via current and further studies.

Moreover, the review of literature reveals that assessment techniques in critical thinking are dependent on the approach of critical thinking. On the other hand, multiple-choice test are recommended as they are appropriate for many conditions due to advantages in implementation and evaluation.

To be in a fuzzy position, the literature point to the significance of teacher's understanding and application of critical thinking. Lastly, the limited scope of the studies conducted on the critical thinking definitions and levels of prospective teachers' points to an unrelenting requirement for investigation. The following chapter includes the method of the study conducted to examine the status of Faculty of Education at METU by investigating the critical thinking levels of prospective teachers as wells as their conceptions of critical thinking.

CHAPTER 3

METHOD

In this chapter, details regarding the methodology of the study are included. Initially, the research questions are presented. Afterwards, the overall design of the study, data collection instruments, population and sampling procedures, the data collection procedures, the data analysis procedures, and limitations of the study are discussed.

3.1 Research Questions

1. What are the critical thinking levels of prospective teachers measured by WGCTA-YM?
2. Are prospective teachers' critical thinking skill levels measured by WGCTA-YM correlated with their reported regular reading activity, CGPA, and gender?
3. How accurately can critical thinking scores of prospective teachers measured by WGCTA-YM be predicted from a linear combination of reported regular reading activity, CGPA, and gender?
4. Does Faculty of Education at METU provide any activity aiming to improve critical thinking skills of prospective teachers?

4.1. Is there any teaching activity reported by the students which aim to improve critical thinking skills offered by different departments of Faculty of Education?

4.2. Is there any course reported by the students in which the concept of critical thinking is covered in Faculty of Education?

5. What are prospective teachers' conceptions about critical thinking ability?

3.2 The Overall Design of the Study

As previously stated, this study aims to address the status of Faculty of Education at METU in terms of Critical Thinking Skills including both the CT levels of students and their CT conceptions. To accomplish this goal, the mixed method research design was applied.

A mixed method research design is a procedure for collecting, analyzing and mixing both qualitative and quantitative data in a single study to understand a research problem (Creswell, 2005). According to Johnson and Onwuegbuzie (2004) mixed method research does not intend to replace qualitative or quantitative approaches; on the other hand, it aims to portrait powerful sites lessening the weak sites of both in single research studies and across studies (p. 4). Creswell (2005) uses the same perspective and states the main reason for conducting mixed method study as and underlines that rather than using one type of data, using both qualitative and quantitative types of data, gives a better opportunity to solve the research problems.

Upon examining the literature it is observed that, there are studies conducted concerning prospective teachers CT in our country. It is witnessed that, those studies

mostly examine CT in relation to another variable. There are also qualitative studies conducted within this field. Contrary to the studies found in the literature, for this research, mixed method research is selected to be able to address the aim of research thoroughly.

In this study embedded design as mixed method design is preferred. A representative figure is presented in Figure 4. Creswell and Plano Clark explain embedded design by stating "The embedded design is a mixed method design in which one data set provides a supportive, secondary role in a study based primarily on the other data type" (Creswell & Plano Clark, 2007). Caracelli and Greene (1997) explain that the embedded design mixes the different data sets at the design level with one type of data being embedded within a methodology framed by the other data type (as cited in Creswell & Plano Clark, 2007, p. 67).

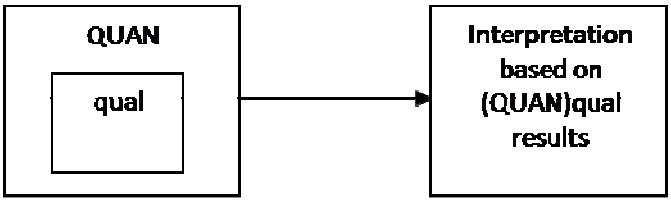

Figure 4. Embedded Design (Creswell & Plano Clark, 2007, p. 68)

Creswell and Plano Clark (2007) explain the embedded design as it includes the collection of both quantitative and qualitative data, on the other hand one of the data types plays a supplemental role within the overall design (Creswell & Plano Clark, 2007). In current research, qualitative examination of data regarding the conceptions of CT plays the supportive whereas the quantitative research questions play the major role.

Creswell and Plano Clark (2007) in their book explain that, a study which does not employ rich qualitative data such as "a survey study that includes a few open ended questions as a part of the survey" fits in the definition of mixed method study (p. 11). Similarly, for the current study, the qualitative data is gathered via open ended questions as a part of the survey.

3.3 Participants of the Study

Prospective teachers attending the Faculty of Education from the department of Foreign Language Education (FLE) Education at Middle East Technical University were the population for this study.

Purposeful sampling method was used to choose the appropriate sample for the current study. Creswell (2005) explains purposeful sampling by emphasizing the intentional decisions of researchers while selecting individuals. He clarifies the reason for purposeful sampling by saying: "to learn or to understand the central phenomenon" (p. 204). Patton (1990) explicates the standard when deciding the participants as the information they possess (as cited in Creswell, 2005, p. 204).

For the sampling procedures, the educational programs of various departments of Faculty of Education are examined. It is noticed that the students of Faculty of Education are attending the key lesson of teaching, often named as pedagogical courses, throughout their studies. In the 1st year, they attend "Introduction to Teaching Profession-119" or "Introduction to Education-120". In the 2nd year, students attend "Educational psychology-220" and lastly in the 3rd and 4th years they attend "Development and Learning - 304" and "Guidance - 424" (METU Academic Catalog).

Within the Faculty of Education, as the grade level increases the students become more eager to their departments as well as the teaching occupation, they become more of prospective teachers. As the scope of this study was aiming to investigate the CT levels of prospective FLE teachers, junior and senior FLE students in the Faculty of Education at METU were decided as a sample, purposefully.

During the data gathering procedure, some of the students were absent at the day of implementation and in some sections and students did not turn their test back. Because of these uncontrollable conditions, the responses except from FLE department were low. The low number of responses did not allow conduction of healthy statistical analysis. As a result, the sample is limited to FLE students. In this way, convenience sampling method is used, additionally. A total of 103 FLE students responses were analyzed and reported within the scope of this study.

3.4 Data Collection Instruments

In this study, The Watson Critical Thinking Appraisal Test form YM and Student Information form are used to gather data. In this part data collection instruments are explained in detail.

3.4.1 *Student Information Form*

For this study, Student Information Form was designed to obtain necessary information about the prospective teachers' background, demographic information and their conceptions about CT. At the beginning of the research process, a draft information

form is prepared by the researcher. Afterwards, necessary adjustments are made sticking to the recommendation made by the advisor.

Student Information Form included the both open and close ended questions. Close ended questions were included to collect qualitative data regarding properties of prospective teachers such as age, gender, grade level, department, reading habit, and mother and father education levels. On the other hand, open ended questions were included to collect qualitative data from the participants about their CT conceptions and their perceptions about CT activities in the Faculty of Education. An example of the Student Information Form is attached to the Appendix A.

3.4.2 *Watson and Glaser Critical Thinking Appraisal- Form YM*

For this research, Watson and Glaser Critical Thinking Appraisal- Form YM (WGCTA-form YM) is used to measure the critical thinking skills of prospective teachers (Appendix B). The Watson Critical Thinking Appraisal Test includes series of test exercises which in which several central abilities for CT are required (Watson & Glaser, 1964, p 2). The sub tests included in appraisal are: 1) Inference; 2) Recognition of Assumptions; 3) Deduction; 4) Interpretation; 5) Evaluation of Arguments.

Inference sub-test has twenty (20) items aiming to assess the ability discriminate the accuracy of inferences drawn from given data. An example question of inference sub-test is provided in Figure 5.

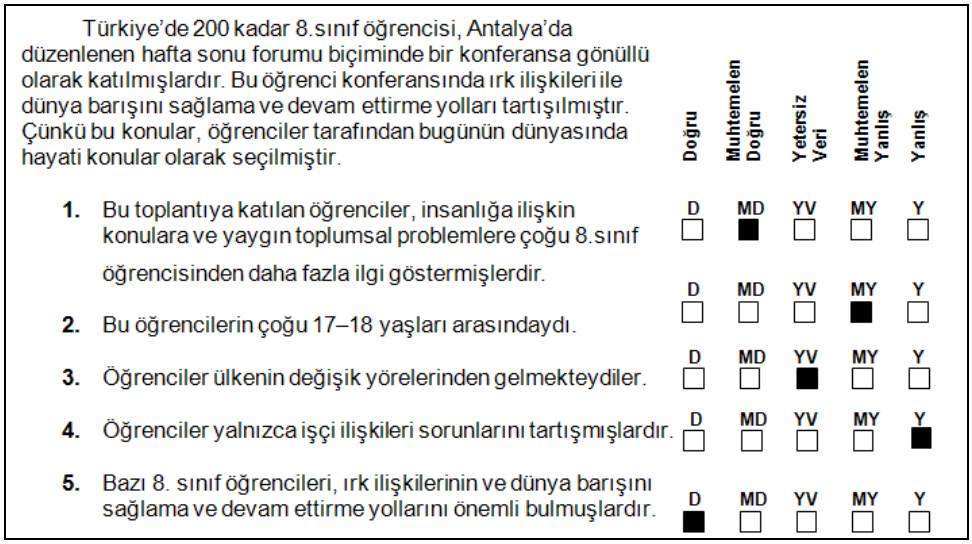

Figure 5. An example question of Inference sub-test.

Recognition of Assumptions sub-test has sixteen (16) items aiming to assess the ability to find out the unstated assumptions in a given text. An example question of recognition of assumptions sub-test is provided in Figure 6.

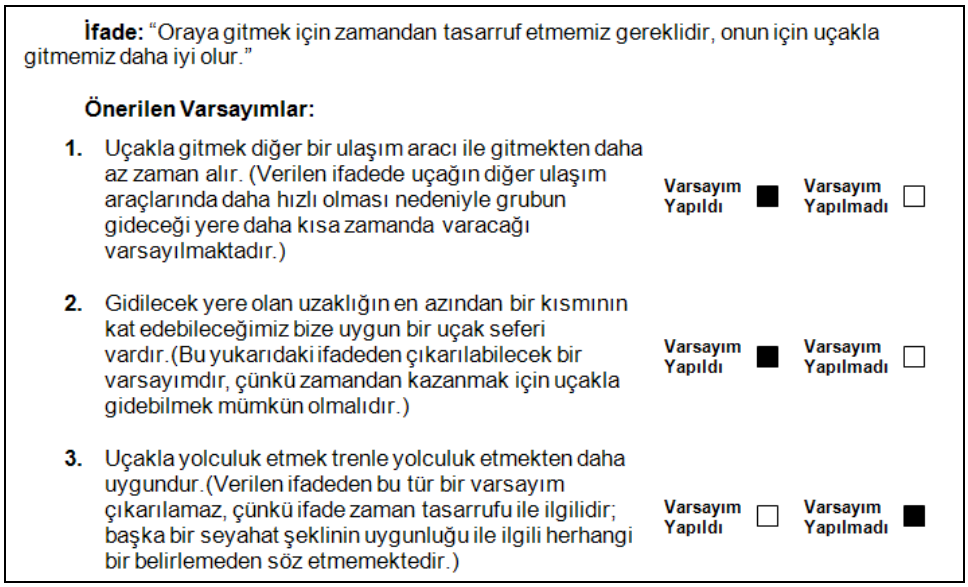

Figure 6. An example question of Recognition of Assumptions sub-test.

Deduction sub-test has twenty-five (25) items aiming to assess the ability to discriminate between the necessary inferences or implications from given statements. An example question of deduction sub-test is provided in Figure 7.

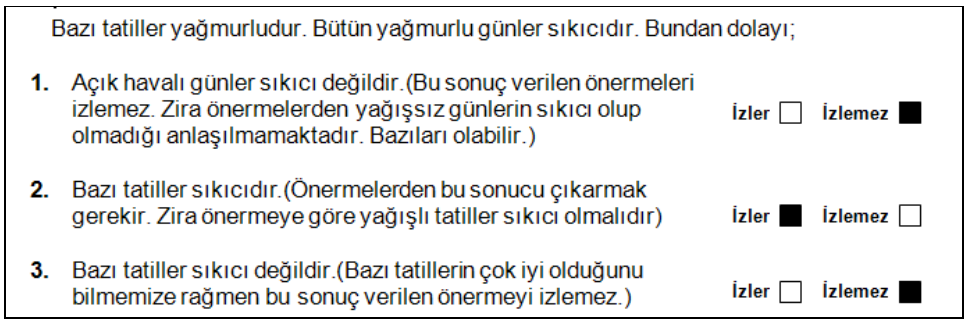

Figure 7. An example question of Deduction sub-test.

Interpretation sub-test has twenty-four (24) items aiming to assess the ability to differentiate generalizations according to the given statements. An example question of interpretations sub-test is provided in Figure 8.

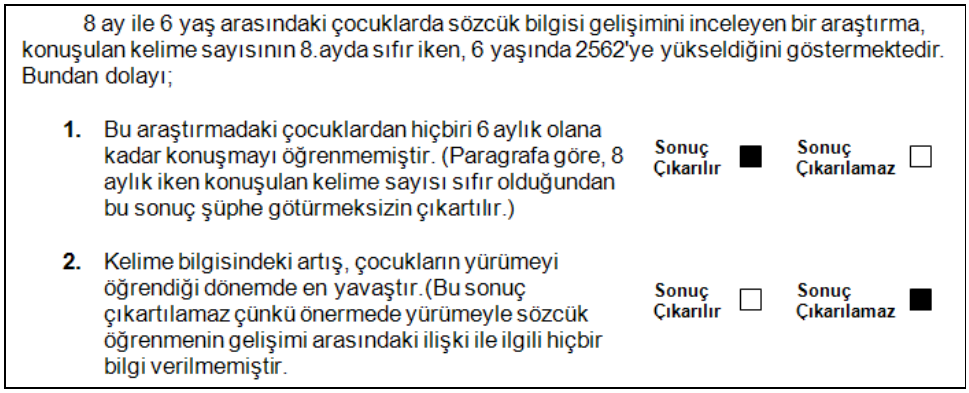

Figure 8. An example question of Interpretation sub-test.

Evaluation of Arguments sub-test has fifteen (15) items aiming to assess the ability to distinguish between arguments which are strong and relevant and those which

are weak or irrelevant to a particular question at issue. An example question of evaluation of arguments sub-test is provided in Figure 9.

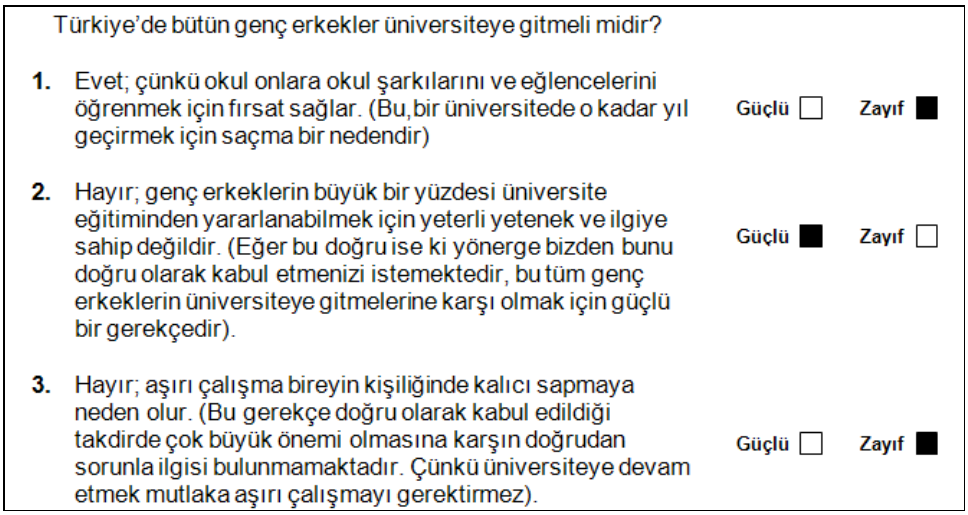

Figure 9. An example question of Evaluation of Arguments sub-test.

The WGCTA-YM test includes 100 questions which are suggested to be completed in 50 minutes by anyone who have the equivalent of a ninth-grade education. Also it is reported by the writers that the test is a power test rather than a speed test therefore there is no rigid time limit (Watson & Glaser, 1964).

In this study, the Watson-Glaser Critical Thinking Appraisal is intentionally chosen as it is the only measurement instrument measuring level of critical thinking and which has a Turkish version. Watson-Glaser Critical Thinking Appraisal form YM was translated into Turkish by Assoc. Prof. Dr. Nükhet Çıkrıkçı Demirtaşlı (Çıkrıkçı, 1993, p. 566). Moreover, the validity and reliability of the test is studied previously.

For the reliability concerns, the split-half reliability coefficient of the YM form of Critical Thinking Appraisal reported to range from .85 to .87 in accordance with the different population to which it was administered (Watson & Glaser, 1964, 13). The

reliability coefficient of YM form reported for the population of the freshmen in 15 liberal arts college is .85 (Watson & Glaser, 1964, 14).

Although the WGCTA-YM had been translated to Turkish previously, upon examining the appraisal, it is observed that the proper nouns, currencies quantities were remained as original in the test. For instance, a question asked "Eğer nitelikleri uygunsa *A.B.D'*deki evli kadınlar resmi okullarda öğretmen olarak çalıştırılmalı mıdır?" This kind of statements were adapted to Turkish by the researcher without affecting the original structure of the questions. Given example is adapted as: "Eğer nitelikleri uygunsa *Türkiye'*deki evli kadınlar resmi okullarda öğretmen olarak çalıştırılmalı mıdır?" The reason for this adaptation is twofold. First rationale is to prevent problems that might arise as a result of cultural differences and the second is to make respondents feel familiar with the questions. Throughout this procedure the researcher is guided by the adviser of the study.

3.5 Data Collection Procedure

The Watson-Glaser Critical Thinking Appraisal is administered to the 3rd and 4th grade FLE Students during the Spring Semester of 2007-2008 Academic Year at METU Faculty of Education.

When conducting a study where data is gathered from the human participants, an approval from the Applied Ethics Research Center is obligatory at METU. Therefore, for this research, an ethical consent is prepared and an approval from the ethics committee is obtained previous to data gathering (Appendix C). Each participant in this research has signed the ethical consent before participation.

As the 3rd and 4th graders are determined as a sample, the weekly program for faculty of education is obtained from the department secretary. Afterwards, classes to implement the WGCTA-YM were settled. The instructors for those classes were contacted to get permission to implement the test in their classes.

The instructors for the identified classes were contacted via mail, telephone or either face to face. They were informed that the necessary permissions were obtained from the ethics committee. The time for the administration of the survey was determined in coordination with the classroom teachers.

Before administration of the test to whole sample, a pilot study is conducted. The pilot study is conducted with 35 individuals in 2 different sections of 3rd yar FLE classes. The aim of the pilot study was twofold. First is to decide on the type of administration and to see if the return rate is acceptable when the appraisal is administered and brought back by the participants. Second is to simulate the data gathering process in the classroom environment and to foresee any problems that might be faced during data gathering.

To decide on the type of administration to be applied, in one section, the appraisal was administered during the lesson time with the permission of the classroom teacher. Alternatively, in the other section, the appraisal was administered and students are asked to bring the tests back to the next lesson. It is observed that, in the first section, it took students between 36 to 52 minutes to complete the test. This time interval was found appropriate according to the recommendations reported by Watson and Glaser (1964). In the other section 17 out of 22 tests were brought back by the

students in the next lesson. Also, this number constituted an acceptable return rate for the researcher.

A total of 30 surveys were examined for the pilot study. The results of pilot study are presented in Table 1.

Table 1

Results of the Pilot Study

Test	number of questions	min	max	M	SD
Test 1-Inference	20	4	14	9.92	2.52
Test 2-Recognition of Assumptions	16	5	16	11.10	2.52
Test 3-Deduction	25	12	20	15.64	2.00
Test 4-Interpretation	24	16	23	19.68	1.66
Test 5- Evaluation of Arguments	15	6	12	9.10	1.64
Total CT Score	100	50	78	65.46	5.39

As a result of pilot administration, distributing survey in the classroom with the researcher as an observer was found to be the most suitable data administration procedure. On the other hand, the instrument, Watson and Glaser Critical Thinking Appraisal- Form YM, is composed of 100 items and its suggested completion time is 50 minutes. Consequently, the administration of the test during any lesson time requires one hour. As giving one hour from their regular lesson time did not suited for some of the section teachers, at those 3 sections the test is administered and prospective teachers brought them back after completion. The data collection period has taken place during the April-May 2008.

3.6 Data Analysis Procedures

For this study, the both qualitative and quantitative data were gathered via survey and both types of data were analyzed. Tashakkori and Teddlie (1998) explain that: “in survey research, there often is a combination of open-ended and close-ended response options. These close-ended responses are analyzed statistically, and the open-ended responses are content analyzed” (p. 128). Correspondingly, for the current study, the quantitative data were analyzed both employing descriptive and inferential statistics. Additionally, qualitative data were analyzed by using content analysis.

The data gathered via surveys were coded and entered to the SPSS 11.5 Statistical Analysis Software. Afterwards, the descriptive analysis was used to investigate the demographic characteristics and background information of the participants. Through descriptive statistics frequencies, means, percentages, and standard deviations were calculated.

For the inferential statistics, Multiple Regression Analysis was conducted to see whether prospective teachers’ CT skill levels measured by WGCTA-YM, dependent variable, correlated with predictor variables which are reported regular reading activity, CGPA, and gender. Moreover, Multiple Regression Analysis was examined to see how accurately can CT scores of prospective teachers measured by WGCTA-YM be predicted from a linear combination of the predictor variables?

The qualitative data collected were analyzed through content analysis. The aim of content analysis which is explained by Yıldırım and Şimşek (2006) is to collect the similar data around particular concepts and themes also to organize and interpret those concepts and themes so that they can be understood by the reader.

For the qualitative data analysis, data were analyzed in accordance with the steps which were explained by Yıldırım and Şimşek (2006) as "1) Coding the data; 2) generating themes; 3) organizing categories and themes; 4) explaining and interpreting the findings" (p. 227).

At the beginning of the contents analysis, the qualitative responses given by the participants were entered to the MS Excel by the researcher. In this way, a complete picture of the qualitative responses was grasped.

After converting the data into soft form, the data were analyzed using computer. For the coding process no initial coding list was used. As the researcher aimed at discovering CT conceptions from the qualitative data, inductive analysis was used and codes were formed from the gathered data. Yıldırım and Şimşek (2006) state that, in the type of coding, where no initial coding is used, the researcher examines data in detail in order to identify the significant aspect for the research. In the next step, the codes are formed by the researcher depending on the data (p. 232). In this research, for the arrangement of the codes and categories, a mind mapping tool was used.

3.7 Validity and Reliability of the Study

The term "validity" is different for qualitative and quantitative research. However, for both type of research, validity is used for checking the degree of excellence of the data and the results (Creswell & Plano Clark, 2007, p. 133). Moreover, the trustworthiness of a research is related to the efforts made for validity and reliability concerns (Merriam, 1998, as cited in Yecan, 2005).

In quantitative research validity refers to “the appropriateness, meaningfulness, correctness and usefulness of the specific inferences researchers makes based on the data they collect” (Frankel & Wallen, 2003, p. 159). According to Yıldırım and Şimşek (2006) the validity in quantitative research is closely related to the instrument used in the research and its’ ability to measure the phenomenon that it is intended to measure.

According to Watson and Glaser (1964), the validity of the Critical Thinking Appraisal is perceived as combined attribute composed of content validity, construct validity, and predictive validity. Due to the vagueness on the limits of the subject matter as well as the impossibility to come up with an agreed on classification of aspects of CT, content validity is established to the extend through the items and definition compatibility within the context that the appraisal is applied (Watson & Glaser, 1964, p. 14). In terms of construct validity, WGCTA-YM is examined through factor-analytic studies in which separate parts of CT are found to be measured by the appraisal (Watson & Glaser, 1964, p. 14). In addition, the WGCTA-YM is examined in terms of relationships of several different intelligence and reading tests (Watson & Glaser, 1964, 14).

In quantitative research, the “Reliability” concerns about the replicability of the findings of the research (Yıldırım & Şimşek, 2005). Similarly, Frankel and Wallen (2003) explain reliability in quantitative research by paying attention to the “consistency of scores or answers provided by an instrument” (p. 173). Creswell and Plano Clark (2007) emphasize the need for referring to the reliability coefficients of the past uses of instruments as well as instrument’s test-retest outcomes. For the test used in this research, Watson and Glaser (1964) reported the split- half reliability coefficients for the

WGCTA-YM for 10th grade calculated with N=2947 participants (p. 14). The coefficients are presented in Table 2.

Table 2

WGCTA Subtest Split-half Reliability Coefficients for Grade 10 Normative Groups by Form. (Watson & Glaser, 1964, p. 14)

Subtest	No of items	Form YM	Form ZM
Test 1-Inference	20	.61	.55
Test 2-Recognition of Assumptions	16	.74	.54
Test 3-Deduction	25	.53	.41
Test 4-Interpretation	24	.67	.52
Test 5- Evaluation of Arguments	.15	.62	.40

WGCTA is translated to Turkish and it's first implemented done with in 9th, 10th and 11th grades in a high school in Ankara by Çıkrıkçı. Çıkrıkçı (1993) reported the KR-20 reliability coefficient ranged from .11 to .57. She explained that this coefficient was low since the homogeneity of the subjects caused the decrease in the consistency level as a result of diminishing the variances. The coefficients are presented in Table 3.

Table 3

The Distribution of KR20 Reliability Coefficients (Çıkrıkçı, 1993, p. 566)

Test	Grade 9	Grade 10	Grade 11
Test 1-Inference	.09	.42	.45
Test 2-Recognition of Assumptions	.56	.10	.24
Test 3-Deduction	.13	.34	.24
Test 4-Interpretation	.57	.50	.26
Test 5- Evaluation of Arguments	.19	.34	.11

On the other hand, in the qualitative research examination of qualitative validity means evaluation of the information gathered in qualitative data collection to ensure its correctness (Cresswell & Plano Clark, 2007, p. 134). In this research the qualitative data consisted of the responses given to the open-ended questions which ask the conception of the participants. Those responses were entered into the soft format and used as it is. Moreover, those responses were reported originally, aiming to increase the validity for qualitative research.

CHAPTER 4

RESULTS

In this chapter, the findings of the research are presented. The results chapter had three main parts: In the first part, the research questions are listed, in the next part the demographics are presented and lastly and lastly the results of research questions are introduced.

4.1 Research Questions

1. What are the critical thinking levels of prospective teachers measured by WGCTA-YM?
2. Are prospective teachers' critical thinking skill levels measured by WGCTA-YM correlated with their reported regular reading activity, CGPA, and gender?
3. How accurately can critical thinking scores of prospective teachers measured by WGCTA-YM be predicted from a linear combination of reported regular reading activity, CGPA, and gender?
4. Does Faculty of Education at METU provide any activity aiming to improve critical thinking skills of prospective teachers?
    4.1. Is there any teaching activity reported by the students which aim to improve critical thinking skills offered by different departments of Faculty of Education?

4.2. Is there any course reported by the students in which the concept of critical thinking is covered in Faculty of Education?

5. What are prospective teachers' conceptions about critical thinking ability?

4.2 Demographics and Background Characteristics

In this section, the demographic data of the participants are presented in order to provide baseline information for the research questions and the results of the current study. Participants of this study were selected among the prospective teachers studying at Faculty of Education at METU during the 2007-2008 spring semester. The 3rd and 4th year students from the Department of Foreign Language Education were selected purposefully. Since, Classroom Management-304 and Guidance-424 are compulsory courses for the students of Faculty of Education; the survey is distributed to juniors and seniors attending Classroom Management and Guidance courses. As a result 103 papers were collected. In terms of demographic characteristics gender, age, CGPA and high school type are examined and presented in this part.

Gender

A total of 103 students responded to the questionnaire. The gender distribution of the sample shows that, the sample consists of 81.56% of female respondents (N=84) and 18.44% male respondents (N=19). Table 4 represents gender characteristics of the participants.

Table 4

The Distribution of Participants According to Gender

	Frequency	Percent
Female	84	81.56
Male	19	18.44

Age

In terms of demographic characteristics, the age of the participants is examined. It is found that, the participants' ages vary between the ages of 22-24. Also a high majority of the participants were at the age of 21 and 22. Table 5 explains the age distribution of the participants.

Table 5

The Distribution of Participants According to Age

Age	Frequency	Percent
20	23	22.33
21	33	32.04
22	39	37.86
23	6	5.82
24	2	1.94

High School Type

In terms of demographic characteristics, the graduated high school type of participants is examined. The results revealed that of a high percentage of the participants (94.17%) were graduates of Anatolian Teacher Lycee. The high school distribution of participants is presented in Table 6.

Table 6

The Distribution of Participants According to High School Type

School Type	Frequency	Percent
Anatolian Teacher Lycee	97	94.17
Super Lycee	4	3.88
Technical Lycee	1	0.97
Other	1	0.97

CGPA

For the current study, the CGPA of the participants is examined. It is found that the participants of the study had a high CGPA level *(*M = *3.31,* SD *=0.36)*. The average CGPA of the participants is in the honor level which means that the participants of the study were mostly high academic achievers. Table 7 presents statistical data about CGPA.

Table 7

The CGPA Distribution of Participants

	n	Min	Max	M	SD
CGPA	94	2.38	3.96	3.31	0.36

4.3 Results of Research Questions

The purpose of this study was to reveal the current status of Faculty of Education at METU in terms of Critical Thinking Skills by examining the current level of prospective FLE students and their CT conceptions. In this section, the results for each research questions are presented.

4.3.1 Result of Research Question 1

Research Question 1: What are the critical thinking levels of prospective teachers measured by WGCTA-YM?

In order to answer this research question, prospective teachers' CT levels measured by WGCTA is examined by using descriptive statistics. A total of 103 prospective teachers' CT levels are measured by WGCTA. The data are presented in Table 8.

Table 8

CT Level Measured by WGCTA

Department	n	Min	Max	M	SD
FLE	103	50	78	64.30	5.85

The results indicated that, the CT level of prospective teachers from the department of FLE varied between 50 and 78. The possible maximum grade for WGCTA-YM is 100. However, the maximum value is 78 among participants. The data reveals that, in this study, none of the individuals in the sample received a high (>80) critical thinking level measured by WGCTA-YM. As a result, the CT level of teacher candidates assessed by WGCTA found to be in the medium level *(*M = *64.30,* SD *=5.85).*

CT levels measured by WGCTA are examined according to the sub-tests by using descriptive statistics. The descriptive data regarding sub-tests are presented in Table 9.

Table 9

CT Level Measured by WGCTA

Test	number of questions	min	max	M	SD
Test 1-Inference	20	4	15	9.67	2.33
Test 2-Recognition of Assumptions	16	2	16	10.79	2.54
Test 3-Deduction	25	11	22	16.20	2.19
Test 4-Interpretation	24	10	23	18.82	2.31
Test 5- Evaluation of Arguments	15	5	13	8.80	1.76

Except from the “Recognition of Assumptions” sub-test none of the sub-tests is fully completed by the participants of this study. Moreover the data reveals that, when compared to each other, among five sub-tests there is no distinguishable success or failure.

4.3.2 Result of Research Question 2

Research Question 2: Are prospective teachers' critical thinking skill levels measured by WGCTA-YM correlated with their reported regular reading activity, CGPA, and gender?

To answer this research question, multiple linear regression (MLR) analysis is selected as statistical method as a result of expert recommendation in addition to arguments proposed by the literature. MLR was employed to determine three independent variables in relation to the CT level of preservice teachers which are reported regular reading activity, CGPA, and gender.

In multiple regressions the main aim is to find out the reason for the variance in the scores observed. Brace et al. (2000) stated that "In multiple regressions we simply measure the naturally occurring scores on a number of predictor variables and try to establish which set of the observed variables gives rise to the best prediction of the criterion variable" (p. 207). In addition, Field (2005) explains that, in order to define the predictor variables to take place in the regression model, the results from the past research should be examined (p. 160). Therefore, in this analysis, reported regular reading activity, CGPA, and gender are determined as predictor variables. The correlations of individual predictors were examined and these are presented in Table 10.

Table 10

The Correlations of Individual Predictors According to MLR

	B	SE B	B
constant	54.80	5.66	
CGPA	2.72	1.99	.16
Gender	0.99	1.76	.07
Reading Habit	-1.05	-1.36	-.08

The results of MLR indicate that the correlations between dependent variable and independent variables vary between .07 and .16. This indicates that the dependent variable (CT) and the independent variables (CGPA, gender, and reported regular reading habit) are correlated but those correlations are very small. Furthermore, the correlation between the reported reading habit and the CT score is negative. In addition the results show that, among the four predictor variables, none of them has resulted in significant regression coefficient. According to the results, reported regular reading activity, CGPA, and gender cannot stand as predictors for CT level in prospective teachers.

4.3.3 Result of Research Question 3

Research Question 3: How accurately can critical thinking scores of prospective teachers measured by WGCTA-YM be predicted from a linear combination of reported regular reading activity, CGPA, and gender?

Since no prior hypotheses had been made to determine the order of entry of the predictor variables, a direct method was used for the multiple linear regression analyses.

As a result of the multiple regression analysis, it is found that the regression model accounts for only 1.7% of the variance in CT scores obtained from WGCTA. In addition, it is not significant fit of the data F (3, 99) =1.591, p> .05. In addition, the adjusted R^2 (.02) shows reduction from the unadjusted value (.05) indicating that the model does not generalize well.

The results of MLR implies that, as the model does not generalize well and only the 1.7% of the variance is accounts for the variance in CT levels, it can be said that WGCTA-YM cannot be predicted from a linear combination of reported regular reading activity, CGPA, and gender.

4.3.4 Result of Research Question 4

Research Question 4: Does Faculty of Education at METU provide any activity aiming to improve critical thinking skills of prospective teachers?

In order to examine perceived critical thinking activities done in METU Faculty of Education, two different questions were asked to participants. The first one was towards CT activities. On the other hand, the second was towards the lessons where CT concepts take place.

Research Question 4.1: Is there any teaching activity reported by the students which aim to improve CT skills offered by different departments of Faculty of Education?

The teacher education program in Turkey does not include any must course designed to improve critical thinking. However whether critical thinking is handled,

covered or implemented within the scope of the current courses is not known. Therefore, this research question was aimed to find of if there is any instructional activity reported by the students which aim to improve CT skills offered by different departments of Faculty of Education. The original question that took place in the survey was:

> Have you ever attended any instructional activity aiming to improve critical thinking in your department? If yes, which one(s)?

The results showed that 88.35% of the respondents reported not attending any instructional activity aiming to improve critical thinking in their departments. On the other hand, 9.70% of the respondents reported attending any instructional activity aiming to improve critical thinking in their departments. The frequency and the percentages about the responses to the attended instructional activity to improve CT question are presented in Table 11.

Table 11

Frequency and Percentage of the Responses (Instructional Activity Attended)

	Frequency	Percent
YES	10	9.70
NO	91	88.35
Left blank	2	1.94

The results shows that, a high majority of the prospective teachers does not think that they ever attended and instructional activity aiming to improve CT in their departments. On the other hand, there is a small percentage who reports attending instructional activities aiming to improve CT in their department.

The qualitative responses regarding the critical thinking activity within the department are examined in detail. The responses showed that, although the question directly asks the "activities to improve critical thinking" some of the respondents only refer to the courses by giving the names of the courses. For instance, "Literature and Method lessons," "History of ideas lesson," are referred as an instructional activity aiming to improve critical thinking. Correspondingly, one prospective teacher explained "Yes, most of the lessons that we take are for improving our CT, educational lessons and Literature lessons." Similarly, one prospective teacher explained the critical thinking activities while referring to a lesson and stated that "activities done in literature lessons, finding suitable teaching method activities done in Foreign FLE Lessons."

On the other hand, a small portion of the respondents preferred to give more detail regarding the instructional activity that improves critical thinking. For instance, one of the prospective teachers stated "Yes, we have examined the poets, stories, novels and we made interpretations on them." In the same way, another respondent stated "For example, we have questioned the social properties and the secret identities of the persons as well as the romantic meaning of the poets."

Furthermore, the critical thinking activities are reflected in a vague manner in responses. For instance, a respondent speak about "some" activity. The answer reveals that she/he has no apparent idea about if there is an activity to improve CT or not as well as the type of activity. She stated that:

> It can be said that there is no activity to improve CT skills in the department that I attend (FLE), on the other hand I can say that in some lessons like English literature and guidance, I gain some kind of thinking skills.

There are remarkable responses within the qualitative responses. For example, one participant refused attending an instructional activity within the department and gave “no” answer while including further clarification. The student responded that he/she had never attended any instructional activity aiming to improve CT activity in his/her department and explained it as “memorization”. This comment of students indicates that the student perceives CT as opposite of memorization.

Another attention-grabbing response is that one of the students believes that classroom activities increase CT skills. In contrast, he comments that his high school was better in improving CT skills. He states that “Many classroom activities (especially in literature and educational sciences) include such activities. But the education in high school was better in this sense.”

Last noteworthy point is that, although the question in the survey is directed to the activities done within the department a respondent point to outside classroom/ social activities such as seminars and discussions. She/he reported attending congress and discussions in a weekly manner.

Consequently, the qualitative responses about the activities done to improve critical thinking in the department showed that students do not point to a common instructional activity. Students mostly refer to lessons when they are asked about an instructional activity. Moreover, students make rudiment or vague statements about critical thinking activities. Lastly, a most significant point is that, students do not refer to activities done in pedagogical courses, the courses about teaching profession, when asked.

Research Question 4.2: Is there any course reported by the students in which the concept of critical thinking is covered in Faculty of Education?

This research question was aimed to find out if there is any course reported by the students in which the concept of CT is covered within the different departments of faculty of education. The original question that took place in the survey was:

> Have you ever taken any course(s) in your department which covers critical thinking term? If yes which one(s)?

The answers given to the question showed that 28.15% of the participants report that they have attended a course that covers the term "Critical Thinking". On the other hand 70.87% of the participants responded that they haven't attended any course covering the term "critical thinking" in their departments. The frequency and the percentages of the responses regarding question are provided in Table 12.

Table 12

Frequency and Percentages of the Responses (Courses Attended)

	Frequency	Percent
YES	29	28.15
NO	73	70.87
Left blank	1	0.97

When the results are examined the high percentage of negative answers given to the question takes attention. However, the existence of responses in the opposite direction reflects that further investigation is required. Therefore, for more explorative data, the distribution of answers according to department is also investigated.

Students who responded “Yes” are asked the names of the courses in the student information form. The course names mentioned by the participants were analyzed according to their frequency. As a result, a list of courses composed of 16 different items is formed. As a result, prospective teachers’ responses showed that, most frequently mentioned courses were: “Literature,” “Novel Analysis” and “Drama Analysis” lessons. The frequencies of mostly referred lessons are listed in Table 13.

Table 13

The Referred Lessons for Research Question 4.2.

Course Name	f	Course Name	f
Literature Lessons	15	Reading	1
Novel	8	Education	1
Drama Analysis	7	EU and the examination of the EU process	1
Poetry	3	History of Ideas	1
Methodology Lessons	3	Survey I-II	1
Research	3	Scientific method	1
International News	1	Area Courses	1
Language Acquisition	1	Pedagogical Courses	1

Three of the frequently referred courses, “Literature,” “Drama Analysis,” and “Novel Analysis” are must courses of the Foreign Language Education (FLE) Undergraduate program. Those courses are offered by Department of FLE. On the other hand, “Pedagogical Courses” and “Education” refer to the courses offered by Department of Educational Sciences such as: Introduction to Teaching Profession,

Development and Learning, and Guidance. These are must courses for all the undergraduate students studying in Faculty of Education. The frequencies of the referred lessons reveal the dominancy of FLE courses rather than the pedagogical courses. Interestingly none of the pedagogical courses is refereed with its original name. This is a significant finding for Faculty of Education as it implies that prospective teachers do not establish a straight connection between CT and courses related to teaching profession.

Additionally, the table reveals that most of the courses are referred only once and there are a variety of courses. This situation proves lack of common understanding of CT among prospective teachers.

4.3.5 Result of Research Question 5

Research Question 5: What are prospective teachers' conceptions about critical thinking ability?

For this research question, the qualitative responses, which are CT definitions of the participants, were examined by using qualitative methods. While conducting qualitative analysis, the themes are formed by employing two different perspectives in coding procedures. The first perspective is the "General Themes Perspective." In the first perspective, critical thinking definitions of the participants are examined to detect what activities are referred as critical thinking by the prospective teachers. Examination of the qualitative responses of the first perspective resulted in five themes: "Critical thinking as Thinking," "Critical thinking as Evaluation," "Critical thinking as Interpretation," "Critical thinking as Questioning," and "Critical thinking as Decision Making." The perspectives and the resultant themes are presented in Figure 10.

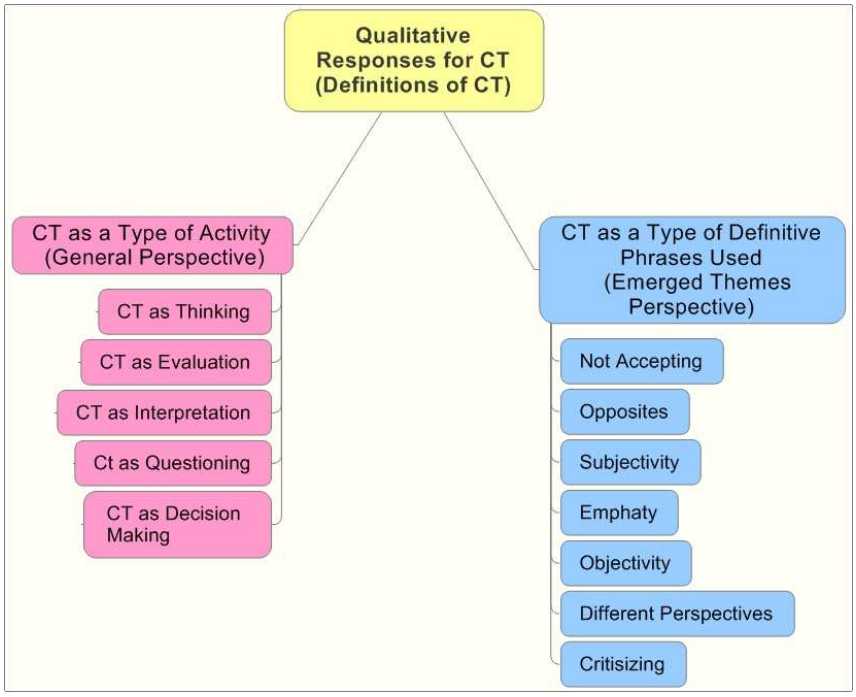

Figure 10. Mind-map of qualitative analysis perspectives and related themes

On the other hand, in the second perspective, "The Emerged Themes Perspective," the qualitative responses are examined by analyzing the frequent words and phrases are used in the critical thinking definitions of the prospective teachers. Examination of the qualitative responses from the second perspective resulted in seven themes: "Not accepting," "Opposites," "Subjectivity," "Empathy," "Objectivity," "Different Perspectives," and "Criticizing." In this part, the results of the qualitative data analysis will be presented under the two perspectives.

Perspective 1 (General Perspective)

The CT definitions of the participants were analyzed in order to identify what kind of activities is seen as a part of CT definitions of the prospective teachers. To accomplish that aim, the actions that are mentioned in qualitative responses were coded

and the themes that emerged most frequently are identified. In this part the resulting five themes, Critical thinking as Thinking, Critical thinking as Evaluation, Critical thinking as Interpretation, Critical thinking as Questioning, and Critical thinking as Decision Making will be explained in detail.

Theme 1: CT as Thinking

The prospective teachers' responses of CT definitions showed that the prospective teachers mainly describe CT as a "thinking" activity. Definitions pointed out that some prospective teachers prefer to define CT as merely an activity of thinking. On the other hand, some of the respondents prefer to define CT as an activity of thinking in a more compound manner by involving other attributes and descriptions into the definition of CT. Table 14 includes the list of the definitions in which CT is defined as merely an activity of thinking.

Table 14

Qualitative Responses CT as Thinking (Simple Definitions)

Critical Thinking Definition
Being able to think positive and negative aspects together (Student A0005).
Ability to think about an event with positive and negative sites. And approaching events objectively (Student A0053).
Rather than having an only one perspective, thinking multiperspectively (Student A0100).
Thinking multiperspectively (Student A0123).

The qualitative responses in which CT is mentioned as a thinking activity in a more complex way involves other attributes that refer to CT. However, the main emphasis remains on thinking. A list of those qualitative responses can be found in Table 15.

Table 15

Qualitative Responses CT as Thinking (Compound Definitions)

Critical Thinking Definition
It is not the ideas that occurs one's mind instantly, thinking differently considering costs and benefits (Student A0002).
A kind of thinking about a subject that a person thinks right or wrong, in which a person develops around her/his experiences and imagination (Student A0050).

Table 15 (Continued)

Critical Thinking Definition
Rather than accepting the ongoing opinions, ability to think about that opinion by considering its negative and positive sides (Student A0059).
The behavior against a subject and ability to handle that subject from multiple angles, multidimensional thinking (Student A0063).
Ability to think by using one's own knowledge and comments about a subject to be able to make decisions in the same or in the opposite direction (Student A0082).
Handling subjects by thinking while considering what is it behind, rather than what is seen (Student A0092).
Not accepting as it is rather thinking about it (Student A0122).
Thinking by respecting all ideas and handling all good and bad sites (Student A0124).
A kind of thinking which involves reasoning about a subject as well as understanding what is happening around (Student A0128).
Ability to think more abstract (Student A0131).
Is hypothetical thinking. Ability to look from multiple perspectives towards a problem (Student P0005).
Thinking while questioning (Student P0028).
Ability to discuss a subject from different perspectives and in an objective manner (Student P0029).
Rather than accepting an idea or a belief when it is declared, thinking about thinking while filtering it with our brain (Student P0030).

The results indicated that CT thinking is mostly perceived as kind of thinking. Besides it is perceived mostly as a cognitive activity, rather than a disposition or a type of act.

Theme 2: CT as Evaluation

The prospective teachers' responses indicated that another theme emerged in CT definitions is "Evaluation". The investigation Evaluation theme indicated that although evaluation stands as a common activity, the object of evaluation have shown a great variation. The objects of evaluation mentioned in the critical thinking definition of the participants. The prospective teachers expressed CT as an activity of evaluation with the following objects: knowledge, lacking parts of something, an event, an opinion, a situation, a problem, a thing, a subject, a document, information, person/people, different aspects of something, opposite ideas, what is happening around, others' expressions, others' behaviors. The qualitative responses in which definition of CT is mentioned an evaluation activity is presented in Table 16.

Table 16

Qualitative Responses CT as Evaluation

Critical Thinking Definition
Bearing in mind that every subject has another side except from what is reflected and ability to consider multiply while approaching to that subject from different perspectives (Student A0048).

Table 16 (Continued)

Critical Thinking Definition
I don’t accept what is written as it is. I try to see good or bad and right or wrong sites. But nothing is invaluable although it includes directly the opposites of my ideas (Student A0057).
Ability to consider and evaluate a situation from all perspectives (Student A0062).
The behavior against a subject and ability to handle that subject from multiple angles, multidimensional thinking (Student A0063).
A person's ability to evaluate people or events according to her/his own experience and perspective (Student A0079).
Ability to form our own opinions, ability to handle a subject with a critical perspective, not only evaluating one side but also evaluating good and bad sides (Student A0125).
To be able to evaluate objectively the things happening around (Student A0127).
Ability to evaluate the positive and negative sites of an event or a situation objectively (Student A0129).
Ability to use multiple perspectives when evaluating events; evaluating an event's positive and negative sides and to come up with a conclusion by questioning (Student P0001).
Ability to evaluate the things that happen around objectively (Student P0016).
Not to accept a thing or a text as it is rather to evaluate it with positive and negative sides (Student P0017).

The results indicated that majority of the prospective teachers offered evaluation as a part of their definition of CT. This supports the results of the previous theme by referring to a cognitive activity.

Theme 3: CT as Interpretation

Another theme emerged in CT definitions of the prospective teachers' responses is "interpretation". The frequency of the themes emerged in the data indicated that the interpretation theme is expressed as much frequently as the evaluation theme in the CT definitions of the prospective teachers. The prospective teachers mentioned interpreting of an idea, a phenomenon, a situation, an argument, an event, a subject, a thought, other's ideas, information, what is observed, and events that are faced as a subject for interpretation. Table 17 presents the qualitative responses in which definition of CT is mentioned as an interpretation activity.

Table 17

Qualitative Responses CT as Interpretation

Critical Thinking Definition
Not to accept ideas, information etc. that is presented, not to believe in dogma. To interpret the authenticity and logicalness (Student A0001).
Not comprehending accepting everything as it is; to interpret the thing you read or heard by synthesizing with your own thoughts (Student A0009).

Table 17 (Continued)

Critical Thinking Definition
Interpreting events while investigating them from our own perspectives (Student A0066).
To be able to make good or bad interpretations about others' thoughts or any idea (Student A0076).
Rather than staying silently when we are faced with positive or negative events, ability to make interpretations from our own perspectives (Student A0090).
Approaching a subject from different angles and making interpretations (Student A0121).
Thinking by seeing positives and negatives ad interpreting them (Student A0126).
To be able to look from different perspectives and to be able to interpret by considering that perspectives (Student P0002).
Looking at a subject from multiple perspectives and to be able to make interpretations (Student P0007).
Ability to analyze and interpret situations while involving ones on perspective (Student P0012).

The results indicate that a lot of prospective teachers define CT in relation to interpretation. This situation shows parallelism with the pervious themes in a way that; CT is mostly defined in the cognitive domain. Additionally, interpretation is one of the five sub-tests of WGCTA. This indicates that prospective teachers a CT definition intersects with the views of Watson and Glaser (1964) under the interpretation theme.

Theme 4: CT as Questioning

What clearly emerged in data analysis was the theme that prospective teachers include “questioning” as a part of their CT definitions. Prospective teachers mentioned questioning different subjects such as an event, an opinion, a phenomenon, a situation, a subject, knowledge, thinking, results and reasons, what is heard, what is seen, and what is learned. The varying definitions including questioning as a part of CT are exemplified in Table 18.

Table 18

Qualitative Responses CT as Questioning

Critical Thinking Definition
Rather than accepting an idea or thought as it is, questioning it to fit it into our logic and before accepting (Student A0074).
Not accepting events or phenomenon’s as they are and questioning them (Student A0094).
A person’s ability to question another person or an event, ability to make interpretations and criticism (Student A0103).
Human being's ability to question what is heard, read or learned. While questioning there is a need to have a strong baseline and a need to investigate their reasons (Student P0011).
Approaching the suggested ideas with a skeptical, questionable and evaluative manner (Student P0020).
A person’s not accepting the situations that happen around, rather questioning its positives and negatives (Student P0026).

The results indicate that prospective teachers perceive questioning as a part o their CT definitions. Actually, when the responses are examined, a skeptical approach in CT is seized. This approach fits in the historical roots of CT.

Theme 5: CT as Decision Making

The last theme that emerged in CT definitions is “Decision Making”. The data analysis resulted that this theme occurred least frequently among the five identified themes. Prospective teachers have mentioned about decision making although what is decided has varied from one definition to another. Some of the students perceived decision making process as a finalizing act whereas some others indicated the deciding on true vs false, right vs. wrong, less vs more or good or bad. The qualitative responses which mention decision making in CT definitions are presented in Table 19.

Table 19

Qualitative Responses CT as Decision Making

Critical Thinking Definition
Ability to handle, investigate and interpret a situation from different perspectives and coming up with a decision (Student A0061).
Before accepting a situation evaluating it according to own standards and coming up with a decision (Student A0071).
Making decisions by scrutinize (Student A0086).

The results indicate that a comparative to the other themes, lower number of students perceive CT as decision making. When the definitions under the questioning

theme are examined, it is seen that the decision making theme represents result oriented perspective. On the other hand decision making also represents the dominance in the cognitive perspective of critical thinking.

Other activities mentioned

The analysis of the qualitative responses resulted that thinking, evaluation, interpretation questioning and decision making are mentioned most frequently in CT thinking definitions of prospective teachers. However, there are other activities mentioned in qualitative data but in less frequency. Table 20 lists the all activities mentioned in CT definitions.

Table 20

Activities Mentioned in Critical Thinking Definitions.

Verb/Activity	**Verb/Activity**
To think	To be able to declare
To evaluate	To have respect
To interpret	To adapt oneself
To question	To use the brain
To make decision	To focus on a subject
To be objective	To make inferences
To analyze	To act
To accept or deny	Generating ideas
To make reasoning	To be able to see positive and negative sides
To synthesize	Forming theories
To investigate	Asking questions
To form an opinion	Understanding
To criticize	Comparing ideas
To have empathy	Identifying own norms
To have an approach	Defending ideas
To conclude	Making explanations
To discuss	Being skeptical

Consequently, the qualitative analysis from perspective one resulted that students mostly perceive CT from a cognitive perspective. Besides, they refer to evaluation which is the highest level in Blooms' taxonomy (Bloom, 1956) for defining CT. Although, mentioned with comparatively lover frequency there is a tendency to define CT as questioning and decisions making which are other forms of higher order-thinking

(Facione, 1990, p. 5). Furthermore, the diversity in the mentioned activities refers to a common-sense view of CT rather than a shared understanding in CT.

Perspective 2 (The Emerged Themes Perspective)

The CT definitions of the participants were analyzed by coding the frequent words and phrases are in order to examine the definitive themes observed in critical thinking definitions.

For this analysis, definitive phrases used by the prospective teachers are coded and seven different themes were formed as a result which are: “Different Perspectives,” “Not accepting,” “Opposites,” “Subjectivity,” “Objectivity,” “Empathy,” “Different Perspectives,” and “Criticizing.”

Theme 1: Different Perspectives

One of the mostly emphasized themes in CT definitions of prospective teachers is “Different Perspectives”. In different perspectives view, students reflect that, the situations, problems have multi-perspectives. Furthermore problems should be dealt with, considering multiple angles. Prospective teachers’ definitions emphasizing the importance of viewing the problem from many different viewpoints can be found in Table 21.

Table 21

Qualitative Responses Referring to Different Perspectives

Critical Thinking Definition
To be able to look from different perspectives, Not sticking to any thought blindly. It is the ability to adapt oneself (Student A0004).
Ability to consider a thought or idea from different perspectives by evaluating and commenting on it differently (Student A0072).
Not to look from only one perspective rather, looking from many different perspectives and analyzing good and bad sides (Student A0047).
Ability to consider a subject from multi-perspectives (Student A0056).
To be able to look from different perspectives to an idea, a thought and to be able to make different interpretations and comment on that (Student A0096).
Ability to handle, investigate and interpret a situation from different perspectives and coming up with a decision (Student A0061).

Theme 2: Not Accepting

The prospective teachers' responses of CT definitions showed that the phrases "not accepting as it is" used quite often in order to define CT thinking. It is noted that, prospective teachers from different classrooms and sections use very similar phrases to define CT which suits in not accepting theme. A list of definitions is presented in Table 22.

Table 22

Qualitative Responses Referring to Not Accepting

Critical Thinking Definition
Not accepting events or phenomenon's as they are and questioning them (Student A0094).
Not to accept ideas, information etc. that is presented, not to believe in dogma. To interpret the authenticity and logicalness (Student A0001).
Not accepting events as they are. Thinking about them, not only considering one perspective but also considering other perspectives. Seeing the wrong sites as well as making confirmations (Student A0120).
Not accepting as it is rather thinking about it (Student A0122).
Rather than accepting the idea which is forced, accepting or denying after criticizing (Student A0003).

The prospective teachers' responses of CT definitions showed that students see "not accepting" as a part of their CT definition. What is not accepted changes from one definition to another. This situation reflects the students' making judgments about anything, in this way seeing beyond the directly givens of any kind of problem.

Theme 3: Opposites

Another theme that has emerged from the phrases used by the prospective teachers in critical thinking definitions is "Opposites." The definitions included two

opposite words and accepting, considering, thinking, and interpreting those opposites is seen as a part of critical thinking definition by the prospective teachers. In fact, this opposites theme reflected the tendency to make comparisons weighing up the positive and negatives. For instance; some prospective teachers included positive and negative as part of their critical thinking definitions whereas others used different word for implying opposites (see Table 23).

Table 23

Qualitative Responses Referring to Opposites

Critical Thinking Definition
Handling all sites of a subject either positive or negative (Student A0112).
Declaring ideas positively or negatively (Student A0118).
Being able to think positive and negative aspects together (Student A0005).
To be able to look at an event considering both the aspects those are suitable to me as well as the cost and benefits to others (Student A0006).
Considering a subject involving the parts that are suitable to me as well as its costs and benefits to others (Student A0088).
Ability to think about an event with positive and negative sites. And approaching events objectively (Student A0053).
Ability to make comments about subject ether positively or negatively, synthesizing… (Student A0132).

Theme 4: Subjectivity

The "subjectivity" theme represents "the role of person" in the definition of CT. The CT definitions of prospective teachers which include the emphasis of personal opinions, personal perspective, personal ideas, and personal experience are grouped under this theme. A list of responses is presented in Table 24.

Table 24

Qualitative Responses Referring to Subjectivity

Critical Thinking Definition
The process of analyzing-synthesizing and coming up with a result while evaluating the current program or process considering our own perspective (Student A0015).
Evaluating events while looking to them from our own perspectives (Student A0066).
Identifying our own norms against the situations that happen around by putting forward our own ideas and perspectives (Student P0006).
To be able to make good or bad interpretations about others' thoughts or any idea (Student A0079).
Ability to analyze and comment on situations while involving ones on perspective (Student P0012).

For instance, a prospective teacher emphasize the importance of own ideas and define CT as: "To be able to declare our own opinions in the correct time and place, without being under pressure" (Student P0025). In the same way, another prospective teacher underlined the subjectivity on the other hand involved the ideas of others in the

CT definition stating, “Evaluating and interpreting a thing that you read, heard or learn according to your own ideas and thoughts, while involving others opinions at the same time” (Student A0080).

Theme 5: Objectivity

Objectivity is another theme that emerged in the CT definitions of prospective teachers. However in what way objectivity is emphasized in critical thinking definitions also vary.

For example, one of the definitions positions objectivity in the CT definition and states that “Reasoning by considering a phenomenon or a situation in an objective manner” (Student A0055). Additionally, another prospective teacher puts objectivity as an aspect of thinking process and says that “Ability to asses a subject objectively…” (Student A0058). There are also other definitions that direct objectivity towards productions, ideas, thoughts, events or situations: “Ability to evaluate the things that happen around objectively” (Student P0016). “Ability to evaluate the positive and negative sites of an event or a situation objectively” (Student A0129). “Ability to handle objectively and to be able to compare it with opposite ideas, when face with an idea” (Student A0130).

Theme 6: Empathy

Another theme that emerged in the CT definitions of prospective teachers was “Empathy.” It is observed that empathy is underlined rarely compared to the previous themes. For instance, one of the prospective teachers equalized CT with empathy and stated that, “critical thinking is to show respect to other's ideas.” (Student A0067). One

other prospective teacher included empathy with abstract thinking ability and objectivity concerns and stated that CT is “Ability to think more abstract, to be able to act emphatically objectively” (Student A0131). Lastly, another response included empathy with investigation of oneself and people and events happening around and explained that “A persons' investigating the people and events around by scrutinizing and acting emphatically” (Student A0068).

Theme 7: Criticizing

The last theme that emerged in the CT definitions of prospective teachers was “Criticizing”. The responses that refer to criticizing are listed in Table 25.

Table 25

Qualitative Responses Referring to Criticizing

Critical Thinking Definition
Criticizing the ideas that are proposed in addition to accepting the sides which seem suitable… (Student A0054).
A person’s ability to question another person or an event, ability to make interpretations and criticism (Student A0103).
Deciding on the best on a subject and criticizing it from all perspectives…. (Student A0093).

The results show that, there are prospective teachers who define CT by referring to criticizing. This demonstrates that, although referred rarely relatively to the other

themes, there is a misconception about criticizing and critical thinking among prospective teachers.

The examination of qualitative responses from the second perspective revealed that, students' definitions of critical thinking show a scattered structure. On the other hand, definitions cluster around some themes. Although, the definitions reflect different understandings, same words, phrases are used and mostly the same points are emphasized.

Moreover, the examination of the prospective teachers' critical thinking definitions revealed that, the definitions reflected a common sense view. Although critical thinking is a wide subject that has several definitions and several argumentative aspects like the purposefulness attribute of critical thinking, those points are not mentioned in the definitions of critical thinking.

Lastly, the definitions reveal that, critical thinking is mostly perceived as kind of thinking In addition, it is mostly perceived as a cognitive activity.

4.4 Summary of Results

The current research is conducted to reveal the status of Faculty of Education at METU in terms of Critical Thinking Skills. For this aim, CT levels and CT conceptions of prospective teachers from the FLE are examined. The results of both quantitative and qualitative data are summarized below:

1. The investigation demographic properties characteristics of prospective teachers revealed that, the participants were mostly female with a percentage of 81.56%. Moreover, 91% of the participants were between

the ages of 20 - 22. In addition, 94.17% were graduates from Anatolian Teacher Lycee. Furthermore, the CGPA average of the participants was 3.11 representing honor level successes.

2. In terms of CT levels, the results demonstrated that the CT level of teacher candidates assessed by WGCTA are in medium level *(*M = *64.30,* SD *=5.85)*. Moreover, the CT levels varied between a minimum of 50 to a maximum of 78.

3. The results of MLR indicated that WGCTA-YM cannot be predicted from a linear combination of reported regular reading activity, CGPA, and gender.

4. The results showed that 88.35% of the prospective teachers reported not attending an instructional activity aiming to improve CT in their departments. Whereas, 9.7% claim the opposite. Qualitative responses about instructional activities are examined for further understanding. The results indicated that;
    - The responses do not point to a common instructional activity. They show a scattered structure.
    - Prospective teachers make vague explanations of critical thinking activities or they rather list names of lessons. Only a small portion of the respondents were able to explain the activities.

- Although the instructional activities are asked, lesson names, activities outside classroom or social activities are noted in relation to CT.

5. The results showed that 70.87% of the participants, report that they have never attended a course that covers the term “Critical Thinking”. Whereas 28.15% of the respondents claim the opposite. Qualitative responses about lessons covering critical thinking are examined for further understanding. The results indicated that;
   - 16 different courses are referred as a lesson that covers the term CT. which proves that that the responses do not point to a common understanding of CT.
   - Most frequently referred courses, “Literature,” “Drama Analysis,” and “Novel Analysis”. Those courses are the courses offered by Department of FLE. The reference to pedagogical courses is not observed.

6. The qualitative investigation of the prospective teachers’ conceptions about critical thinking ability reveals that;
   - The definitions showed a scattered structure. This situation points to a lack of common understanding of CT among prospective teachers.
   - CT thinking is mostly perceived as kind of thinking. Also CT is mostly perceived as a cognitive activity.

- Majority of the prospective teachers regard CT as evaluation, interpretation, decision making or questioning. Although some themes are supported by the literature there are also misconceptions like equating critical thinking with criticizing.
- The resultant themes and structures of the definitions indicate a common sense view rather than an understanding in CT. The definitions do not touch the significant issues about critical thinking.
- Although the importance of self is referred in subjectivity theme, no clear emphasis on the regarding awareness and purposefulness attribute of CT is mentioned.

CHAPTER 5

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

5.1 Conclusions and Interpretations

The participants of the study were examined in terms of background characteristics and demographic characteristics. The results show that 94.17% of the participants were graduates of “Anatolian Teacher Lycee”. This is an expected result, as the graduates of “Anatolian Teacher Lycee” are strongly encouraged to prefer Faculty of Education by the enformance of extra coefficients in the University Entrance Exam in Turkey. This result reveals that the participants of the study are from similar backgrounds.

Rickets and Rudd (2004) point out that gender should be discussed as a predictor variable in order to investigate critical thinking skill (p. 21). For the current study, gender is also examined as a predictor for the CT scores measured by WGCTA. The results indicated that, participants were mostly female with a high percentage. This situation also represents the current position of faculty of Education at METU. In addition, this result shows congruity with the general opinion that teaching is seen as the best occupation for females’ perspective towards teaching profession in Turkey. Moreover, gender is entered as a predictor for CT multiple regression analysis. The results of the multiple regression analysis showed no significant effect of gender on CT measured by WGCTA. Similarly, using the Watson-Glaser Critical Thinking Appraisal, critical thinking was found to be independent of gender in the study conducted by

Dayıoğlu (2003). Kürüm (2002) also reports no significant effect of gender on CT as a result of the study she conducted with 1st 2nd and 3rd grade students in Anadolu University faculty of Education.

The results also indicated that the CT levels of teacher candidates assessed by WGCTA are in the medium level. Similarly, Dayıoğlu (2003) reports medium level CT as a result of the study she conducted with the English Preparatory School Students at Hacettepe University. Correspondingly, Çıkrıkçı (1993) reports medium level scores measured by WGCTA in her study and explains this result due to test's being a new and different test for the participants .Watson Glaser (1964) reports the CT results measured by WGCTA- form YM as *(*M = *74,* SD =*9.6*) for college seniors. The reasons for moderately low scores of CT levels of teacher candidates at METU faculty of Education cannot be assigned to only one reason. Those reasons generate new areas which are open to research.

For this research, the research question "Is there any teaching activity reported by the students which aim to improve critical thinking skills offered by different departments of faculty of education?" is examined. The results indicated that a high majority of respondents have reported that they have never attended any instructional activity aiming to improve critical thinking activity in their department. This high percentage is conspicuous. To interpret this we can say, either, there is not adequate CT activities that take place in the Faculty of Education or the CT activities that take place in the Faculty of Education currently is not comprehended by the prospective teachers. In addition wider studies concerning the faculty members' and instructors' view is needed for a deeper understanding.

The responses of the prospective teachers who believe that they have attended instructional activity aiming to improve critical thinking are scattered. This result implies the lack of straightforward, distinct and explicit CT activities within the Faculty of Education. Students try to explain the activities with vague statements like “some activities done within the scope of the lesson” or “some/most lessons” rather than exemplifying the CT activities which implies that students are not clear about what to consider as a CT activity. Also, some student responses just refer to lessons like “Literature lessons”, “Method Lessons”, “Guidance Lessons” and “lessons offered by educational sciences” for CT activities, in this way they point out the faculty of Education as the source for the CT activities. On the other hand, some responses directly point outside the faculty for the CT activities by referring to the “seminars and activities outside the department”. As a whole the results imply misconceptions and failure in distinguishing CT activities. To overcome this situation Facione (1990) introduces a recommendation in “Delphi Report” and states that: “Direct instruction in CT and assessment of CT should be an explicit parts of any course granted approval for purposes of satisfying CT requirements, whether that course is a CT course per se or a course in a given subject field” (p. 14).

Correspondingly, the parallel research question, which is “Is there any course reported by the students in which the concept of critical thinking is covered that is reported by the students?” implied collateral results. A high majority of the students have reported that they did not take any lesson covering the term CT in their department. The qualitative responses when reporting CT courses indicated attention taking results. The results denoted 16 different items, regarding the lesson that covers CT. This result

indicated that the lesson covers CT concept is perceived very differently by the prospective teachers. Also the responses for CT lessons clustered around “Literature”, “Drama Analysis”, “Novel Analysis” responses. This result also underlines the emphasis on CT in area lessons rather than pedagogical lessons.

Although 70.87% of the participants reflected that they haven’t attended any course covering the CT concept they made their own descriptions of CT when asked. The investigation of the CT definitions of prospective teachers resulted that students see the activities of “Thinking”, “Evaluation”, “Interpretation”, “Questioning”, and “Decision Making” as a part of their CT definitions.

Students’ definitions perceiving CT an activity of “Thinking” is sound and is also supported by many researchers in the literature. For example Paul and Elder (2005) define critical thinking as “a mode of thinking” in the same way Moon (2008) defines CT as an “aspect of the activity of thinking”.

The themes of “Evaluation” and “Interpretation” are also supported by the literature Facione (1990) includes activities of “Evaluation” and “Interpretation” in the consensus list of cognitive skills and sub skills in the Delphi report. Similarly, “Inference” and “Interpretation” are seen as a part of CT by Watson and Glaser, so that they are included as sub-test in the WGCTA. Moreover, the mostly emphasized themes that take part under the cognitive skills list emphasize that students’ definitions of CT are eager to the view of perceiving CT as a cognitive skills rather than a set of skills and attitudes. Theme “Questioning” is also mentioned in definitive attempts regarding CT in literature bearing in mind that critical thinking is routed to Socratic questioning historically (Paul, Elder & Bartell, 1997). On the other hand, although “Decision

making" is appeared as a theme for defining CT in this study the literature supports the idea of discriminating CT with "Decision Making". Facione (1990) accepts the relatedness of decision making with CT but, perceives decision making as another form of higher-order thinking and underlines the lack of sufficient examinations of the relationship of decision making and CT. (p. 5)

Form the second perspective, as a result of the analysis of the definitive phrases used by the prospective teachers, seven different themes were formed:"Not accepting", "Opposites", "Subjectivity", "Objectivity", "Empathy", "Different Perspectives" and "Criticizing".

Correspondingly, Phillips and Bond (2004) report 4 categories of undergraduate experiences of a reflections of critical thinking as a result of the qualitative study conducted:"weighing up", "looking at it from all angles", "looking back on" and "looking beyond what is there" (p. 283). When the study is examined, it is observed that although the names given to the emergent themes differ, similar points are touched upon. Under "weighing up" comparisons of pros and cons, positives and negatives are emphasized. Those correspond to the themes of "Opposites" and "Objectivity" for the current study. In the same way, "Different Perspectives" theme in which seeing something from number of angles is emphasized by the students directly overlap the theme looking at it from all angles" of the Phillips and Bond's (2004) study (p. 284-285).

Besides, the occurrence of the theme "Criticizing" pointed out the existence of misconceptions about critical thinking. The misconception can be explained that, some

prospective teachers equalize criticizing something to reveal or point out wrong or faulty points with critical thinking process.

From a general perspective, when the qualitative responses given by the students are imply that prospective teachers reflect the common sense view of CT rather than any implicit, conscious and sensible definition of the term which takes its bases from the literature. In addition, there are misconceptions about the CT definitions of students. Furthermore, the results demonstrated that prospective teachers are having difficulty when asked about a critical thinking activity. In addition to all this, courses and instructional techniques of critical thinking are reported in low percentages. These points to a conclusion that CT is not handled and comprehended well. Keeping in mind that, as Paul Linda and Bartel (1997) notes, to be able to teach CT effectively, teachers are required to think critically (p. 93), expecting prospective to teach CT teachers without CT would be misleading.

To overcome this problem, the literature suggests the implementation of courses with an interdisciplinary approach is to be able to transmit critical thinking (Tsui, 1999, p.187). Although the literature is quite rich in terms of CT concerns, there appears a need for implementations in order to make the theory implied in the practice. For this aim, Paul, Elder and Bartell (1997) make four recommendations as a result of their study they conducted with 38 public and 28 private universities:

1. Disseminating information in order to change faculties' perceptions.
2. Providing sources for professionals so that they develop appropriate professional development.
3. Launching standards authorization for teacher prep in critical thinking

4. Encouraging and supporting teachers for critical thinking instruction throughout their by employing credentials (p. 73-103).

To sum up, to accomplish any change in terms of CT, it requires time and effort. Additionally, for critical thinking no one correct strategy is appropriate (Moon, 2008, p.131).

5.3 Recommendations for Further Research

Considering the experience gained during this study and the findings of this study, some recommendations for further research are provided.

This study is conducted based on the prospective teachers' levels of CT and their definitions of CT. To provide a broader picture of Faculty of Education in terms of CT perceptions and implications, further studies are needed covering faculty members, instructors and, directors.

This study is conducted with FLE students in Faculty of Education at METU which is one of several Education Faculties in our country. This study should be replicated aiming to understand the position in broader populations like other universities and departments with further studies.

In this Study, WGCTA-YM is used as a measuring instrument. Although WGCTA-YM is a standardized instrument used in wide range all over the world, cultural differences can affect the results. Aiming to overcome bias resulting from cultural perspective differences, further studies should be done for developing CT measuring tools for Turkish Students.

In this research, prospective teachers formed the sample. CT is such a broad term that everyone needs to develop CT skills in her/his life. Because of this reason, further studies analyzing student's CT ability should be conducted with other departments and faculties.

Critical thinking is given extra importance with new curriculum in Turkish Educational System, not only prospective teachers but also employed teachers' should be involved in CT studies as a sample or as a population.

The results of this study indicated medium level CT levels. The reasons for this medium level of CT are which is apparent for new research.

In this study CT is handled as a whole with CT disposition. However, the literature review revealed that other approaches covering CT disposition as a separate entity do exist. Moreover, alternative instruments measuring CT disposition are present. Another recommendation is to continue studying CT dispositions of the students.

The current study aims to find out the current applications of CT in METU Faculty of Education, which are perceived by the students. Moreover, there exists a need for further studies in the application site of curriculum to increase CT in students. With this aim the questions of "How CT should be thought to prospective teachers?"; "what kind of modifications should be made in current curriculum to increase the CT levels of prospective teachers?" should be employed as research questions in further research. Along with this aim longitudinal studies should be done.

Another debate taking place within the scope of CT is the subject specificity. It is recommended that further studies should be conducted on subject specificity of critical thinking in teacher education to shed light on curricular movements.

5.4 Recommendations for Further Practice

Considering the limitations and the results of the study, recommendations for further practice are proposed. This study points to the ambiguity of critical thinking in teacher education programs. To overcome this problem and in order to reach a better position in terms of critical thinking the decision makers should work in coordination towards the same aim.

First of all, Ministry of National Education should handle teacher education program in accordance with the curriculum renovation movements in coordination with Higher Education Council. Therefore, the current teacher education curriculum should be reviewed and applied accordingly.

In this study, a translated critical thinking test WGCTA is used as a measurement instrument. However, for national educational acts, a “National” test should be developed in Turkish. Thus, both cultural bias and translation bias should be defeated. To accomplish that aim, Faculties of Education should work in coordination with Ministry of National Education and should support development of critical thinking tests.

Critical thinking should not be perceived as a skill that is gained or improved during higher education. It should be taught and developed from primary level to university level. Therefore, critical thinking competencies should be defined for each level of education in connection to curriculum and curricular objectives. Books and course contents should be reviewed by the Board of Education so that they incorporate critical thinking skills and competencies in each level of education.

The current study revealed that a common sense understanding of critical thinking is prevalent among prospective teachers. However, for application of critical thinking in any context a better and scientific understanding is needed. To be able to constitute such and understanding and to be able to answer the questions appear in the critical thinking subject, universities should support research projects as well as graduate studies in the field of critical thinking in education.

The examination process in Turkey is comprised of multiple choice exams and they are highly dependent on content knowledge. This situation forces students to improve their test techniques rather than their thinking skills. To be able to improve the critical thinking skills of the students, testing and evaluation methods should be revised taking the related literature about CT into account with respect to techniques and activities of CT as well as suitable measurement methods for CT.

This study deals with the prospective teachers' critical thinking definitions and their critical thinking levels. On the other hand, for critical thinking to be penetrating into our educational system, the professional teachers who work currently should be examined. General Directorate of Teacher Training Department working under Ministry of National Education should conduct projects so that teachers are be elucidated about the teaching of critical thinking.

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APPENDICES

Appendix A- The Student Information Form

1. Devam Ettiğiniz Bölüm : ……
2. Genel not ortalamanız (C.GPA): ……..
3. Devam Ettiğiniz Sınıf: 1. Sınıf ☐ 3. Sınıf ☐
   2. Sınıf ☐ 4. Sınıf ☐
4. Cinsiyetiniz:

   Bay ☐ Bayan ☐

5. Yaşınız:……..
6. Mezun olduğunuz lise türü

   ☐ Genel lise
   ☐ Süper Lise
   ☐ Fen Lisesi
   ☐ Anadolu Lisesi
   ☐ Teknik Lise
   ☐ Anadolu Meslek Lisesi
   ☐ Anadolu Öğretmen Lisesi
   ☐ Diğer……..

7. Anne ve Babanızın Eğitim Düzeyi

Anne	**Baba**
☐ Okuryazar	☐ Okuryazar
☐ İlkokul Mezunu	☐ İlkokul Mezunu
☐ Ortaokul Mezunu	☐ Ortaokul Mezunu
☐ Lise Mezunu	☐ Lise Mezunu
☐ Üniversite /Yüksekokul Mezunu	☐ Üniversite /Yüksekokul Mezunu
☐ Okuryazar Değil	☐ Okuryazar Değil

8. Düzenli olarak kitap, dergi, gazete okur musunuz?

   ☐ Evet ☐ Hayır

9. En son ne zaman kitap okudunuz? :

   ☐ Geçtiğimiz 1 hafta içinde okudum.
   ☐ 1 ay önce okumuştum.
   ☐ 3 veya 4 ay önce okumuştum.
   ☐ Geçtiğimiz yıl okumuştum.

10. Ne sıkılıkla gazete okursunuz?

    ☐ Her gün okurum
    ☐ Haftada 3–4 kez okurum
    ☐ Haftada 1-2 kez okurum
    ☐ Hiç okumam

11. Ders kitapları dışında okuduğunuz kitap türleri nedir?(Birden fazla işaretleme yapabilirsiniz.)

☐ Roman-	☐ Anı, Biyografi	☐ Psikoloji	☐ Dini Kitaplar
☐ Hikâye	☐ Makale	☐ Felsefe	☐ Sağlık Kitapları
☐ Şiir	☐ Deneme	☐ Tarih	☐ Kişisel Gelişim

12. Eleştirel Düşünme becerisini nasıl tanımlarsınız? Aşağıda bırakılan yere kendi tanımınızı yazınız.

Eleştirel Düşünme:……..

……..

……..

13. Devam ettiğiniz bölümde eleştirel düşünme becerilerini geliştirmeye yönelik herhangi bir öğretim etkinliğine katıldınız mı?

☐ Evet ise açıklayınız……
……

……

☐ Hayır

14. Devam ettiğiniz bölümde “eleştirel düşünme” kavramının yer aldığı herhangi bir ders aldınız mı?

☐ Evet ise hangi ders/dersler? (Dersin adı, kodu, dersi veren kişinin adı gibi bilgilerden birini yazabilirisiniz.)

……

……

☐ Hayır

Appendix B- Watson and Glaser Critical Thinking Appraisal

Note: Watson and Glaser Critical Thinking Appraisal is removed intentionally from the appendix because of the copyright concerns. Please contact researcher for further information.

Appendix C- Approval from Ethics Committee

1956

Orta Doğu Teknik Üniversitesi
Middle East Technical University

Öğrenci İşleri Dairesi
Başkanlığı
Registrar's Office

06531 Ankara, Türkiye
Phone: +90 (312) 2103417
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Eğitim Bilimleri
28.03.2008
SBE/2008-332

B.30.2.ODT.0.70.72.00/400 -2432-385

25.3.2008

SOSYAL BİLİMLER ENSTİTÜSÜ MÜDÜRLÜĞÜ'NE

İLGİ: 18.3.2008 tarih ve B.30.2.ODT.0.E1.00.00/2008/400-480-3152 sayılı yazınız.

İlgi yazınız ile Didem Aydan TUFAN'ın, 2007 - 2008 eğitim-öğretim yılı II. döneminde yüksek lisans tezi ile ilgili "ODTÜ Eğitim Fakültesinde Eleştirel Düşünme: Öğretmen Adaylarının Eleştirel Düşünme Becerileri ve Öğretim Elemanlarının Konu ile İlgili Görüşleri" başlıklı çalışmasına ilişkin olarak ODTÜ Eğitim Fakültesinin farklı bölümlerinde öğrenim gören 3. ve 4. sınıf öğrencilerinden yaklaşık 700 kişiye uygulama yapma isteği Rektörlük Makamınca uygun görülmüştür.

Gereğini bilgilerinize arz ederim.

Saygılarımla.

Nesrin ÜNSAL
Öğrenci İşleri
Dairesi Başkanı

Danışmanına ve öğrenciye

31/3/08

Appendix D- Permission for Using WGCTA Form YM- Turkish Version

04.10.2007

Ankara

Didem (AVDAN) TUFAN'ın, ODTÜ Sosyal Bilimler Enstitüsü - Eğitim Bilimleri - Eğitim Programları ve Öğretim alanında sürdürmekte olduğu, Öğretmen adaylarının eleştirel düşünme becerilerine yönelik araştırması için tarafımdan Türkçe'ye çevrilmiş olan "Watson Glaser Eleştirel Akıl Yürütme Gücü Ölçeği"nin kullanılmasına izin verdiğimi bildiririm.

Saygılarımla,

Doç. Dr. Nükhet ÇIKRIKÇI DEMİRTAŞLI

Ank. Ünv. Eğitim Bilimleri Bölümü
Ölçme ve Değerlendirme Anabilim Dalı