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İLKÖĞRETİM İKİNCİ KADEME ÖĞRENCİLERİNİN ELEŞTİREL DÜŞÜNME EĞİLİMLERİ

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TO AHİ EVRAN UNIVERSITY INSTITUTE OF SOCIAL SCIENCES

We certify that this thesis is satisfactory for the award of the degree of M.A. in Education Sciences.

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ÖZET

Bu araştırmanın amacı ilköğretim ikinci kademe öğrencilerinin eleştirel düşünme eğilimlerinin farklı değişkenlere göre belirlenmesidir.

Araştırmanın evrenini, 2012-2013 eğitim-öğretim yılında Yozgat ilinin Çekerek ilçesinde öğrenim gören ilköğretim ikinci kademe 6, 7 ve 8. sınıf öğrencileri oluşturmaktadır. Millî Eğitim Bakanlığı'na bağlı iki şehir merkezi okulu iki tane de kırsal kesim okulu seçilmiş ve toplam 545 öğrenci üzerinde anket uygulaması yapılmıştır.

Bu çalışma, betimsel bir araştırma niteliğindedir. Tarama modelinde yürütülmüştür. Araştırma verileri, araştırmacı tarafından, araştırmanın bağımsız değişkenleri hakkında bilgi toplamaya yönelik geliştirilen "Kişisel Bilgi Formu" kullanılarak elde edilmiştir.

Bunun yanı sıra öğrencilerin eleştirel düşünme eğilimlerini belirlemek için Facione Giancarlo ve Facione Ganien tarafından 1998'de geliştirilen ve 2003 yılında Kökdemir tarafından Türkçeye uyarlanan "Kaliforniya Eleştirel Düşünme Eğilimi " ölçeğinden faydalanılmıştır.

Araştırmada elde edilen veriler üzerinde, aritmetik ortalama ($\overline{X}$), standart sapma (Ss), t testi, varyans analizi (ANOVA) ve Scheffe testi uygulanmıştır. Anlamlılık testleri için $p<.05$ düzeyi yeterli görülmüştür.

Araştırma sonucunda öğrencilerin eleştirel düşünme eğilimi düzeylerinin; analitiklik ve meraklılık alt boyutlarında yüksek; gerçeği arama, açık fikirlilik, sistematiklik, kendine güven alt boyutlarında ve eleştirel düşünme eğilimi toplam

puanında ise orta düzeyde olduğu görülmüştür. Anne eğitim durumu, baba eğitim durumu, aylık gelir ve cinsiyet faktörlerinin çocukların eleştirel düşünme eğilimine doğrudan etkisi olmadığı ancak bu faktörlerin kişisel güveni arttırdığı tespit edilmiştir. Merkezi okul öğrencilerinin eleştirel düşünme toplam puanlarının kırsal kesim okullarında okuyan öğrencilerden daha fazla olduğu tespit edilmiş ancak okul alanı değişkeni ile öğrencilerin eleştirel düşünme eğilimi düzeyleri arasında anlamlı farklılık bulunmamıştır. Sınıf değişkeni ile öğrencilerin eleştirel düşünme eğilimi düzeyleri arasındaki farklılığın anlamlı olduğu görülmüş ve 6.sınıf öğrencilerinin 7 ve 8.sınıf öğrencilerinden daha fazla eleştirel düşünme eğiliminde olduğu görülmüştür.

Anahtar Kelimeler: Eleştirel Düşünme, Eleştirel Düşünme Eğilimi, Ortaokul, Öğrenci.

ABSTRACT

The goal of this study is to determine the critical thinking dispositions of primary school secondary stage students according to different variables.

The population of the research is formed by the students of primary school secondary stages who are attending 6^{th}, 7^{th} and 8^{th} grade in Çekerek, Yozgat in 2012/2013 academic year. Depended on Ministry of Education, two of the schools were in the city center and two of them in the countryside and the questionnaire have been applied totally on 545 students.

This study is a descriptive research. It is carried out by scanning model. "Personal Information Form" developed by the researcher has been used in order to gather data about the independent variables of the research.

Beside this ; "CCTDI" (California Critical Thinking Dispositions Inventory) developed by Facione Giancarlo and Facione Ganien in 1998 and which was adapted to Turkish in 2003 by Kökdemir was used to determine the critical thinking dispositions of primary school secondary stage students .

Arithmetic mean (M), standard deviation (SD), t test, variance analysis (ANOVA), and Scheffe test have been applied on the data gathered. In the research $p<.05$ level has been approved for the significance tests.

As a result of the study, it has been found out that students' critical thinking disposition levels in analyticity and inquisitiveness subscales are high; however truth-seeking, open-mindedness, systematicity, self-confidence subscales and critical thinking disposition total points are in medium level. The results showed that the

mothers’ and fathers' educational background, monthly income and gender do not directly effect on but increase the self-confidence of the students. It has been determined that urban students' critical thinking disposition total points are higher than rural students' but there is not a significant difference between school area variable and students' critical thinking disposition level. Also, it has been determined that there is a significance difference between grade variable and students' critical thinking disposition level and 6th grade students have more critical thinking dispositions than 7th and 8th grade students.

Key Words: Critical Thinking, Critical Thinking Disposition, Secondary School, Student.

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I don't know how to say my thanks to my mom and dad for all you have done for me during all my life. I love you...

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ABBREVIATIONS

CCTDI : California Critical Thinking Disposition Inventory

F : ANOVA (Analysis of Variance)

SS : Sum of Squares

MS : Mean Square

M : Mean

CHAPTER I

INTRODUCTION

In this part the main problem of the study and the goal of the research would be defined. The importance of the study, constraints, descriptions, premises and research questions would also be given in this chapter.

1.1. Statement of the Problem

The most important difference of the human is the thinking. The brain can work different from the other creatures so the human can see the options and make decisions. The thinking ways may be changed with the skills so the human can have different thinking abilities. The thinking types directly effect on the decisions and these decisions shape the person's life (Heidegger, 1976).

Thinking ways mostly settle to the personality in adolescence ages during which the children are at the secondary school. Critical thinking is the most important factor of the creativity and also the development of the opinions. So the critical thinking must be well taught to the children in the school and also at home. The perceptions and the decisions of the person are mainly based on the thinking functions, and this is important for individual life, career and also for the future of the society (Bakan and Kefe, 2012).

Critical thinking is a thinking type and the person tries to define the reasons when s/he gets information. The critical thinker does not accept the new information

without reasoning. The person tries to define the problem, find the solutions and see every part of the information. This is not enough for a critical thinker because he/she would not believe every seen or what s/he heard, continue to survey and try to find the largest and true information. Many academicians studied on this subject but the oldest definitions about critical thinking have been made by Plato, Socrates and Aristotle. The critical thinking term has been one of the most important subjects of Philosophy (Lia, 2011). Gilbert (1960) defined critical thinking as a group of skills employed in problem-solving which is composed of steps of identifying problems, gathering information, organizing and analyzing information and then making conclusions based on valuable evidence. The critical thinking is a reflective thinking type which involves the mental process of the act of inquiry and searching to resolve doubt, hesitation, perplexity, or mental difficulty for Dewey. He had written this definition in 1933. Dewey (1933) also proposed that the critical thinking is a fundamental goal of all levels of education. Mc Callen (1987) has surveyed the critical thinking abilities. He said that critical thinking ability of the people can be developed through education. As cited in Ircink Waite (1989) the ability of critical thinking can be developed in people when they are child so they can place this ability in their life (Gellen, 2003). Brookfield (2005) has surveyed the advantages of tough critical thinking in adult ages. He noticed that the critical thinkers are more successful in their life and they are the people who look for more justice. Burbules and Berk (2009) surveyed the effects of critical thinking in pedagogy and the authors noticed that the critical thinker children can see more positive their life.

Paul is one of the most popular researchers about critical thinking and teaching this skill. He studied (1990) about critical thinking and he published his

book called “Critical thinking: What every person needs to survive in a rapidly changing world”. Facione (1990) wrote “Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction Research Findings and Recommendations”. Garrison (1992) studied the subject and he surveyed critical thinking and self-directed learning in adult education: An analysis of responsibility and control issues. Kimmel (1995) studied the subject and he wrote “A framework for incorporating critical thinking into accounting education”. Again Facione and his friends (2000) had a study about the disposition toward critical thinking: Its character, measurement, and relationship to critical thinking skill**.**

A few studies about critical thinking have been realized in Turkey as well. We can see some examples of the subject. Demirhan (2010) searched the effectiveness on academic achievement, attitude, perception of self-efficacy and critical thinking disposition of brain used based learning in biology teaching. Palavan (2012) researched the effects of brain-based learning on achievement, attitude and critical thinking skills of students in social studies lessons in the school. Akıllı (2012) surveyed the evaluation the levels of eight grade primary school students’ critical thinking dispositions and creativity. Öztürk (2013) prepared a research as thesis and the subject was about the relation between science process, critical and creative thinking skills of primary school eighth grade students. Göbel (2013) wrote about the levels about the adequacies and applications for the critical thinking skills teaching of classroom teachers. Şahin (2014) studied on the relationship between English language teachers’ critical thinking disposition levels and their levels of utilizing the critical thinking strategies. Again Polat (2014) studied on multifaceted examination

of critical thinking skill instruction. Yılmaz (2015) in his thesis surveyed the influence of school-engagement on the success level of high school students and he found that if a student knows the way if critical thinking, he/she would be more cheerful for going to school. Şahin (2015) studied "The research of meta-cognitive awareness levels of science teacher trainers and their problem solving skills and she noticed that the critical thinking activities in the class help to solve the education and teaching problems. Aşkar (2015) studied critical thinking dispositions of primary and secondary school teachers and students and affecting factors of these dispositions. He found that the skills mostly come from the personality of the human but if the children may be motivated to learn and researching, also if they be curious about the lessons' subjects these factors would be placed in their personality and the critical thinking would be a natural individual.

As we can infer from the previous paragraphs there are many studies on critical thinking yet no studies done about critical thinking dispositions of primary school secondary stage students could be encountered. The studies are about the importance of critical thinking and teaching the skills to the students but the studies are not specialized on the adolescent students. Because of this reason, this study has been planned to analyze primary school secondary stage students' critical thinking disposition level and to fulfill this vacancy in the literature.

1.2. Purpose of the Study

The main purpose of this study is to define the critical thinking disposition of primary school secondary stage students and to analyze by many variables as grade, gender, school area, father's education, mother's education and socio-economic status perception. A research would be applied to show the critical thinking dispositions of the primary school secondary stage students. The sub-goals of our study are as below:

1. What are the critical thinking disposition levels of the students?
2. How do students' critical thinking dispositions differ based on grade?
3. How do students' critical thinking dispositions differ based on gender?
4. How do students' critical thinking dispositions differ based on schools?
5. How do students' critical thinking dispositions differ based on father's education?
6. How do students' critical thinking dispositions differ based on mother's education?
7. How do students' critical thinking dispositions differ based on socio-economic status perception?

1.3. Importance of the Study

Thinking is a regular activity of the people and everybody can think with the biological activities. But this does not mean that everybody has an affective thinking method. The people can develop the thinking skills with some activities in the

childhood and this directly effects on future life. The critical thinkers are successful people who can analyze the events and try to find the best systems to make life better. They research and never are satisfied from learning. The critical thinking is a thinking activity which helps people to discover and develop.

Teaching critical thinking can be possible by some attractive activities at schools and the teachers' behavior is very important in the teaching period. The critical thinker students would be curious about the subjects not only at school, also in daily life. The critical thinking helps societies to be more developed about art, math, science, economy and every subject.

A review of literature on critical thinking suggests that researches about critical thinking dispositions in Turkey are very limited. A subject which directly can effect on a country's future must be examined more. Especially the education and the curriculum should contain the critical thinking skills for more systematic economy, democracy and science for coming years. This study's goal is to define the critical thinking detailed and to survey the disposition of secondary stage students of primary schools and this may show what to do to increase these skills by the education.

The critical thinking can be taught in early life to the people to shape the lifestyle of the society. In the curriculum of Ministry of Education there is Thinking Training lesson at school and 6th to 8th grade students are taking these courses because they believe that the society would not be developed if the critical thinking skills would not be learned. The people may not query the information and they would accept all the rules and this is the most important obstruction for poverty of the country in economics, science, medicine and education. For this reason the critical thinking techniques and level of critical thinkers in young population should

be surveyed and interrogated. The stages should be seen and if the critical thinking teaching level is not high enough at schools, the precautions should be taken.

It is thought that critical thinking disposition levels of students by many variables at the end of this study would help the related literature.

1.4. Premises

1. The answers of the students to the inventory show their own ideas.
2. The students' critical thinking disposition levels are in measurable quality.

1.5. Limitations

1. The study has been performed on primary school secondary stage students attending 6th, 7th and 8th grade in Çekerek, Yozgat in 2012/2013 education year.

2. Critical Thinking Disposition Levels of Students are limited to measurable qualifications of "California Critical Thinking Disposition Inventory" adapted to Turkish by Kökdemir (2003) and the points gained from it.

1.6. Definitions

Thinking: Natural biologic activity of the human brain. The activity of mind with the gained information before guessing and determining (Mcpeck, 1981; Paul, 1990; Facione, 2000).

Critical Thinking: Critical thinking is the art of analyzing and evaluating thinking with a view to improving it (Paul and Elder, 2008).

Thinking Disposition: The abilities of thinking and thinking behaviors of the person (Facione, 2000).

Education: The learning period of adolescence students who are in the secondary stage of primary schools (Şahin, 2015).

Attendees: Primary school secondary stage 6, 7 and 8th grade students of two urban and two rural area schools in Çekerek, Yozgat.

Disposition of Students: The needed disposition for critical thinking skills and the attraction of the students.

CHAPTER II

REVIEW OF LITERATURE

In this chapter, thinking and critical thinking will be explained and the specifications about critical thinking will be searched. A literature review will be done about critical thinking and the authors' definitions will be written. Then, the dispositions for critical thinking will be surveyed and teaching the critical thinking strategies in adolescence years will be argued.

2.1. Theoretical Basis about Thinking

2.1.1. Definition of Thinking

Throughout the history, thinking was defined in various ways by different philosophers and psychologists. According to Heidegger thinking is a natural behavior of human being. People cannot make self-handicapping about stopping thinking. The person starts to think at the same moment of its born. So here we can say that the thinking is an unstoppable mind process of the person (Heidegger, 1976). Also, in the late nineteenth century when the associationism was the dominant philosophy, it was believed that the ideas and associations between them were the key to explain mental activities. The Greek philosopher Aristotle, the pioneer of the associationism defined thinking as the act of making associations among the elements or ideas through images. Associationist viewers considered thinking as a trial and error application.

As cited in Mayer (1993) by the late nineteenth century, Wilhelm Wundt who was accepted as the father of psychology did not agree with the psychologists

supporting associationism. He criticized the introspection methods of associationists claiming imageless thought. Then, another psychologist, Selz created an alternative theory which consisted of images and associations. He claimed that “thinking is the tendency of a complex toward completion”.

In 1920s, behaviorism was developed in America. Behaviorists believed that thinking is an internal mental event and it cannot be studied in psychology. While behaviorism was common in America, in Germany Gestalt psychology had appeared. Gestalt psychologists defined thinking as “the ability to comprehend how all the parts of the problem fit together to satisfy the requirements of the goal” (Mayer, 1992) Gestalt psychologists tried to take Selz’s ideas one step further until between the years 1950 and 1960 when cognitive psychology was reborn. Through cognitivists, thinking could be studied on a large scale.

To cognitivists, “thinking depends on how a person perceives the world and in what ways a person can manipulate or act upon this internal representation.” (Mayer, 1992). Cohen (1971) defined thinking as “the mental derivation of mental elements (thoughts) from perceptions and the mental manipulation/combination of these thoughts”. However, Beyer’s definition was a little bit different. He stated “The mental manipulation of sensory input to formulate thoughts, reason about, or judge” (Beyer, 1991).

Kirby and Goodpaster (2002) defined thinking as “the activity of the brain that can potentially be communicated”. They meant thinking can be expressed in the primary form of communication, language. They claimed that we get the input-we

listen, observe and read, then we think and we express our thinking through speaking, acting or writing.

The term "thinking" is used too much in the daily language. Heidegger (1976) defends that the thinking is shaped by the memory of the person and with the accumulation of the memories, the thinking also develops and the human shapes its life with its thoughts.

The thinking can be possible with the biology and the brains works with the chemical compounds but it does not mean that every type of thinking has the same quality. If the thinking would enrich the ideas, help to solve the problems and manage the options and classify them.

People have thoughts and these thoughts are formed with the purpose, questions, perceptions from the implications, notions and many components. These components of the thought help people to define their goals, information, results, signs, implications and assumptions also the forecasting. The elements of thought have been shown in the figure below:

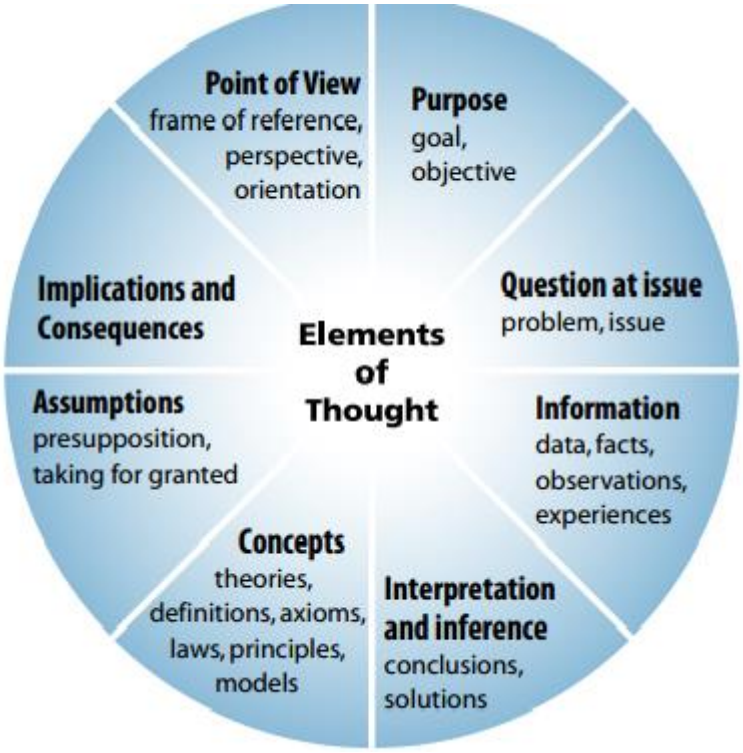

Figure 1. The Elements of Thought

Reference: Richard Paul and Linda Elder, (2006), the Miniature Guide to Critical Thinking, the Foundation for Critical Thinking

As seen in Figure 1, thinking has some components. The people think instinctively but every thought has an objective and tries to define something in mind. The person thinks and prompts by his/her thoughts and the thinking shapes from the personal perspective.

Of course the perspectives may be changed if the person would be persuaded from the concepts as theories, definitions and examples. Thinking pushes the person to find other information and also the information would be formed by personal assumptions and experiences. The personal truth can be told as the conclusion of the thinking activity but this causes new subjects to think for.

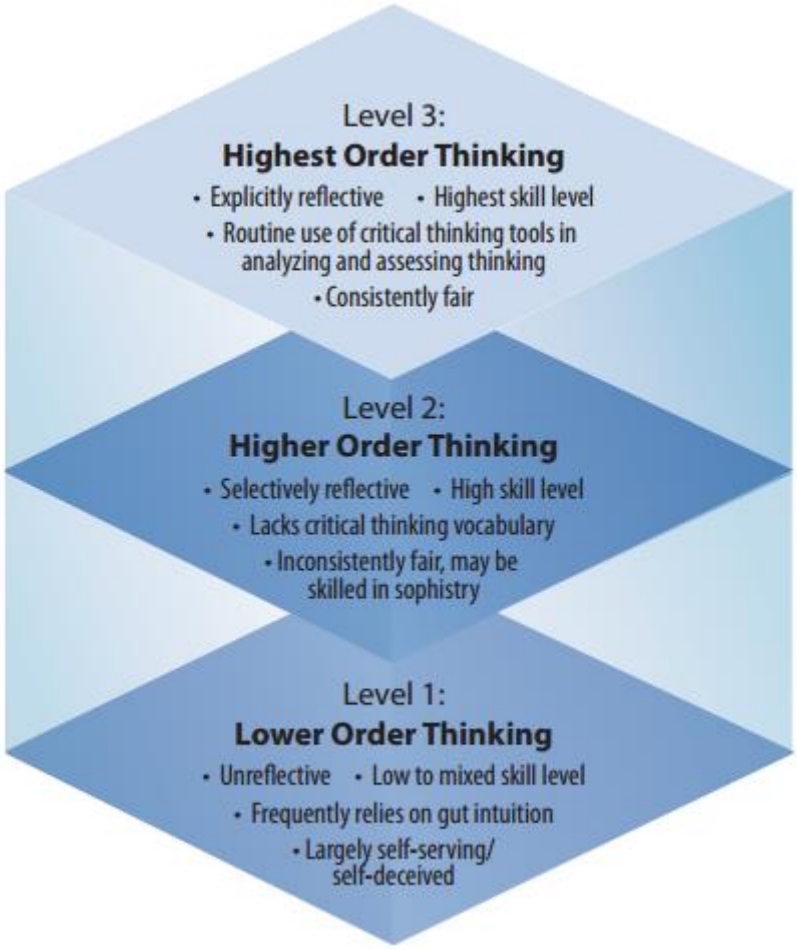

Figure 2. Levels of Thought

Reference: Paul and Elder, 2008

As seen in Figure 2, a person may have three basic levels of thought. The first level is called lower order thinking and this thinking is unreflective, frequently relies on gut intuition and largely self-serving. The second level is higher order thinking and here the thinker is selectively selective, inconsistently fair and good skilled. The highest order thinking level is the third one and the person is explicitly reflective here. The thinking skills are highest and the thinker uses the critical thinking tools every time.

In the literature, the researchers sometimes defend that not every thought comes from the personal thinking. Researchers say that most of the people do not tire themselves to check the truth of the ideas, people just directly accepts ideas. They do not feel excited about the new opinions and they do not use their brains for researching or brainstorming. For checking the truth and looking for the other viewpoints, the person should have critical thinking.

2.2. Definition of Critical Thinking

Critical thinking has been used and defined by many different terms, including creativity, decision making, reasoning, rational thinking, reflective thinking, evaluative thinking, and problem solving. Over the years, there are numerous definitions of critical thinking.

Especially the critical thinking and defining the term had been one of the most important subjects of philosophy and psychology. Plato, Socrates and Aristotle are the first people who had used the critical thinking and they had tried to define that. The philosophical approach, "focuses on the hypothetical critical thinker, enumerating the qualities and characteristics of this person rather than the behaviors or actions the critical thinker can perform" (Lia, 2011).

On the other hand, the "psychological approach contrasts with the philosophical perspective in two ways. First, cognitive psychologists, particularly those immersed in the behaviorist tradition and the experimental research paradigm, tend to focus on how people actually think versus how they could or should think under ideal conditions. Second, rather than defining critical thinking by pointing to characteristics of the ideal critical thinker or enumerating criteria or standards of

"good" thought, those working in cognitive psychology tend to define critical thinking by the types of actions or behaviors critical thinkers can do".

While talking about the critical thinker Socrates must be namable person because he was the first philosopher who has been thought on criticism and critical thinking. However, the term critical thinking is so new in Turkey and the first study was done about 1980's. This shows that Turkey has limited studies and especially for education, critical thinking in an unaddressed subject (Demir, 2006).

Dewey (1933) defined the critical thinking as reflective thinking type which involves the mental process of the act of inquiry and searching to resolve doubt, hesitation, perplexity, or mental difficulty. He also proposed that the critical thinking is a fundamental goal of all levels of education.

According to Gilbert (1960), critical thinking is defined as a group of skills employed in problem-solving which is composed of steps of identifying problems, gathering information, organizing and analyzing information and then making conclusions based on valuable evidence. This is consistent with Facione (1990), and Lewis and Smith (1993) who describes critical thinking as skills which require higher order thinking for problem solving. This thinking skill also involves various mental activities and comes along with decision making and creative thinking.

Mc Peck (1981) also posits that "critical thinking does not merely refer to the assessment of statements, but includes the thought process involved in problem solving and active engagement in certain activities" According to Mc Peck's view, critical thinking requires the judicious use of mode of doing thing to produce a more

satisfactory solution or insight to solve the problems at hand. He further asserts that critical thinking in each discipline involves knowledge and skills in a particular field.

A critical thinker in one discipline might not be a critical thinker in another discipline. As Mc Peck (1990) noted, critical thinking involves a combination of willingness to engage in "commenting, and criticizing the pattern of reasoning peculiar to the given discipline", knowledge based and critical skills in intimate relation.

The Kurfiss's idea was similar to McPeck's. He assumed critical thinking as an investigation which aims to explore a situation, phenomenon, questions or problems to make a hypothesis and make conclusion about it that integrates all available information and can therefore be convincingly justified (Kurfiss, 1988).

Halpern (1999) has defined critical thinking as "the use of those cognitive skills and strategies that increase the probability of a desire outcome". She insisted that when people are critical thinkers, they can evaluate the outcome of their thought process and judge of their decisions and of how well their problems have been solved.

In Ennis's view (1996), critical thinking is referred to as reasonable and reflective thinking emphasizing deciding what to believe or do. In this thinking process, creative acts are needed in formulating hypotheses, having alternative ways of viewing a problem, making related questions, possible finding solutions, and planning for investigating something.

Paul, Elder and Bartell (1997) noticed that the critical thinking is a self-directed thinking and it is related to the perfections of thinking appropriate to

particular mode or domain of thought. For the writers, critical thinking may be occurred in two forms: The first one is weak sense of critical thinking and the second one is the strong sense of critical thinking. Weak sense critical thinking can be described as to serve the interests of a particular individual or group, to the exclusion of other relevant persons and group, it is sophisticated. Strong sense critical thinking takes into account the interests of diverse persons or groups; it is fair-minded.

Paul and Scriven (2004) provided the definition of critical thinking as the disciplined intellectual process of active and skillful in conceptualizing, applying, analyzing, synthesizing, and evaluating information we gathered and generate from our observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

Based on Duron, Limbach, and Waugh (2006), critical thinking has been defined as the ability to analyze and evaluate information. This is in line with Bloom (1956) and Fraenkel (1980) who view critical thinking as higher order of thinking for evaluating concepts and materials. According to them, critical thinking is the heart of evaluation which is described as a process of determining the worth of things, and the comparison among them as well. Bloom (1956) and Fraenkel (1980) claim that critical thinking will happen when we try to make an intelligent judgment by using a particular criterion to compare two or more alternatives, and judge whether which alternative is better. This is in line with Beyer (1995) who views critical thinking as "the process of making judgments" This means that reaching judgment involves determining the degree to which a thing meets particular criteria.

When the researches mentioned above are reviewed, it can be seen that Dewey (1933), Ennis (1989), and Paul (1990) define critical thinking by emphasizing its form and function, while others such as McPeck (1981), Beyer (1995) view critical thinking as the skills and ability to provide reasonable judgments.

As seen, there are many definitions of critical thinking but here is the common point: the critical thinking skills can be learned, and it is a developable ability if it may be supported with some activities at school during the education and if the student can learn other thinking approaches.

The term critical thinking mostly gets involved with creative thinking, scientific thinking, analytical thinking and other different thinking types. That's why a general definition should again be written to understand the real meaning of critical thinking and why it is needed in the social life, and how it helps other thinking types (Seferoğlu and Akbıyık, 2006).

Critical thinking has been the subject of many professions like psychology, education, philosophy and else. Some of the researchers as Chance (1986) told that the critical thinking is ability and it brings analyzing, creating new ideas, defending opinions and comparing to the personality.

The cognitive psychologists said that the critical thinking is a result of consciousness activity period. Halpern's (1999) idea about critical thinking was a bit different from the others. He discussed that the critical thinking is a combination of ability and strategy. He says that the strategies and the abilities may change and developed so by this reason the critical thinking may also be developed. The table

below shows the most important definitions about the critical thinking in both approaches:

Philosophical and Psychological Approach to Critical Thinking

Philosophical approach	McPeck, 1981	"the propensity and skill to engage in an activity with reflective skepticism"
	Ennis, 1985	"reflective and reasonable thinking that is focused on deciding what to believe or do"
	Facione, 1990	"purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological , or conceptual considerations upon which that judgment is based"
	Paul, 1992	"disciplined, self-directed thinking that exemplifies the perfections of thinking appropriate to a particular mode or domain of thought"
	Bailin, 1999	"thinking that is goal-directed and purposive, "thinking aimed at forming a judgment," where the thinking itself meets standards of adequacy and accuracy"

	Facione, 2000	"judging in a reflective way what to do or what to believe"
Psychological approach	Sternberg, 1986	"the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts"
	Halpern, 1998	"the use of those cognitive skills or strategies that increase the probability of a desirable outcome"
	Willingham, 2007	"seeing both sides of an issue, being open to new evidence that disconfirms your ideas, reasoning dispassionately, demanding that claims be backed by evidence, deducing and inferring conclusions from available facts, solving problems, and so forth"

Reference: Lai, 2011

2.2.1. Major Components and Processes of Critical Thinking

The components and processes of critical thinking have been proposed differently by researchers. According to Scriven and Paul (2004), critical thinking has two components: a set of skills in generating and processing information and

belief and the intellectual habit based on commitment of using information and belief generating and processing skills to guide behavior. From the point of view of Keeley and Browne (1994), the important component of critical thinking is an awareness of a set of interrelated critical questions, the ability and willingness to ask and answer them at appropriate times.

According to James and Constance (2007), critical thinking is composed of seven components: perception, assumptions, emotion, language, argument, fallacy, logic and problem solving. Perception is the way we receive and translate our experience. It is a significant filtering system because it defines how we think. Assumptions are central to critical thinking. They make us comfortable with present beliefs and alternatives. Emotion is a part of everything we do and think, it is impossible to live without emotion. Critical thinkers will not ignore or deny emotion; instead they accept and manage it effectively.

As cited in Govier (1997), Socrates believed that, by talking, arguing, and questioning the concepts of virtue, knowledge, and understanding, new ideas and thoughts could emerge. This Socratic questioning continues to be practiced today and is considered to be "at the heart of critical thinking" (Binker, 1990).

Critical thinking skills and abilities are essential in today's vastly changing world. Pithers & Soden (2000) report that national governments and employers alike have a vested interest in educated individuals who are able to think well and think for themselves. In essence, society has come to understand the importance of critical thinking and is demanding that it be addressed. Daly (1998) and Ennis (1996)

emphasize the role critical thinking has had on forming and maintaining a democratic society and way of life.

In the 21st century, the approach of the people may change and most of the people has been started to question the information. The new century brings significant and fundamental change is coming from all directions. Especially the new methodologies of the communication let many changes; the influences and the advancement of information and technology, and the complex society require the needs to prepare students to live in this rapidly changing world successfully. One important way in preparing students to live in the world today successfully is equipping them with critical thinking ability and skills (Dumteeb, 2009).

Critical thinking is an important learning and life skill. It will enable students to make sense of an overwhelming abundance of information and make skillful and responsible choices in life. This will further enable them to solve problems effectively in their real life situations. Critical thinking is also considered an essential tool for democratic society (Beyer, 1995; Bond, 1988), and for independent and lifelong learning, the learning goals in educational arena today. In response to the need, developing students' critical thinking skills has been an increasing emphasis in higher education.

Facione (1990) says that the critical thinking's one of the major components is the disposition. He explained these dispositions as "consistent internal motivations to act toward or respond to persons, events, or circumstances in habitual, yet potentially malleable ways". We can say that these dispositions have variously been cast as attitudes or habits of mind.

According to Bailin, Ennis, Facione and Halpern, we can list the most commonly cited critical thinking dispositions include (Lai, 2011);

I. Open-mindedness

II. Fair-mindedness

III. The propensity to seek

IV. Inquisitiveness

V. The desire to be well-informed

VI. Flexibility.

Pearson education notices that the true critical thinking has three main parts which are asking questions, trying to answer those questions by reasoning them out and believing the results of our reasoning. Asking questions step is the main step to start critical thinking. The critical thinkers start to ask questions about solving a problem while they have a duty. As an example; a critical thinker student would ask him/herself that "how could he/she solve this problem?" when a teacher directs a question, even in math in the class. In daily life, critical thinking starts with asking some basic questions about the problem.

Facione (2011) in Pearson education has listed these questions as :

I. "What is the purpose behind the problem?

II. What is a good way to begin?

III. Do I have all the information I need to start solving the problem?

IV. What are some alternative ways of solving the problem assigned?

V. Can the problem be solved? Does it even make sense?"

Asking some questions may help critical thinker to understand the problem better and see it from every perspective. Arntzen, Lokke and Eilertsen (2010) says that the students would answer the real problem when they are thinking critically and the critical think would also help to solve the misconceptions about a problem.

Most of the people keep away from asking questions to themselves and also to the others. But the psychologists advise to ask questions ourselves for having better life standards. For example, how can I have better grades? or how can I make new friendships? Questions may bring us new perspectives and maybe better ways (Rehman, 2015).

As cited in Pearson education (2011) especially at schools the students should keep asking these questions:

I. "How does what I learn in this course relate to my own experience?

II. How can I use what I learn here in my own life?

III. Can I think up my own examples?

IV. How does this subject matter relate to other courses I am taking?

V. What is the evidence behind this?

VI. How do the topics in this course fit together?

VII. What is the purpose of the course?

VIII. Why?"

Second stage of critical thinking is reasoning out step. This step contains the personal answers to the questions which have been asked in the first stage. After trying to answer one one's own, the person may ask these question to others for new

answers. So the answers may be more detailed and the critical thinker can find new viewpoints. The answers should be related to the information and the subject and they have to be noted somewhere or mind for comparing later. So the answers may be ready for analyze.

Believing the results is the last part of the critical thinking. The critical thinkers analyze the answers and when they proof them, they start to believe but never forget that the truth may change when the information changes (Vaidya, 2014).

2.3. Relevant Researches

The usage of critical thinking in education and teaching it has been an important subject of the philosophers, psychologists and teachers. Therefore, there are some important studies about the subject in the world.

The term learning must be well explained to understand the teaching of critical thinking to the students. That's why some studies about learning must be placed here. Şahin and Heppner (1993) studied about the determining teacher trainees' problem solving skills and they saw that the critical thinking helps teachers for solving the education and teaching, also communication problems in the classroom. The teachers also can attract the notice of the students for the lectures by teaching the critical thinking skills to their students.

Kaplan and Kies (1995) have studied about learning the critical learning skills and they have explained the learning as a natural behavior and it starts with the born

of the baby. Carrol (1998) said that learning and teaching develop together and for a better learning the thinking skills should be well learned in the study.

The learning style term has been used by Dunn (1960) for the first time and the writer noticed that there is a positive relationship between the teaching and learning styles and if the students can think effectively the period would be easier.

As seen the thinking style, learning style and teaching style has a much closer relationship between each other. So the literature review should continue with investigating the studies about critical thinking and education.

As cited in Ricket (2003), Beyer (1987) explained that the abilities for critical thinking are needed for being a critical thinker but if these abilities would not be shaped with the education, the person would not know how to use it and the abilities may rust in time.

Pascarelle and Terenzini (1991) have applied a questionnaire in schools to understand what is critical thinking and how it works. The authors explained that the critical thinking understands the relationship between different subjects after their research. They told that the teachers can teach the life and the relationship between life and the lessons by teaching the critical thinking and if the students may learn the critical thinking skills they also can easily overcome with the hard formulas of science. Because they would see the relationship between the science rules and daily life activities by the critical thinking and they would apply the learned rules on their daily life.

Again Facione (1990) told that critical thinking is possible if the person has ability and disposition but he also said that if the person is not an educated one, the disposition and ability would not mean anything.

Paul (1992) explained the critical thinking as a way for self-realization and he noticed that the teaching critical thinking at schools is very important because the people go to school for self-development and being powerful in life.

Weiss (1993) said that the goal of the education is to train people for their career and the thinking is important as the vocational education in his study. Torres (1993) has developed a strategy for building the critical thinking abilities in the students at school. He said that the students' abilities and learning styles should be mixed in the classroom activities for teaching the thinking skills. Gibson (1995) noted that the thinking is a natural behavior of the human but learning how to think help person in life and to learn effective thinking can only be possible with the education (Cited in Güven and Kürüm, 2006).

Myers and Dyer (2004) studied on the learning skills and they tried to understand the relationship between critical thinking and learning skills. The researchers found a significant relationship between critical learning and Gregorc Style learning. Rudd, Baker and Hover (2000) that if open mindedness could be learned well, learning critical thinking would be easier for the student.

Chaim et al (2000) studied on 588 students and tried to see the relationship between critical thinking and open mindedness. The research showed that the critical thinker students have more open mindedness sensitivities and also the students who

live in the cities are more critical thinkers than the students from the towns and villages.

Hoge (2002) tried to define if there is a relationship between critical thinking and researching wistfulness and learning wish. After the study on the nurses the author saw that the nurses who had learned the critical thinking they want to get information about the patients and they want to learn more about their jobs. This means the critical thinker workers are more efficient people.

Laird (2005) studied on the university students for understanding the self-confidence and critical thinking. He saw that the critical thinker students know themselves better than others, know what they request from life and they can talk in front of the community easier (Akıllı, 2012). Wangensteen et al (2010) used CCTDI to understand the abilities of just graduated nurses on critical thinking and the writers tried to understand do the previous experiments effect on critical thinking in young people.

Not surprisingly, studying learning and teaching styles have been among the interests of Turkish academicians, as well, in an attempt to suggest more effective methods of education for their students. However, it is not likely to claim that researches in Turkey are as detailed and deep as the ones conducted worldwide, especially with regard to “critical thinking”. Just at this point, it is worth reminding that one of the pioneering studies in Turkey about thinking skills has been Açıkgöz’s (1996) study that she has indicated the learning has a relationship between the thinking skills. The writer noticed that the learning can be affected from the social life, environment and teacher out of thinking skills. The term "critical thinking" in

academic environment is very new in Turkey. The first studies have been done in 1980's. Kökdemir (2003) said that teaching the critical thinking is more important than teaching other subjects because the student cannot be successful if he/she does not learn the thinking skills.

Kürüm (2002) has studied on students by using Developing Cognitive Abilities Test / DCAT to see the relationship between education and critical thinking. The researcher saw that there is not a relationship between the gender, nation or culture of the student and critical thinking but also she saw that the age of the student effect on learning thinking skills period.

Demirhan (2010) searched the effectiveness on academic achievement, attitude, perception of self-efficacy and critical thinking disposition of brain-based learning in biology teaching. The researcher learned that the learning may be easier with the critical thinking activities because the critical thinking pushes the curiosity of the teachers and the students.

Palavan (2012) researched the effects of brain-based learning on the achievement, attitude and critical thinking skills of students in social studies lessons and he saw that the children (especially the primary schools' students) may learn with the critical thinking activities. The 3rd grade students can feel bored in the class if the creative activities would not be done for bring them up to speed about the curiosity and if the teaching activities may be based on learn-by-rote education system. Also he found that the information which has taken by learn-by-rote system would be forgotten in a short time.

Akıllı (2012) surveyed the evaluation the levels of 8th grade primary school students' critical thinking disposition and creativity. Öztürk (2013) prepared a research about the relation between science process, critical thinking and creative thinking skills of primary school 8th grade students. The study contains Cornell Critical Thinking Test Level X for testing the critical thinking levels of the students. At the end of the study the author realized that there is a positive relationship between the critical thinking and the creativity.

Göbel (2013) wrote a thesis about the levels about the adequacies and applications for the critical thinking skills teaching if classroom teachers. The teachers may teach the critical thinking to the students with some games in the class.

Şahin (2014) studied on the relationship between English language teachers' critical thinking dispositions levels and their levels of utilizing the critical thinking strategies. The writer told that learning a new language would be easier with the curiosity and if the students may be critical thinkers, they would try to make more complicated sentences and this would help them practicing the language for learning in a shorter time than others. Again, Polat (2014) has studied multifaceted examination of critical thinking skill instruction and he saw that teaching and learning the critical thinking has many ways. Especially teaching the critical thinking to the students may be easy and enjoyable with creating discussion groups in the class and motivate the students for researching.

Yılmaz (2015) prepared thesis to survey the influence of school-engagement on the success level of high school students and he found that if a student knows the

way of critical thinking, he/she would be more cheerful to going to school and learning the lessons' subjects. Şahin (2015) wrote a thesis called "The research of meta cognitive awareness levels of science teacher trainers and their problem solving skills". At the end of the survey she noticed that the critical thinking activities at the classroom help to solve the problems during the lesson and also help teachers to solve communication problems especially with adolescence students. She also commented that the critical thinking help people to gain new sights. Aşkar (2015) studied on critical thinking dispositions of primary and secondary school teachers and affecting factors of these dispositions to them.

2.4. Misconceptions about Critical Thinking

As it is the case with every subject in life, critical thinking has misconceptions and misrepresentations. Especially most used terms as critical thinking are opened for misconceptions more because when a subject becomes popular, the people start to talk about it without any information and this cause to misunderstandings and prejudices.

Thinking is as old as human history and critical thinking is a very old term even from the ancient Greek but the term critical thinking is a 21st century skill. In everyplace like in business, in diplomacy and in the education the critical thinking skill are wanted personal specifications in these days.

Einstein and his mind have shown as an example of the critical thinking because he had ignored everything about math and this made him a very successful scientist. His thinking skills were different from the others for this reason people

could not understand him for many years; even his teachers thought that he was not intelligent (Cotrell, 2005). This example shows that the background knowledge is the most important and the biggest cause of misconception on critical thinking.

When the amount of knowledge increases, most of the educators think that the prejudgments also increase and it becomes harder to search for the same subjects for the person. When a person thinks that he/she is right, he/she does not want to search more. But this can be a wrong manner because the critical thinkers never say enough to knowledge and they think critically on the information that they know. "Knowledge is prerequisite but not sufficient. Understanding of principles which govern a particular domain is also necessary" (Moments, Snippets, Spirals, 2013).

2.5. Importance of Critical Thinking

The critical thinkers have some characteristics. These characteristics enrich the personality and bring additions about the quality of life. Ferret (1997) suggests the following characteristics of a critical thinker:

Ask Pertinent Questions:

Questioning may be beneficial if they are concerned with the researched subject or the learned skill. The critical thinkers want to learn more about the topic that they are learning. So they memorize it better.

I. Assess statements and arguments.

The people always try to establish and also try to perception management to others. The critical thinkers withstand the inflexible ideas and they always are open to new arguments.

II. Are able to admit a lack of understanding or information.

Every information even scientific and proofed ones may have lacks and the information or the understandings may be changed with the new improvements and the change in the world. The information brings new ones. Also the information and the understanding may be changed with the perception, assets and living standards.

III. Have a sense of curiosity.

Not only critical thinkers, scientific, analytic ones also have curiosity and by this reason they always have also suspicion about the surroundings, this help them to discover.

IV. Are interested in finding new solutions.

The systems are needed to define the solutions easier. But the critical thinkers want to find the best systems for be more productive and they always keep on mind the new technologies or any related thing about the system that they are working on. These shows the critical thinkers always follow the new progresses.

V. Are able to clearly define a set of criteria for analyzing ideas.

The people may believe something if the subject is compatible with their older perceptions and information. The experiences and memories clear the future ideas.

VI. Are willing to examine beliefs, assumptions, and opinions and weigh them against facts.

The critical thinker people do not act with the supposals and they approach to the assumptions with skeptics.

VII. Listen carefully to others and are able to give feedback.

Critical thinkers want to learn every part of an assumption and they think that everybody may have al solution for the problems.

VIII. Suspend judgment until all facts have be gathered and considered.

The critical thinkers do not think that way means true, if most of the factors show one way. Sometimes, slight probabilities may show the truth.

IX. Look for evidence to support assumptions and beliefs.

The critical thinkers' most common specification is that they never believe in an idea in the first time they hear. They need an evidence to believe and support to the assumptions that they have met.

X. Are able to adjust opinions when new facts are found.

The critical thinkers are flexible for changes and they can change their opinions with the recent developments.

XI. Look for proof.

The critical thinkers do not learn by heart, they examine, test and look for the proof before acknowledgement.

XII. Examine problems closely:

The critical thinkers do not keep away from the problems, they try to understand, check the options and try for the best solution. The critical thinkers do not give up if they cannot solve, they go on trying.

XIII. Are able to reject information that is incorrect or irrelevant.

Sometimes rejecting may be hard for people because they sometimes afraid from break one's hearth. Sometimes people block out the wrong ideas. But the critical thinkers argue if they find a mistake.

XIV. See that critical thinking is a lifelong process of self-assessment

The critical thinking habit is a life style.

2.6. Critical Thinking and Education

Critical thinking has been recognized as essential in all levels of education for several years. At the same time, teaching critical thinking in some ways remains a mystery (Atkinson, 1997; Chaisuriya, 2000; Collins, 1991; Hongladarom, 2000; Nimkannon, 2007; Rfaner, 2006; Wallace, 2003). However, Wallace (2003) insists that one important factor to successful teaching of critical thinking is the teachers' understanding of the concept of critical thinking. Thus, it is necessary to conceptualize the concept of critical thinking.

The importance of the critical thinking may be explained with the advantages and the adding to the human. Ennis (1991) revised his definition of critical thinking to mean "reasonable reflective thinking that is focused on deciding what to believe or do".

However, Ennis (2012) felt both his early and later definitions were vague and required further elaboration through a list of decisions designed to guide one through a process of critical discrimination. This list of decisions is very similar to Ennis's twelve aspects of critical thinking from his earlier definition:

1. Judge the credibility of the sources.

2. Identify conclusions, reasons, and assumptions.

3. Judge the quality of an argument, including the acceptability of its reasons, assumptions, and evidence.

4. Develop and defend a position on an issue.

5. Ask appropriate clarifying questions.

6. Plan experiments and judge experimental designs.

7. Define terms in a way appropriate for the context.

8. Be open-minded.

9. Try to be well informed.

10. Draw conclusions when warranted, but with caution.

Here, by looking at these definition sentences which have been written item by item above can be shown as the advantages of the critical thinking for the people. For this reason the critical thinking components must be shown well to the children.

2.7. The Tools of Critical Thinking

The critical thinkers have routine behaviors and they have a check list to believe the idea. The first tool to be a critical thinker is to be determined to define the "true". Paul and Elder (2008) have searched the common checklist for critical thinkers and showed that most of the critical thinkers look for similar situations for proof. The critical thinkers check periodically to be sure they are still on target while they are researching for their answers but the new information brings new questions and they note them for new researches.

The brainstorming is the other important tool for critical thinking because the critical thinkers want to learn from every side. While teaching the parents or teachers let children to discover other views of the subject, the child would be more related and eager to learn (Battal, 2014).

In 1990, a Project called 'Delphi' has shown the tools for critical thinking. The project has been applied at schools and showed that if these attainments can be given to students, they would be successful on critical thinking (Faione, 1990).

I. Interpretation:

   In the interpretation stage the person has to categorize the information about the surveyed subject. The push for more information and curiosity comes from decoding significance.

II. Analysis:

The critical thinking needs to examine the opinions to reach the truth. Identifying the arguments done before like literature reviews; help the thinker to see the subject from other sides. The analyzing stage is sine qua non in critical thinking.

III. Evaluation:

This stage is needed for assessing claims and arguments. The thinker asks questions like how to build rules.

IV. Inference:

This tool is needed to check the proof. Here the thinker query the evidence, conjecture the alternatives and draw the conclusions. Sometimes the thinker does not be satisfied from the results and this stage continues unless the satisfaction.

V. Explanation:

This period contains stating results, justifying procedures and presenting arguments.

VI. Self-Regulation:

The thinker does not criticize others, they do it for themselves. The examination themselves and correcting own discussions are the other tools of critical thinking.

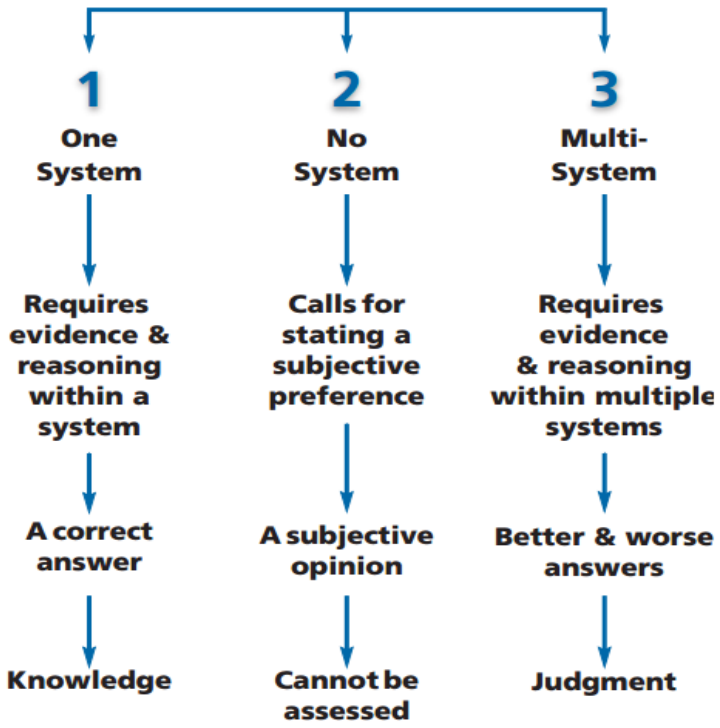

Figure 3. Questionning

Reference: Paul and Elder, 2008.

The figure tree shows the three approaches to a question. The critical thinkers ask themselves these questions and at the end of answering them, they make decisions to believe as knowledge or go on searching.

The three questions are (Paul and Elder, 2008):

I. Is it a question with one definitive answer?

II. Is it a question that calls for a subjective choice?

III. Does the question require you to consider competing points of view?

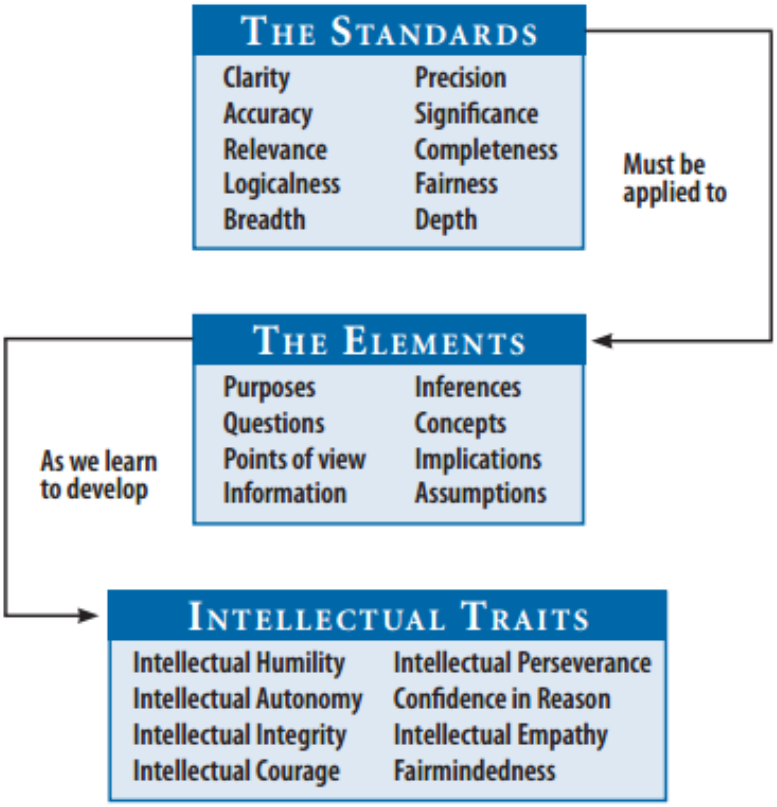

Figure 4. Analyzing The Information

Reference: Paul and Elder, 2008

The critical thinkers have personal standards to believe any subject. The first stage is to analyze the subject is clear enough to survey. Here they check the accuracy, relevance, logicalness, depth, fairness and precision. While they are taking the information the source should be significant and the information should be completeness. The purposes, inferences, implications, assumptions also have to have these characteristics or else the critical thinker would understand that experiment would not be impartial.

2.8. Critical Thinking for Education

Teaching the other thinking ways to other people needs more communication to reduce ambiguity and confusion and improve student attitudes about thinking tasks. The curriculum and the lectures should contain the activities to teach the students other thinking skills. The activities of the lessons must be with thinking examples and with these instructions, the students may discover their abilities and they can improve their brains, they may like brain storming. By this reason the education at school and also at home by parents should be enriched with a little support and avocatory questions are needed (King, Goodson and Rohani, 2009).

Education is mostly needed for teaching the subjects which are needed in daily life but if an education would not contain teaching the thinking skills, it means that it is not enough. The goal of education is to train people who are flexible and agreeable for different conditions. The assumptions, prejudices, generalizations and common ideas directly effect on our lives. The people who have critical thinking skill may change the perspective and create awareness (Petress, 2006).

Epstein (1989) notices that there are a few ideas but there are many people who try to put across these few ideas. He says that the critical thinking is a defense tool for this persistence. Education is for creating new ideas and critical thinking provides person to be more careful and decisive. The society needs educated people to develop the living standards. The health judgmental people are needed for solving the social problems, making decisions for future and for the management so the

critical thinking must be learned from childhood. A critical thinking may help students to gain these abilities (Lai, 2011);

I. Ennis and Facione noticed that analyzing arguments, claims, or evidence can be possible with a critical thinking mind.

II. Again Ennis says making inferences using inductive or deductive reasoning may be easily with a critical thinking skill.

III. Case and Lipman told that critical thinking helps people for judging or evaluating.

IV. Halpern indicates making decisions or solving problems can be healthy if a person learns critical thinking when he/she was a child.

2.8.1. Teaching Critical Thinking

The teaching period is hard and needs self-abnegation. For this reason the teachers have an education and this education especially contains children's psychology. For the secondary stage of the primary schools, knowing about the psychology is more important because the children in these classes are adolescences. Gürkaynak, Üstel and Gülgöz (2008) have listed some strategies for teaching the critical thinking and other thinking skills easier:

I. Building cooperation and asking activities which need work sharing and group work in the class:

   Sharing the work with others would build a friendship and also the student would feel more comfortable while sharing the

responsibility. In the group the strategies and the plans for work can be argued and this would also develop the brain storming, advising each other and respecting.

II. Arguments about the stories or any other event:

These arguments would teach students to watch around carefully. During the argument, the questions would make sensation. So the students would learn how to question and also how to answer.

III. Questioning:

The teachers should organize presentations and ask students to listen to their friends' presentations and ask some questions from opposite view. With these activities, the students would learn how to plead and how to oppose.

IV. Reading hours:

Reading is very important for reaching to new information and also this activity develops imagination. Reading comprehension can also be learned with these activities.

V. Writing homework:

The people can listen to their selves while writing. Writing also can show the speaking mistakes. Also writing is a way to keep ideas and the student can read his/her caption later.

In the classrooms the seating arrangement is important. The seating should let every student to see the blackboard well and when an argument emerged everyone should hear and must be sufficient for group work (Demir, 2006).

As cited in Lai (2011), most of the researchers like Bloom and Kennedy think that the critical thinking and other thinking skills are related to each other. Hence, in an education, the student should learn the thinking strategies, and this should be done with an enjoyable methodology. Bloom remarks that the thinking skills are needed to gain children the analysis, synthesis and evaluation.

The learning the thinking skills can be possible by experiments so at the class the teachers should organize some activities and push students to think. The dialogs should be encouraged between the students and teachers. This would help students to feel more comfortable and to understand how can make discussions and arguments with each other (Gürkaynak, Üstel, Gürgöz, 2008).

The students' perception about the school, teacher and friends are important in the teaching period because if a student does not feel that him/herself belong in the environment, the self-confidence may be damaged and also he/she would feel bored. The teachers should be well educated about understanding the students.

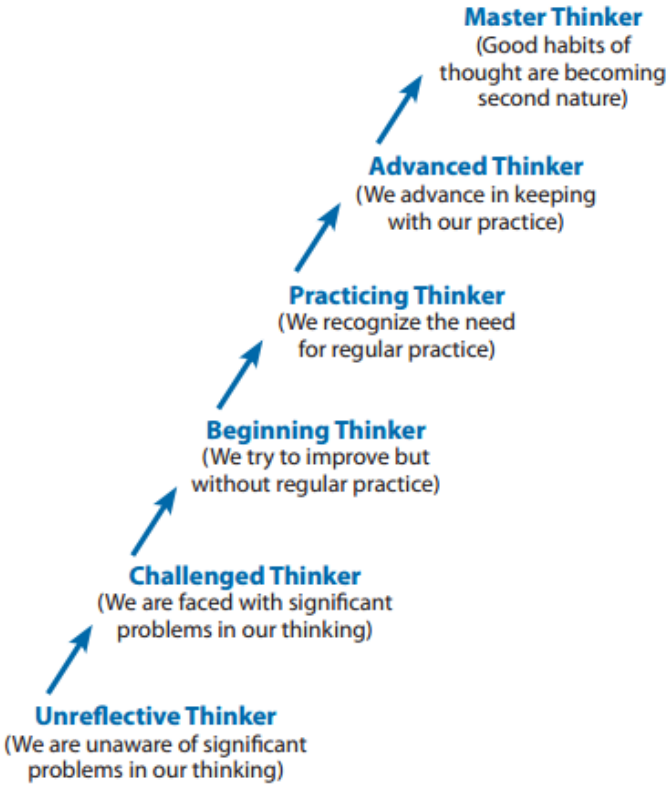

Figure 5. Stages of Critical Thinking

Reference: Paul and Elder, 2008

As seen in figure 5, there are 6 stages of being a critical thinker. While teaching the critical thinking at school, the teacher should be at the top level and can understand which level is the students' level. The first stage is the unreflective thinker level. Here some new subjects must be given to the student and these subjects must be attractive and popular. The Challenger thinker is the second stage and here the students may be faced with significant problems in their thinking. Beginning thinker is the third stage and most of the adolescences are in this level. The students may have personal ideas but some practice is needed to clarify and explain them to others. Also this stage contains a few questions. The fourth one is practicing thinker

stage and this stage is a transitional stage to being a real critical thinker. Advanced and master thinkers have routine questions and a check list to believe and judgment (Paul and Elder, 2008).

2.8.2. Building Critical Thinking

The critical thinking should be learned by the students and the children also should learn to settle this thinking skill in every part of their life. But also the critical thinking should be used to teach other subjects. Because the researches –especially about the education- shows that if a person criticizes and if surveys the subject during learning, he/she would more easily focus on, store and experienced.

So here, especially at schools, the teachers have some responsibilities for building the critical thinking in the students' minds. The teachers should leave the ordering compliances and let the students to question the subjects and the teachers should motivate the students for questioning.

Shouting must never be used for disciplining. The teaching process must not be stick to the books only especially for the homework must push students to search from other materials like internet and, should advise them not to believe the ever seen in the internet and check the information from other resources (Gürkaynak, Üstel and Gürgöz, 2008).

If a person would believe that he/she would really use the information which has been learned, he/she would be motivated more easily and would want to learn

detailed. Here, the teachers and also the parents should convince the children that the lectures are needed in the real life, and the subjects would get their lives easier, the students may be persuaded to learn and would request to learn more.

If the subjects would be explained with audio visual aids the lessons would be more attractive and also the students' unconscious mind would believe that they must not believe information without experience and without questioning (Seferoğlu and Akbıyık, 2006).

The human rights and respect to others' ideas is important while building the critical thinking in the students' mind. The esteem would prove that the people may have in different ideas but it does not mean that they would live separately. The teachers should create arguments in the class, they should join the fray but they never direct it (Facione, 2011).

Facione (2011) has written the best questions for building the critical skills and those are shown in the table below:

OUESTIONS	
Interpretation	I. What does this mean? II. What's happening? III. How should we understand? IV. What is the best way to characterize/ categorize/ classify this? V. In this context, what was intended by saying that? VI. How can we make sense out of this (experience, feeling and statement)?
Analysis	I. Please tell us again your reasons for making that

	claim. II. What is your conclusion/ What is it that you are claiming? III. Why do you think that? IV. What are the arguments pro and con? V. What assumptions must we make to accept that conclusion? VI. What is your basis for saying that?
Inference	I. Given what we know so far, what conclusions can we draw? II. Given what we know so far, what can we rule out? III. What does this evidence imply? IV. What additional information do we need to resolve this question? V. If we believed these things, what would they imply for us going forward? VI. What are the consequences of doing things that way? VII. What are some alternatives we haven't yet explored? VIII. Let's consider each option and see where it takes us. IX. Are there any undesirable consequences that we can and should foresee?
Evaluation	I. I low credible is that claim? II. Why do we think we can trust what this person claims? III. How strong are those arguments? IV. Do we have our facts right? V. How confident can we be in our conclusion, given what we know how?
Explanation	I. What were the specific findings/results of the investigation?

	II. Please tell us how you conducted that analysis. III. How did you come to that interpretation? IV. Please take us through your reasoning one more time. V. Why do you think that (was the right answer/was the solution)? VI. How would you explain why this particular decision was made?
Self-Regulation	I. Our position on this issue is still too vague; can we be more precise? II. How good was our methodology, and how well did we follow it? III. How good is our evidence?

Reference: Facione, 2011

2.8.3. Thinking Abilities

Presseisen (1985) noticed that if a person does not have ability about thinking, no one can teach it. If the human can make basic calculations, solve easy problems and can make decisions about himself/herself that means he/she has ability to think. Here we should explain those easy abilities. The basic calculations can be described as defining the relationship between the reason and the result and defining and classification the relationships around. Presseisen says solving easy problems can be explained as solving little troubles in daily life like combining information about the problem, classify them and use them in the solution. Making decisions can be described as seeing the options and comparing them and choosing one. These

activities are done in daily life and shows that the person is healthy enough for thinking and learning.

Özden (2000) thinks that the thinking abilities cannot be described with only Presseisen's three rules. The writer notices that reading and talking comprehensions are also needed to notice that someone has ability of thinking Beyer (1988) has tackled thinking abilities in three levels:

I. Problem Solving, making decisions and conceptualization ability.

II. Critical thinking ability

III. Using knowledge ability

Beyer (1988) notices that thinking ability cannot be taught without critical thinking because if a person accepts an idea without any question, that means he/she does not think.

2.9. Critical Thinking Dispositions

The dispositions mean that what kind of people and which kind of personality specifications are more successful and how much easier they can learn the subject. The learning the ability of critical thinking would be easier if the dispositions would be expounded. The critical spirit is needed for the critical thinking for the first. But of course this must not mean that the person who has critical spirit is always negative and hypercritical of everyone and everything (Facione, 2011).

The critical learning's one of the most important disposition is the hunger for learning. The person who is insatiable about the curiosity, this means he/she would always find the new pieces to learn, even about the same subject. He/she would ask the questions about everything to the others and also to him/herself. Asking would bring the explorations and every new exploration would bring new questions. The curiosity would push that person (Giancarlo, Gainen and Facione, 1995).

Second, a keenness mind is needed for being a critical thinker (Facione, 2011). The keenness can be described as not getting tired from asking, who, why, when and other questions. These kinds of people think that information is never guaranteed and there may always be an easier solution.

Of course there are some people who have the critical thinkers' characteristics but they do not use them. Here the needed thing is the self-confidence. "There is hardly a time or a place where it would not seem to be of potential value. As long as people have purposes in mind and wish to judge how to accomplish them, as long as people wonder what is true and what is not, what to believe and what to reject, strong critical thinking is going to be necessary" (Giancarlo, Gainen and Facione, 1995). Self-confidence let people to get calm and make decisions.

And yet weird things happen, so it is probably true that some people might let their thinking skills grow dull. It is easier to imagine times when people are just too tired, too lax, or too frightened. But imagine it you can, Young Skywalker, so there has to be more to critical thinking than just the list of cognitive skills. Human beings are more than thinking machines. And this brings us back to those all-important attitudes which the experts called "dispositions" (Facione, 2011).

Here also the preventing factors of critical thinking should be referred. Blind obedience to the authority, ideology, faith and any other thing inhibits the examination before judgment. The environment –society- is a very important factor of shaping the personal values. If the society has no tolerance for a change and if it has blind obedience to the communal attitudes, the people would be faint about questioning and criticizing (Battal, 2014).

The dispositions may change by the personality but most of the critical thinkers have similar specifications (Ennis, 2011):

I. They would like to believe that their beliefs are true and they care about it more than others. The critical thinkers seek the alternative hypothesis and their explanations.

II. Considering is important for critical thinkers. They consider all the point of views and try to see every detail about the subject.

III. The critical thinkers keep to looking for information about the subject and search for the latest information.

IV. They ask other critical thinkers' opinion.

V. The critical thinkers try to understand the other positions of the problem honestly and clearly.

VI. The critical thinkers always want to discover so the other perspectives are important for this.

VII. They seek and offer the reasons.

VIII. The critical thinkers listen or read carefully to understand clearly.

IX. The critical thinkers are reflectively aware of their own basic beliefs.

X. The critical thinkers care about every sight and by this reason they care about every people who are related with the subject and they respect to opposite ideas.

2.10. The Need for Critical Thinking in Primary Education

The secondary stage of primary school starts when the child is about 11 and 12 years old and this period can be called as “adolescence”. The shape of the body changes and the young person starts to find oneself. The adolescence period starts with increase in length and weight gain. The adolescence time does not mean only the body shapes; the cognitive and emotional development also starts and finishes in this period. Also the personality specifications and social development settle in the personality and the person’s behaviors in the future are related to this puberty. The development of girls and boys are different in adolescence period (Willingham, 2007).

Before explaining the need for critical thinking in the primary education, the development of the adolescences’ should be searched. The adolescence period and K-12 education prepares young people to the future, challenges of life and uncertainties of life (Marin and Halpern, 2011):

a. Cognitive Development:

   The adolescence time is the period when the logical thinking attains to the adults’ stage. This period also is called as “formal operational stage”. In this circle the young person tries to define the logical rules of the life and agree

with his/her friends. This period is a bit dangerous because the young can easily be attracted others' opinions.

b. Emotional Development:

The adolescence period is full of confusions. The emotions are also may be confused and if this period cannot be survived in healthy conditions at home and at school the young persons' self-confidence may be damaged. The girl/boy can be introvert if he/she thinks that he/she is ineligible. This is undesirable position in the future because introvert people mostly abstain from carrying his/her points, even he/she cannot utter his/her requests.

c. Social Development:

The young person feels anxious about the social life's functions as friendships, success in the school and financial difficulties. He/she may be stressed and tries to define personal values. This period witnesses responsibility, identification and self-rule questions.

The young person looks for someone who he/she wants to be like. So, especially the parents and the teachers should set a good example. The personality and the skills of the teachers are really important for teaching thinking to the young person in this period.

The people go to school for being good thinkers. Because life always brings new surprises and people have to decide after analyzing the options. The judgments dominate the life so learning thinking is very important but "educators have long noted that school attendance and even academic success are no guarantee that a student will graduate an effective thinker in all situations" (Willingham, 2007).

The adolescence period is the time circle when the young person starts to get in contact with around out of school. Hence asking them about the worlds' problems showed that most of the students do not have any idea about the solutions. The educators think that teaching the thinking skills, especially the critical one is needed for the world's future first. A diploma is not enough for direct the life and as the need of math, thinking is needed. The secondary stage of the primary school starts to prepare the people for the life and the high school contains (Marin and Halpern, 2011).

Most of the surveys show (American Philosophical Association The California Critical Thinking Disposition Inventory etc.) that most of the young people do not criticize and challenge the information. They directly take the information from any place –even from the social media and they believe. Also Paul's research showed that 19 percent of teachers know and define the term critical thinking and 89 percent of the attendant teachers do not (Begbie, 2007). These results show that the world is fall even further behind teaching the critical thinking and if the educators do not work on this subject, a few people may continue to manage our futures.

The people communicate faster, easier and cheaper in the 21st century and the people who have gained critical thinking skills can motivate, attract and train others more efficiently. The society scientists, economists, and managers for solving the problems, make decisions, reasoning through argument, and identifying ways. Not only has the society, the business world also needed critical thinkers in the competitive market. The critical thinkers are always hungry for the success and they always have energy for building more effective systems. The limited energy in the

earth makes obligatory people to change their life styles and for a healthy future the skilled laborers are needed (Marin and Halpern, 2011).

The critical thinking is very important for the democracy and progress of the countries. When we check the world if the critical thinking is not prevalence in a country, we would see that they could not be developed. So for the progress of the economy, science and even art, the critical thinkers are needed. The critical thinking period pushes the information production (Battal, 2014).

The science cannot develop by repeating the known. The critical thinkers discover new information while they are trying to confirm. Also for actualization the democracy can only be possible with critical thinkers. The democracy needs unprejudiced people. Also the societies need reading comprehension ability. The critical thinkers not only read and understand they also interpret and compare the information with the others (Battal, 2014).

The people request and buy for their life. This is called satisfaction and satisfaction is needed when a person is an employee or a customer. Satisfaction brings happiness and feeling motivated. Here, we should mention Maslow's (1943) motivation theory.

Maslow's theory is the most popular one in all the motivation theories. Abraham Maslow has formed this theory in 1940's and he noticed that people can be motivated only because of the want of their needing satisfied.

These requests have a hierarchic gradation. The physiologic requests are in the first step and the second is the social requests, third one is prestige and the fourth one is self-actualization needs. He said that if the low level needs have been satisfied,

the top level needs become important. So, the first level is the physiologic needs which are the most important ones. The person wants safety after he/she satisfies the first level needs. Then, after satisfying the safety, the human starts to want to satisfy the social needs, prestige and finally he/she would ask for self-actualization needs (Reid-Cunningham, 2008).

a. *Basic physiologic needs:*

   Eating, drinking, sexuality etc. are the basic needs of a human. If we think organizational based physiological needs we can say warming up, a sufficient salary for living etc.

b. *Safety needs:*

   It is a keep of danger and a safety life request. A person also needs a safety emotional environment.

c. *Social needs:*

   People want to honoring in the social life, having friends, affiliation and love. If we think organizational based social needs can be good relationship with the leaders and managers, have positive communication with working friends and the leaders etc.

d. *Prestige needs:*

   People need to have a positive image, appeal in the society, recognition by other people, favoring and honoring.

e. *Self-actualization needs:*

   Using own potential, to increase the abilities, education are self-actualization needs of a person.

By looking at this theory we can see how much critical thinking is important for personal satisfaction. Especially for social, prestige and self-actualization needs, critical thinking skills are needed. If a person can recognize the true and false and can decide with his/her free will, that means he/she has a self-actualization and this can be provided only with critical thinking (Battal, 2014).

Critical thinking develops the emotional intelligence. The emotional intelligence provides person to have self-consciousness, motivate force, empathy, controlling emotions and communication skills (Özden, 2005).

Education's goal is to nurture democratic, creator, productive, learned how to learn, problem solver, sophisticatedly thinker, tolerant and respectful people. But there is not a formula how to do it. Most of the researchers think that these functions may be possible with the critical thinking and if the schools can educate students with teaching critical thinking would prevent to have unskilled societies in the future.

CHAPTER III

METHODOLOGY OF THE RESEARCH

This chapter presents the model of the research, the selection of the participants, the instruments, the data collection procedure, the methods used for data analysis and the procedure. The main concern of this study is to examine whether there is a significant difference between the independent variations, like the area of the school, grade level, genders, parents' educational levels and perceived socio-economic status of students. The study was conducted to primary school secondary stage students in 2012-2013 academic years to seek answer to the research questions.

3.1. Research Model

In this study it was aimed to determine whether primary school students' critical thinking dispositions vary with grade, gender, parents' education level, school area and perceived income. Survey method was used in this research. Survey methods are research approaches aiming to describe a situation from past or in present. Individual or object indicated as subject in research must be defined in its own conditions (Karasar, 2009). With this aim, California Critical Thinking Disposition Inventory adapted by Kökdemir (2003) which has 51 items applied to workgroup and critical thinking disposition profiles were tried to expose.

3.2. Participants and the Context

The participants of the study consist of students who are attending Primary School Secondary Stage in 2012-2013 academic years in Çekerek, Yozgat. The participants were selected from two rural and two urban schools.

Introductory information about working group has been given in Table 1.

Table1. Breakdown of the Participants

School area			Grade			Total
			6th	7th	8th	
Urban	gender	female	45	62	57	165
		male	45	65	48	158
	Total		90	127	105	323
Rural	gender	female	44	34	32	110
		male	39	39	35	112
	Total		83	73	67	222

As it is seen from Table 1; 545 6th, 7th and 8th grade students participated in this research. 275 females and 270 males attended in this study.323 of them attended schools in urban and 222 of them were in rural schools.173 students were 6th graders, 200 of them 7th graders and 172 students attended 8th grade. In this study there were four schools: two of them were in rural and two were in urban area. The schools in county town are more modern than the schools in villages.

3.3. Procedure

This study was conducted on primary school secondary stage students in Çekerek; Yozgat depended on Ministry of Education. The researcher informed the headmasters of the school about the study. The study lasted four days. The researcher went to 2 rural and 2 urban schools to apply the inventory. In each application, the aim and content of California Critical Thinking Dispositions Inventory were explained to the participants. Also, participants were informed about the Personal Information Form. Participants were required to choose the best appropriate choice for them.

3.4. Instrumentation

While collecting required data to determine critical thinking dispositions of primary school secondary stage students "California Critical Thinking Dispositions Inventory" developed by Facione Giancarlo and Facione Ganien (1998) and adapted to Turkish by Kökdemir (2003) was used. Also, "Personal Information Form" prepared by researcher was used to collect the data about the participants. The instruments are explained in detail below.

3.4.1. California Critical Thinking Dispositions Inventory

According to Insight Assessment (2006), the California Critical Thinking Dispositions Inventory (CCTDI) is based on "the conceptualization of critical thinking articulated in the Expert Consensus Statement on College Level Critical Thinking (1990) known as *The Delphi Report* .This concept was supported by an independent replication research study of policy-makers, employers, and academics which was conducted at Penn State University, sponsored by US Department of Education." Insight Assessment (2006) states, the CCTDI measures the "consistent internal motivation toward critical thinking... the disposition to use or not to use one's reasoning and reflective judgment when solving problems and making decisions."

Laird (2005) states the CCTDI consists of 75 items with six responses that range from "Strongly Agree" to "Strongly Disagree" and requires approximately 20 minutes to complete. The subscale scores include the categories of Truth-seeking, Open-mindedness, Analyticity, Systematicity, Critical Thinking Self-confidence, Inquisitiveness, and Cognitive Maturity; the total score is derived from all the questions on the test and indicates an individual's overall inclination toward using critical thinking to approach a situation (Insight Assessment, 2006). According to Giancarlo and Facione (2001), the Truth seeking scale measures the ambition for the best knowledge in any situation; those who have a high truth seeking score are inclined to ask tough questions in order to find the truth of a given situation. Tolerance of different views and new ideas are measured by the Open-mindedness score (Giancarlo and Facione, 2001). The Analyticity score indicates a propensity for anticipating the potential outcomes of a given situation (Giancarlo and Facione,

2001). Systematicity is the practice of approaching problems "in a disciplined, orderly, and systematic way" (Giancarlo and Facione, 2001). Critical Thinking Self-Confidence indicates trust in one's ability to use logic and reasoning (Giancarlo and Facione, 2001). Giancarlo and Facione (2001) state "Inquisitiveness measures intellectual curiosity and the intention to learn things even if their immediate application is not apparent." The final scale score of the CCTDI is Cognitive Maturity, the practice of regarding situations as complex, instead of in black and white, and making a judgment in a timely manner (Giancarlo and Facione, 2001).

Laird (2005) provides examples of test questions for each of the subscale categories:

Truth-seeking

It's never easy to decide between competing points of view. Being impartial is impossible when I'm discussing my own opinions.

Open-mindedness

It concerns me that I might have biases of which I'm not aware. It's important to me to understand what other people think about things.

Analyticity

It bothers me when people rely on weak arguments to defend good ideas. Others look to me to decide when the problem is solved.

Systematicity

People say I rush into decisions too quickly. If I have to work on a problem, I can put other things out of my mind.

Critical thinking Self-confidence

I'm proud that I can think with great precision. My peers call on me to make judgments because I decide things fairly.

Inquisitiveness

Studying new things all my life would be wonderful. Learn everything you can, you never know when it could come in handy.

Cognitive Maturity

Reading is something I avoid, if possible. Powerful people determine the right answer.

The California Critical Thinking Disposition Inventory has been used to evaluate critical thinking dispositions in nursing programs' teaching methods (Nokes, Nickitas, Keida and Neville, 2005; Öztürk, Muslu and Dicle, 2008), in students in different degree programs in nursing (Shin, Jung, & Shin, 2006), in art versus non-art majors (Lampert, 2006), in business education (Wlson, 2003), history education (Reed & Kromrey, 2001), in political science education (Ishiyama, McClure, Hart & Amico, 1999), in athletes (McBride & Reed, 1998), and to evaluate differences between genders and academic majors (Walsh & Hardy, 1999).

CCTDI was developed by Facione and Facione (1998) and consists of 75 items and 7 subscales. CCTDI was translated from English to Turkish by Kökdemir (2003), consistency and reliability studies were conducted. Kökdemir (2003) stated that the obtained data for measuring the dimensions of inventory that has been adapted by him do not coincide with first scale's data generally but the total scores are close to each other.

The new inventory obtained after analyses consists of 51 items and 6 subscales. Subscales are analyticity (10 items), open mindedness (12 items), curiosity (9 items), self-confidence (7 items), search for truth (7 items) and systematicity (6 items). The items of inventory are answered with 6-point Likert scale in which items indicates strong agreement, agreement, partially agreement, partially disagreement, disagreement and strong disagreement. Strong agreement has given 6 points, agreement has given 5 points, partially agreement 4 points, partially disagreement 3 points, disagreement has given 2 points and strong disagreement has given 1 point. Reliability coefficient for analyticity is .75, for open mindedness is .75, for curiosity is .78, for self confidence is .77, for search for truth is .61 and for systematicty is .63. Internal consistency coefficient for full scale is .88. During calculation for CCTDI each subscale had determined score. In every subscale score under 40 indicates low critical thinking disposition, above 50 indicates high critical thinking disposition. In inventory score under 240 (40x6) indicates low critical thinking disposition, 240-300 indicates average critical thinking disposition and score above 300 (50x6) indicates high critical thinking disposition (Kökdemir, 2003).

The current inventory that we used in our study has also been used by Akıllı (2012) in her study called "Evaluation the Levels of Eight Grade Primary School

Students' Critical Thinking Dispositions and Creativity". In her study she stated that this inventory is appropriate to primary school students.

3.4.2. Personal Information Form

The information form has been prepared by the researcher and the questions have been asked for identifying the critical thinking skills and dispositions of the students. The form has questions about learning the demographic specifications of the students and the critical thinking levels.

3.5. Data Analysis

The information gained from the attendees to the questionnaires has been analyzed in SPSS for Windows 15.0 program. The information has been stated as the frequencies and the percentages and analyzed to understand the critical thinking dispositions of the students. The t test has been applied to see the relationship between the variables of the groups. For the variables which can have more than two values the ANOVAs –analysis of variance- has been used. To determine the inducements of the differences between the variables the nonparametric “Scheffe” test has been applied. In the implementation the significance level $p<.05$ has been accepted and in Sheffe Test, the significance level $p<0, 01$ has been accepted.

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

In this part of the study, with the analysis the sub questions of this research have been tried to be answered and the found data after the statistical analysis have been explained.

4.1. The Findings about the Critical Thinking Dispositions of the Students

The score intervals for explaining the meanings of the students' critical thinking disposition levels have been given in the Table 2:

Table 2. The Score Intervals of The Students Critical Thinking Disposition Levels

	Min. Score	Max. Score	Low	Medium	High
Truth-seeking	7	42	7,00-18,66	18,67-30,33	30,34-42,00
Analyticity	10	60	10,00-26,66	26,67-43,33	43,34-60,00
Open-mindedness	12	72	12,00-32,00	32,01-52,01	52,02-72,00
Systematicity	6	36	6,00-16,00	16,01-26,01	28,00-36,00
Self-confidence'	7	42	7,00-18,66	18,67-30,33	30,34-42,00
Inquisitiveness	9	54	9,00-24,00	24,01-39,01	39,02-54,00
Critical Thinking Dispositions	51	306	51,00-136,00	136,01-221,81	221,82-306,00

Students' critical thinking disposition levels and determining the changes of these levels by analyticity, open mindedness, curiosity, self-confidence, search for truth and systematicty is the first sub goal of this study. For determining if there is change in the score levels analyze has been done and the result of the calculations (critical thinking disposition level averages and the standard averages) are given in the table 3 below:

Table 3. Students' Critical Thinking Disposition Levels

Variables	N	Min. Score	Max. Score	M	SD	Level
Truth-seeking	545	7,00	42,00	22,55	6,12	Medium
Analyticity	545	10,00	60,00	44,55	7,02	High
Open-mindedness	545	12,00	72,00	43,45	8,59	Medium
Systematicity	545	6,00	36,00	21,79	4,55	Medium
Self-confidence'	545	7,00	42,00	27,06	6,37	Medium
Inquisitiveness	545	9,00	54,00	41,33	7,22	High
Critical Thinking Dispositions	545	51,00	306,00	198,79	27,34	Medium

As seen in the Table 3, the average of truth-seeking score of the students is (22,55±6,12), the average of the analyticity score is (44,55±7,02), the average of open-mindedness score is (43,45±8,59), the average of systematicity score is (21,79±4,55), average of self-confidence score is (27,06 ± 6,37). The average of

inquisitiveness score of the students is (41, 33 ± 7, 22) and the average of critical thinking dispositions level score is (198, 79 ± 27, 34).

So here, we can say that the analyticity score average and inquisitiveness score average of the students are in high level. The truth-seeking average score, open-mindedness average score, systematicity average score, self-confidence average score and critical thinking dispositions average score are at medium levels.

As the result if we compare the sum of the scores we would see that Baydar's (2012) minimum critical thinking dispositions' total score was 171,94; maximum critical thinking dispositions' total score was 335,00. Also the total sample students' critical thinking disposition scale factor is (X=244, 52) and it shows us they are in the "medium level" part of whole. So here we can say that most of the students are in the medium level of the critical thinking disposition.

Yıldırım (2013) has calculated the students' CCTDI sub scales as in order of;

I. In sub scale of the truth-seeking 36.38 ± 7.78,

II. In sub scale of open-mindedness 41.55 ± 7.09,

III. In sub scale of analyticity 45.45 ± 6.70,

IV. In sub scale of systematicity41.90 ± 7.29,

V. In sub scale of self-confidence 40.27 ± 7.38,

VI. In sub scale of curiosity 41.25 ± 7.39.

At the end of his study he has calculated the average of the total score of the students in CCDTI scale as 211.65± 24.81 and he noticed that the critical thinking dispositions of the students is in the low level.

4.2. Findings about the Students' Critical Thinking Disposition Levels

Here to determine if there is any change with the students' critical thinking disposition levels and the demographic variables, the t test and one way variance analyze test would be applied and the results would be commented.

4.2.1. Determining the Student's Critical Disposition Levels According to Their Genders

Another sub question of this study was to determine if there is a change with the students' critical thinking disposition level according to their gender. For understanding the changes, here the Table 4 contains the average of students' critical thinking disposition levels scores according to their genders would be given. The calculations would be done by using t test.

Table 4. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their Genders, Standard Deviations and t Test Results

Variables	**Gender**	N	M	SD	t	df	p
Truth-seeking	**Female**	275	21,7418	6,30857	-3,145	543	0,002
	Male	270	23,3778	5,82185			
Analyticity	**Female**	275	45,6364	6,81551	3,695	543	0,000
	Male	270	43,4407	7,05648			
Open-mindedness	**Female**	275	42,5345	9,21606	-2,519	543	0,012
	Male	270	44,3815	7,82801			
Systematicity	**Female**	275	21,8727	4,56764	0,386	543	0,700
	Male	270	21,7222	4,53084			
Self-confidence	**Female**	275	27,0182	6,66807	-0,136	543	0,892
	Male	270	27,0926	6,06308			
Inquisitiveness	**Female**	275	42,3964	7,23833	3,522	543	0,000
	Male	270	40,2407	7,04562			
Critical Thinking Dispositions	**Female**	275	199,1555	29,35263	0,311	543	0,756
	Male	270	198,4253	25,17904			

As seen in the table, the truth seeking average score of the male students'(23,37±7,82) is higher than the girls' truth seeking average scores (21,74±6,30). As the results of the interpretation analyze, the difference between the female students' truth-seeking average score and the male students' average score is meaningful (t (543) = -3,145; p< 0, 05).

Again in the Table 4, we can see that the analyticity average score of the female students (45, 63±6, 81) is higher than the male students' average analyticity score (43, 44±7, 05). As the results of the interpretation analyze, the difference between the female students' analyticity average score and the male students' average score is meaningful (t (543) = 3,695; p< 0, 05).

The average score of the male students' about open-mindedness (44,3815±7,82), is higher than the girls' open-mindedness average score (42,53±7,82). As the results of the interpretation analyze, the difference between the female students' open-mindedness average score and the male students' average score is meaningful (t(543)= -2,519; p< 0,05).

The average score of the female students' about systematicity (21,87±4,56), is higher than the male students' systematicity average score (21,72±4,53).As the results of the interpretation analyze, the difference between the female students' systematicity average score and the male students' average score is not meaningful(t(543)=0,386; p > 0,05).

Self-confidence average score of the male students' (27,01±6,66) is higher than the female students' self-confidence average scores (27,09±6,06) As the results of the interpretation analyze, the difference between the female students' self-confidence average score and the male students' average score is not meaningful(t(543)= -0,136; p> 0,05).

The calculations also show that the inquisitiveness average score of the female students (42, 39±7, 23) is higher than the male students' inquisitiveness average score (40, 24±7, 04). As the results of the interpretation analyze, the

difference between the female students' inquisitiveness average score and the male students' average inquisitiveness score is meaningful (t (543) = 3,522; p< 0, 05).

The critical thinking disposition level average score of the female students (199, 15±29, 35) is higher than the male students' (198, 42±25, 17). As the results of the interpretation analyze, the difference between the female students' inquisitiveness average score and the male students' average critical thinking disposition score is not meaningful(t(543)=0,311; p > 0,05). By looking the results the change of student's critical disposition levels according to their genders is not meaningful.

These results have similarities with the previous researches of the literature. Çekin (2012) and Topoğlu and Öney (2013) did not see any difference in the students' critical thinking dispositions according to their genders. Also Baydar (2012) noticed that the female students' average critical thinking disposition score is higher than the male students' average critical thinking disposition score.

But Emir (2012) has prepared a research and the writer saw that the male students' average critical thinking disposition score is higher than the female ones and also he commented that this change is meaningful after his calculations.

4.2.2. Determining the Student's Critical Disposition Levels According to The School Environment

The other sub goal of this study was to determine if there is a change with the students' critical thinking disposition level according to their school environment.

For understanding the changes, here the Table 5 contains the average of students' critical thinking disposition levels scores according to their school environment and the standard deviations would be given. The calculations would be done by using t test.

Table 5. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their School Environment, Standard Deviations and t Test Results

Variables	School Area	N	M	SD	t	df	p
Truth-Seeking	Urban	322	22,4006	6,29773	-0,600	542	0,548
	Rural	222	22,7207	5,82967			
Analyticity	Urban	322	45,177	7,31041	2,593	542	0,012
	Rural	222	43,5991	6,46092			
Open-Mindedness	Urban	322	43,3975	8,66675	-0,089	542	0,929
	Rural	222	43,464	8,4888			
Systematicity	Urban	322	21,6025	4,30428	-1,108	542	0,268
	Rural	222	22,0405	4,84354			
Self-Confidence	Urban	322	27,8385	6,59831	3,559	542	0,000
	Rural	222	25,8829	5,83753			
Inquisitiveness	Urban	322	41,5683	7,78308	1,003	542	0,316
	Rural	222	40,9369	6,29268			
Critical Thinking Dispositions	Urban	322	200,0075	27,4143	1,372	542	0,171
	Rural	222	196,7516	26,9182			

As seen in the table, the rural school's students' average truth-seeking score (22,72±5,82) is higher than the urban schools students' average truth-seeking score (22,40±6,29). As the results of the interpretation analyze, the difference between the rural school students' truth-seeking average score and the urban school students' average truth-seeking score is not meaningful(t(542)= -0,600; p> 0,05).

Again by looking the Table 5, we would see that the urban school students' average analyticity score (45, 17±7, 31) is higher than the rural school students' average analyticity score (43, 59±6, 46). As the results of the interpretation analyze, the difference between the rural school students' analyticity average score and the urban school students' average analyticity score is meaningful(t(542)= 2,593; p< 0,05).

Average open-mindedness score of the rural school students (43, 46±8, 48), is higher than the urban school students' average open-mindedness score (43, 39±8, 66). As the results of the interpretation analyze, the difference between the rural school students' open-mindedness average score and the urban school students' average open-mindedness score is not meaningful (t(543)= -0,089 p > 0,05).

The Table also shows that the average systematicity score of the rural school students (22, 04±4, 84) is higher than the average systematicity score of the urban school students (21, 60±4, 30). As the results of the interpretation analyze, the difference between the rural school students' systematicity average score and the urban school students' average systematicity score is not meaningful(t(542)=-1,108; p > 0,05).

As seen, the average self-confidence score of the urban school students (27, 83±6, 59) is higher than the average self-confidence score of the rural school students (25, 88±5, 83). As the results of the interpretation analyze, the difference between the rural school students' self-confidence average score and the urban school students' average self-confidence score is meaningful ($t(543)= 3,559$; $p< 0,05$).

The average inquisitiveness score of the urban school students (41, 56±7, 78) is higher than the average inquisitiveness score of the rural school students (40, 93±6, 29) as calculated and written in the Table 5. As the results of the interpretation analyze, the difference between the rural school students' average inquisitiveness score and the urban school students' average inquisitiveness score is not meaningful ($t(543)= 1,003$; $p> 0,05$).

The average critical thinking disposition score of the urban school students (200, 00±27, 41) is higher than the average critical thinking disposition score of the rural school students (196, 75±26, 91). As the results of the interpretation analyze, the difference between the rural school students' average critical thinking disposition score and the urban school students' average critical thinking disposition score is not meaningful($t(542)=1,372$; $p > 0,05$).

An analysis of these results suggests that the change of student's critical disposition levels according to their school area is not meaningful. We can interpret that the location of school is not the key element at shaping critical thinking of students. We can also say that critical thinking is not affected by external forces.

4.2.3. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their Grades

Another sub goal of this study was to determine if there was a change with the students' critical thinking disposition level according to their school grades. For understanding the changes, here the Table 6 contains the average of students' critical thinking disposition levels scores according to their school grades and the standard deviations have given. The calculations have done by using one way variance test.

Table 6. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their School Grades, Standard Deviations

		N	M	SD
Truth-Seeking	6. grade	173	23,4798	6,18568
	7. grade	200	21,545	5,83681
	8. grade	172	22,7907	6,24287
	Total	545	22,5523	6,12174
Analyticity	6. grade	173	45,2659	6,9113
	7. grade	200	44,7	6,20261
	8. grade	172	43,6512	7,9011
	Total	545	44,5486	7,01613
Open-Mindedness	6. grade	173	46,0116	8,58066
	7. grade	200	42,565	7,91511
	8. grade	172	41,9012	8,84741
	Total	545	43,4495	8,59857

Table 6. (continuation)

	6. grade	173	22,7803	4,92953
	7. grade	200	21,69	4,20742
Systematicity	8. grade	172	20,936	4,3544
	Total	545	21,7982	4,54588
	6. grade	173	28,5087	5,54854
	7. grade	200	26,53	6,3893
Self-Confidence	8. grade	172	26,2035	6,88582
	Total	545	27,055	6,36979
	6. grade	173	42,4046	6,90958
	7. grade	200	41,695	6,49561
Inquisitiveness	8. grade	172	39,8198	8,06241
	Total	545	41,3284	7,21801
Critical Thinking Dispositions	6. grade	173	206,5173	28,37029
	7. grade	200	196,6281	22,46421
	8. grade	172	193,5434	29,79708
	Total	545	198,7937	27,34200

As seen in the Table 6, the school grades of the students effect on their average critical thinking disposition score levels. To determine the importance of the differences between the grades affect, a one way variance analyze test has been done and given in the table 7.

Table 7. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their Grades' One Way Variance Analyze Test Results

Statistical Variance Reference	df	SS	MS	F	p	Scheffe
Truth-Seeking	2	361,52	180,76	4,892	0,008	6-7
	542	20025,24	36,947			
	544	20386,76				
Analyticity	2	232,123	116,061	2,37	0,094	-----
	542	26546,84	48,979			
	544	26778,96				
Open-Mindedness	2	1704,411	852,205	11,992	0,000	6-8
	542	38516,45	71,064			7-8
	544	40220,86				
Systematicity	2	297,068	148,534	7,356	0,001	
	542	10944,73	20,193			6-8
	544	11241,8				
Self-Confidence	2	545,414	272,707	6,866	0,001	6-7
	542	21526,94	39,718			6-8
	544	22072,35				
Inquisitiveness	2	618,725	309,363	6,048	0,003	6-8
	542	27723,48	51,15			7-8
	544	28342,21				
Critical Thinking Dispositions	2	15999,497	7999,749	11,098	0,000	
	542	390686,807	720,824			6-7
	544	406686,304				6-8

To determine whether these differences are meaningful or not, the interpretation analyze has been applied. As the results of the interpretation analyze, it is seen that the students' average truth seeking score according to their school grades is meaningful (F (2–542) =4,892; p<0, 05). Classifying by the Scheffe test, it is seen that the differences between the 6th and 7th grade students' average truth seeking score is meaningful. (p<0,01).

The difference in the average analyticity score of the students according to their school grades is not meaningful statistically (F (2–542) =2,370; p>0, 05).

The difference in the average open-mindedness score of the students according to their school grades is meaningful statistically (F (2–542) = 11,992; p<0,05). Classifying by the Scheffe test, it has seen that the differences between the 6th, 7th and 8th grade students' average open-mindedness score is statistically meaningful. (p<0,01).

The difference in the average systematicity score of the students according to their school grades is meaningful statistically (F (2–542) =7,356; p<0, 05). Classifying by the Scheffe test, it has seen that the differences between the 6th, 7th and 8th grade students' average systematicity score is statistically meaningful. (p<0,01).

The difference in the average self-confidence score of the students according to their school grades is meaningful statistically (F (2–542)=11,098; p<0,05). Classifying by the Scheffe test, it has seen that the differences between the 6th, 7th and 8th grade students' average self-confidence score is statistically meaningful. (p<0,01).

The difference in the average inquisitiveness score of the students according to their school grades is meaningful statistically (F (2–542) =6,048; p<0,05). Classifying by the Scheffe test, it has seen that the differences between the 6th, 7thand 8th grade students' average inquisitiveness score is statistically meaningful (p<0,01).

The difference in the average critical thinking disposition score of the students according to their school grades is meaningful statistically (F (2–542) =7,356; p<0,05). Classifying by the Scheffe test, it has seen that the differences between the 6th ,7th and 8th grade students' average critical thinking disposition score is statistically meaningful(p<0,01).

By looking at these test and statistical results we can comment as the 6th grade students' critical thinking disposition level is higher than the 7th and 8th grade students and also the test results showed that this difference according to the school grades is meaningful statistically. We can interpret that 6th grade students may have better background than the 7th and 8th that's why they have more dispositions. In addition to this we can say that as the child grows up the critical thinking disposition of students lessen because of Turkish education system. Because, teachers in Turkey may not lead to students to use critical thinking techniques.

4.2.4. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their Mothers' Educational Background

The other sub goal of this study was to determine if there is a change with the students' critical thinking disposition level according to their mothers' educational

background. For understanding the changes, here the Table 8 contains the average of students' critical thinking disposition levels scores according to their mothers' educational background and the standard deviations.

Table 8. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their Mothers' Educational Background

		N	M	SD
Truth-Seeking	Literate	304	22,7895	6,39578
	Primary Education	209	22,1722	5,64315
	High School	27	22,7037	6,96041
	University	5	23,2	3,83406
	Total	545	22,5523	6,12174
Analyticity	Literate	304	44,0921	6,57313
	Primary Education	209	44,9234	7,6538
	High School	27	46,963	5,59864
	University	5	43,6	10,40673
	Total	545	44,5486	7,01613
Open-Mindedness	Literate	304	44,0033	8,53937
	Primary Education	209	42,4976	8,7432
	High School	27	44,8148	8,14785
	University	5	42,2	6,30079
	Total	545	43,4495	8,59857

Table 8.(cont.)

	Literate	304	21,977	4,55144
	Primary Education	209	21,555	4,57608
	High School	27	22	4,59933
Systematicity	University	5	20	2,23607
	Total	545	21,7982	4,54588
	Literate	304	26,477	6,16437
	Primary Education	209	27,512	6,43242
	High School	27	29,7778	6,64677
Self-Confidence	University	5	28,4	10,59717
	Total	545	27,055	6,36979
	Literate	304	40,3487	7,20768
	Primary Education	209	42,5359	6,89481
	High School	27	42,8889	7,91947
Inquisitiveness	University	5	42	10,22252
	Total	545	41,3284	7,21801
Critical Thinking Dispositions	Literate	304	197,7120	26,68300
	Primary Education	209	199,3273	28,19232
	High School	27	207,0627	27,60730
	University	5	197,6088	29,79585
	Total	545	198,7937	27,34200

As seen in Table 8, the mothers' educational background of the students effect on their average critical thinking disposition score levels. To determine the importance of the differences between the mothers' educational background affect, a one way variance analyze test has been done and given in the Table 9.

Table 9. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their Mothers' Educational Background One Way Variance Analyze Test Results

Statistical Variance Reference	df	SS	MS	F	p	Scheffe
Truth-Seeking	3	50,005	16,668	0,443	0,722	-----
	541	20336,76	37,591			
	544	20386,76				
Analyticity	3	254,602	84,867	1,731	0,16	-----
	541	26524,36	49,028			
	544	26778,96				
Open-Mindedness	3	340,743	113,581	1,541	0,203	-----
	541	39880,12	73,716			
	544	40220,86				
Systematicity	3	39,342	13,114	0,633	0,594	-----
	541	11202,46	20,707			
	544	11241,8				

Table 9.(cont.)

Self-Confidence	3	354,423	118,141	2,943	0,033	Not Meaningful between the groups
	541	21717,93	40,144			
	544	22072,35				
Inquisitiveness	3	664,522	221,507	4,33	0,005	Literate and primary education
	541	27677,69	51,16			
	544	28342,21				
Critical Thinking Dispositions	3	2268,412	756,137	1,012	0,387	-----
	541	404417,891	747,538			
	544	406686,304				

An interpretation analyze has been applied to determine these differences are meaningful or not. As the result of the interpretation analyze, the difference of the students' truth seeking average score according to their mothers' educational background is not meaningful statistically (F(3–541)=0,443; p>0,05). The students' truth seeking average score according to their mothers' educational background is not meaningful statistically.

The students' analyticity average score according to their mothers' educational background is not statistically meaningful (F (3–541) =1,731; p>0,05).

The students' open-mindedness average score according to their mothers' educational background is not statistically meaningful (F (3–541) =1,541; p>0,05).

The students' systematicity average score according to their mothers' educational background is not statistically meaningful (F(3–541)=0,633; p>0,05).

The students' self-confidence average score according to their mothers' educational background is statistically meaningful (F (3–541) =2,943; p<0, 05). The difference between the groups is also not statistically meaningful according to Scheffe Test.

The students' inquisitiveness average score according to their mothers' educational background is statistically meaningful (F (3–541) =4,330; p<0,05). According to Scheffe Test results, the students whose mothers are literate or primary school graduated have a meaningful difference about the critical thinking disposition level statistically. (p<0,01).

The students' critical thinking disposition average score differences according to their mothers' educational background are not statistically meaningful (F(3–541)=1,012; p>0,05). According to these results the changes between the mothers' educational background variance and students' critical thinking disposition average score is not meaningful on statistics.

The statistical results above are similar to some other researches in the literature. For example, Aybek (2006) found that there are not any meaningful differences between the relationship of the students' mothers' educational background and their critical thinking dispositions. However, Çekin (2012) had a research and the writer noticed that there is a meaningful difference between the students' critical thinking dispositions according to their mothers' educational background.

4.2.5. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their Fathers' Educational Background

Another sub goal of this study was to determine if there is a change with the students' critical thinking disposition level according to their mothers' educational background. For understanding the changes, here the Table 10 contains the average of students' critical thinking disposition levels scores according to their mothers' educational background and the standard deviations.

Table 10. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their Fathers' Educational Background and the Standard Deviations

		N	M	SD
Truth-Seeking	Literate	188	23,5426	6,244
	Primary Education	247	22	6,00271
	High School	64	22,4219	6,28883
	University	46	21,6522	5,66163
	Total	545	22,5523	6,12174
Analyticity	Literate	188	43,7606	6,71108
	Primary Education	247	44,7287	7,10171
	High School	64	44,875	7,18574
	University	46	46,3478	7,32793
	Total	545	44,5486	7,01613

Table10.(cont.)

	Literate	188	44,4521	8,51063
	Primary Education	247	43,3036	8,65608
	High School	64	41,7188	8,22398
Open-Mindedness	University	46	42,5435	8,89371
	Total	545	43,4495	8,59857
	Literate	188	22,3351	4,82634
	Primary Education	247	21,8097	4,46397
	High School	64	20,9219	4,36547
Systematicity	University	46	20,7609	3,74275
	Total	545	21,7982	4,54588
	Literate	188	25,9309	6,32206
	Primary Education	247	27,3846	6,07824
	High School	64	27,4375	7,16888
Self-Confidence	University	46	29,3478	6,24755
	Total	545	27,055	6,36979
	Literate	188	40,0957	6,81076
	Primary Education	247	42,0972	6,99584
	High School	64	41,125	7,86089
Inquisitiveness	University	46	42,5217	8,47936
	Total	545	41,3284	7,21801
Critical Thinking Dispositions	Literate	188	198,2679	28,29397
	Primary Education	247	199,3154	26,41415
	High School	64	196,7177	29,00641
	University	46	201,0298	26,54816
	Total	545	198,7937	27,34200

As seen in Table 10, the fathers' educational background of the students effect on their average critical thinking disposition score levels. To determine the importance of the differences between the fathers' educational background affect, a one way variance analyze test has been done and given in Table 11.

Table 11. The Average Scores of the Students' Critical Thinking Disposition Levels According to Their Fathers' Educational Background and One Way Variance Analyze Results

Statistical Variance Reference	df	SS	MS	F	p	Scheffe
Truth-Seeking	3	298,056	99,352	2,676	0,047	Not meaningful between the groups
	541	20088,7	37,133			
	544	20386,76				
Analyticity	3	280,472	93,491	1,909	0,127	-----
	541	26498,49	48,981			
	544	26778,96				
Open-Mindedness	3	423,716	141,239	1,92	0,125	-----
	541	39797,15	73,562			
	544	40220,86				
Systematicity	3	152,874	50,958	2,486	0,06	-----
	541	11088,92	20,497			
	544	11241,8				
Self-Confidence	3	515,601	171,867	4,313	0,005	Literate-University
	541	21556,75	39,846			
	544	22072,35				

Table 11.
(Cont.)

	3	499,786	166,595	3,237	0,022	Literate-Primary Education
Inquisitiveness	541	27842,42	51,465			
	544	28342,21				
Critical Thinking Disposition	3	625,053	208,351	,278	,842	-----
	541	406061,251	750,575			
	544	406686,304				

An interpretation analyze has been applied to determine whether these differences are meaningful or not. As the result of the interpretation analyze, the difference of the students' truth seeking average score according to their fathers' educational background is meaningful statistically ($F(3–541)=2,676$; $p<0,05$).).The students' truth seeking average score according to their fathers' educational background is not meaningful statistically.

The students' analyticity average score according to their fathers' educational background is not statistically meaningful ($F (3–541) =1,909$; $p>0,05$).

The students' open-mindedness average score according to their fathers' educational background is not statistically meaningful ($F (3–541) =1,920$; $p>0,05$). The students' systematicity average score according to their fathers' educational background is not statistically meaningful ($F (3–541) =2,486$; $p>0,05$).The students' self-confidence average score according to their fathers' educational background is

statistically meaningful (F(3–541)=4,313; p<0,05). The difference between the groups is also statistically meaningful according to Scheffe Test (p<0,01).

The students' inquisitiveness average score according to their fathers' educational background is statistically meaningful (F(3–541)=3,237; p<0,05). According to Scheffe Test results, the students whose fathers are literate or primary school graduated have a meaningful difference about the critical thinking disposition level statistically. (p<0,01).

The students' critical thinking disposition average score differences according to their fathers' educational background are not statistically meaningful (F(3–541)=0,278; p>0,05). According to these results the changes between the fathers' educational background variance and students' critical thinking disposition average score is not meaningful on statistics.

The statistical results above are similar to some other researches in the literature. For example, Aybek (2006) found that there are not any meaningful differences between the relationship of the students' fathers' educational background and their critical thinking dispositions. But Çekin (2012) had a research and the writer noticed that there is a meaningful difference between the students' critical thinking dispositions according to their fathers' educational background.

4.2.6. The Average Scores of the Students' Critical Thinking Disposition Levels According to Socio-Economic Status Perception

One another sub goal of this study was to determine if there is a change with the students' critical thinking disposition level according to their families' monthly

earnings. For understanding the changes, here the Table 12 contains the average of students' critical thinking disposition levels scores according to their families' monthly earnings and the standard deviations.

Table 12. The Average Scores of the Students' Critical Thinking Disposition Levels According to Socio-Economic Status Perception and the Standard Deviations

		N	M	SD
Truth-Seeking	Very low	230	23,2565	6,2425
	Low	167	22,497	5,75386
	Medium	89	20,4831	6,03609
	High	59	23,0847	6,22644
	Total	545	22,5523	6,12174
Analyticity	Very low	230	43,6043	7,2897
	Low	167	44,503	7,07352
	Medium	89	45,8427	5,97894
	High	59	46,4068	6,69565
	Total	545	44,5486	7,01613
Open-Mindedness	Very low	230	44,4043	8,96217
	Low	167	42,7246	8,31073
	Medium	89	41,9213	7,92468
	High	59	44,0847	8,61692
	Total	545	43,4495	8,59857

Table.12.(Cont.)

	Very low	230	22,1957	4,92041
	Low	167	21,7605	4,58942
	Medium	89	20,8539	3,74029
Systematicity	High	59	21,7797	3,83751
	Total	545	21,7982	4,54588
	Very low	230	26,2739	6,02025
	Low	167	26,497	6,39924
	Medium	89	29,0674	6,65001
Self-Confidence	High	59	28,6441	6,40787
	Total	545	27,055	6,36979
	Very low	230	40,7174	7,02666
	Low	167	40,9521	7,17913
	Medium	89	43,4944	6,90211
Inquisitiveness	High	59	41,5085	8,05021
	Total	545	41,3284	7,21801
Critical Thinking Disposition	Very low	230	198,5600	29,09257
	Low	167	197,0878	27,40850
	Medium	89	199,4502	24,15172
	High	59	203,5430	24,55248
	Total	545	198,7937	27,34200

As seen in the Table 12, the families' monthly earnings of the students effect on their average critical thinking disposition score levels. To determine the importance of the differences between the families' monthly earnings of the students affect, a one way variance analyze test has been done and given in the Table 13.

Table 13. The Average Scores of the Students' Critical Thinking Disposition Levels According to Socio-Economic Status Perception and One Way Variance Analysis Results

Statistical Variance Reference	df	SS	MS	F	p	Scheffe
Truth-Seeking	3	512,345	170,782	4,649	0,003	Very Low/Medium
	541	19874,42	36,736			
	544	20386,76				
Analyticity	3	558,182	186,061	3,839	0,01	Not meaningful between the groups
	541	26220,78	48,467			
	544	26778,96				
Open-Mindedness	3	529,112	176,371	2,404	0,067	-----
	541	39691,75	73,367			
	544	40220,86				
Systematicity	3	115,947	38,649	1,879	0,132	-----
	541	11125,85	20,565			
	544	11241,8				
Self-Confidence	3	701,736	233,912	5,922	0,001	Very Low/Medium
	541	21370,61	39,502			Low/Medium
	544	22072,35				
Inquisitiveness	3	528,969	176,323	3,43	0,017	Very Low /Medium
	541	27813,24	51,411			
	544	28342,21				
Critical Thinking Disposition	3	1867,679	622,560	0,832	0,477	-----
	541	404818,625	748,278			
	544	406686,304				

An interpretation analyze has been applied to determine whether these differences are meaningful or not. As the result of the interpretation analyze, the difference of the students' truth seeking average score according to socio-economic status perception is meaningful statistically (F (3–541) =4,649; p<0,05).). The students' truth seeking average score according to their families' monthly income is meaningful statistically according to Scheffe Test (p<0,01).

The students' analyticity average score according to their families' monthly income is statistically meaningful (F (3–541) =3,839; p>0,05). The difference between the groups is not statistically meaningful according to Scheffe Test (p>0,01).

The students' open-mindedness average score according to their families' monthly income is not statistically meaningful (F (3–541) =2,404; p>0,05).

The students' systematicity average score according to their families' monthly income is not statistically meaningful (F (3–541) =1,879; p>0,05). The students' self-confidence average score according to their families' monthly income is statistically meaningful (F (3–541) =5,922; p<0,05). According to Scheffe Test results, the students whose family earning is medium and whose family earning is very low and whose family earning is low have different critical dispositions. And according to the same test results these differences are meaningful (p<0,01).

The students' inquisitiveness average score according to their families' monthly income is statistically meaningful (F (3–541) =3,430; p<0,05). According to Scheffe Test results, the students whose family earning is medium and whose family earning is very low and whose family earning is between low have different critical

dispositions. And according to the same test results these differences are meaningful ($p<0,01$).

The students' critical thinking disposition average score according to their families' monthly income is not statistically meaningful ($F (3–541) =0,832$; $p>0,05$). According to these results, we have seen that the students' critical dispositions according to their families' monthly income is not meaningful statistically.

The statistical results above are similar to some other researches in the literature. For example, Aybek (2006) found that there are not any meaningful differences between the relationship of the students' families' monthly income and their critical thinking dispositions.

On the other hand, Çekin (2012) had a research and the writer noticed that there is a meaningful difference between the students' critical thinking dispositions according to their families' monthly income. After his statistical calculations, Çekin (2012) found that the students' average critical thinking disposition score is (4,03) whose family monthly earning is between 1001-2000 TL. Also he calculated the students' average critical thinking disposition score is (4, 35) whose family monthly earning is between 2001-3000 TL. And he thought that the students' whose family monthly earning is between 2001-3000 TL is higher than the students' whose family monthly earning is between 1001-2000 TL and he said that this difference is meaningful statistically ($p<.05$).

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

In this chapter the results of the analysis about the critical thinking skills were presented accordingly and some recommendations were given.

5.1. Conclusion

In this study the results gathered have been listed below according to findings about critical thinking dispositions of students.

I. The critical disposition score average of the attendees totally is at medium level. We can say that the analyticity score average and inquisitiveness score average of the students are in high level. The truth-seeking average score, open-mindedness average score, systematicity average score, self-confidence average score and critical thinking dispositions average score are in the medium levels.

II. The survey also contains the differences between the students' genders. The average critical disposition of the female students is not statistically meaningful.

III. The research was about understanding the relationship between the critical thinking disposition and their genders. Our results showed that the genders do not effect on the critical thinking disposition but we

have seen that the boys' truth seeking average score, average open-mindedness score, and self-confidence average score are higher than the girls. Also the results showed that the female students' average systematicity score, average inquisitiveness' score and analyticity average score are higher than male students.

IV. Another result showed that the school area do not have effect on the average critical thinking score of the students. The relationship between the school environments and critical thinking disposition of the students has been surveyed. As seen in the results, the rural school's students' average truth-seeking score, average open-mindedness score and average systematicity score were higher than the children whose schools are in the city center. The average inquisitiveness score of the urban school students, the average self-confidence score and average inquisitiveness score were higher than others. The critical thinking disposition score of the urban school students were higher than the average critical thinking disposition score of the rural school students but the statistical calculations showed that this difference is not meaningful.

V. The average critical thinking disposition score differences according to the school grades were statically meaningful according to Scheffe Test. The test results showed that the 6^{th} grade students' average critical thinking disposition score was higher than 7^{th} and 8^{th} grade students. Calculations showed that the school grades of the students effect on their average critical thinking disposition score levels. To

determine these differences are meaningful or not, the interpretation analyze has been applied. As the results of the interpretation analyze, it was seen that the students' average truth seeking score, difference in the average open-mindedness score, average self-confidence score and average systematicity score according to their school grades were meaningful. But the difference in the average analyticity score of the students according to their school grades was not meaningful statistically. 6th grade students' critical thinking dispositions can be higher because of the education system in Turkey. We can say that as the child grows up, the education system lessens the critical thinking dispositions.

VI. According to mothers' and fathers' educational background, the test results showed that there is not a statistically meaningful difference for the average critical thinking disposition of the students. The students' analyticity average score according to their mothers' educational background is not statistically meaningful. The students' self-confidence average score, open-mindedness average score, inquisitiveness average score according to their mothers' educational background were statistically meaningful. The results also showed that the students' critical thinking disposition average score differences according to their mothers' educational background are not statistically meaningful.

VII. The students' truth seeking average score, self-confidence average score and open-mindedness average score according to their fathers'

educational background is not meaningful statistically. The students' self-confidence average score and inquisitiveness average score according to their fathers' educational background were statistically meaningful. Also students' critical thinking disposition average score differences according to their fathers' educational background are not statistically meaningful.

VIII. The students' analyticity average score, self-confidence average score and inquisitiveness average score according to their families' monthly income were statistically meaningful. The students' open-mindedness average score, systematicity average score and average critical thinking disposition score according to their families' monthly income were not statistically meaningful.

IX. At the end of the survey, the relationship between the families' monthly income and students' critical thinking disposition has been calculated. The test results showed that there is not a meaningful difference about the critical thinking disposition average score according to their family incomes.

5.2. Recommendations

Recommendations about the result of the study:

1. In order to increase the self-confidence of the students, the activities based on practices should be increased.

2. Education programs and curriculums should be developed to make students acquire critical thinking disposition.
3. The critical thinking skills may be improved by the families' and the teachers' motivation so the courses and seminars can be held to increase their critical thinking skills.
4. The critical thinking ability starts with a disposition. But if the child cannot ask questions to its parents and teachers, this disposition disappears and this mostly happens when the child is in adolescence period (6^{th}, 7^{th} and 8^{th} grades of the school). That's why the teacher and parents attitudes should let the children ask and investigate.
5. The personality of the human places in the adolescence period. So the gained critical thinking skill helps students to learn more in these ages. The lectures would be well learned and also the other skills -like creativity, problem solving- develop with the critical thinking. So, the lectures, subjects and activities in the classroom should be more based on critical thinking.
6. The teachers are vital factors in learning period of the students so teachers' information about the critical thinking skills should be enriched and techniques how to teach it in the classroom should be taught by professionals via conferences.

Suggestions for further studies:

I. The studies similar to this can be done in other cities or across Turkey. The questionnaire can be applied more than 1000 students and more schools.

II. The study can be held with high school students or university students and these groups can be compared.

III. The survey can contain the reading book routine of the students.

IV. This study can be repeated with different demographic variables.

V. The studies about critical thinking should also contain qualitative data not only quantitative.

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APPENDICES

APP-1.Personal Information Form

APP-2.CCTDI (California Critical Thinking Skills Disposition Inventory)

PERSONAL INFORMATION FORM

Açıklama: Aşağıda kişisel bilgilerinizle ilgili sorular yer almaktadır. Lütfen bu soruları kendinize uygun olarak cevaplayınız, hiç bir soruyu boş bırakmayınız.

Cinsiyetiniz: Kız ○ Erkek ○

Sınıfınız: 6 ○ 7 ○ 8 ○

Anne Eğitim Durumu: Okur-Yazar ○ İlköğretim ○ Lise ○ Üniversite ○

Baba Eğitim Durumu: Okur-Yazar ○ İlköğretim ○ Lise ○ Üniversite ○

Algılanan Aylık Gelir Durumu: Çok Düşük ○ Düşük ○ Orta ○ Yüksek ○

Okulunuzun Bulunduğu Yer: Kasaba ○ Merkez ○

CCTDI (California Critical Thinking Skills Disposition Inventory)

Aşağıdaki ifadelerin sizi ne kadar tanımladığını düşünerek, bu ifadelere ne ölçüde katıldığınızı aşağıdaki ölçek üzerinde değerlendiriniz. Değerlendirmelerinizi sizi tam olarak yansıtacak şekilde yapınız (Sample Questions).

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

1. Tüm hayatım boyunca yeni şeyler çalışmak harika olurdu	1	2	3	4	5	6
3. Cevap vermeye kalkışmadan önce, her zaman soruya odaklanırım.	1	2	3	4	5	6
8. Diğer insanlar entelektüel merakımı ve araştırıcı kişiliğimi takdir ederler.	1	2	3	4	5	6
12. Kişisel harcamalarımın dikkatlice kaydını tutmak benim için önemlidir.	1	2	3	4	5	6
13. Büyük bir kararla yüz yüze geldiğimde, ilk önce, toplayabileceğim tüm bilgileri toplarım.	1	2	3	4	5	6
17. İnandıklarımın tümü için dayanaklarım olmalı.	1	2	3	4	5	6
23. İnsanlar benim karar vermeyi oyaladığımı düşünürler.	1	2	3	4	5	6
30. Zorlayıcı şeyler öğrenmeye istekliyimdir.	1	2	3	4	5	6
35. Diğerlerinin düşüncelerini anlama yeteneğimden dolayı takdir edilirim.	1	2	3	4	5	6
40. Elimizdeki sorun hakkında açık bir fikir edinmek ilk önceliklidir.	1	2	3	4	5	6
44. Karmaşık problemlere düzenli yaklaşımımla tanınırım.	1	2	3	4	5	6
48. Diğer insanlar, sorunun ne zaman çözümleneceği kararını bana bırakırlar.	1	2	3	4	5	6
51. Karmaşık problemlerin çözümüne yönelik düzenli planlar geliştirmede iyiyimdir.	1	2	3	4	5	6