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# Determining the Relationship between High School Students' Critical Thinking Dispositions and Reflective Thinking Skills

**Atilla Ergin**[1]
**Yelkin Diker Çoşkun**[2]
**Esra Mutlu**[3]
**Simge Kambur**[4]
**Büşra Betül Altunbaş**[5]

**Abstract**

21st-century learners live more digitally and work with a fuzzy mind. Together with this century, we deal with individuals with new and different thinking styles. The current situation affects the thinking skills of high school students during a critical period such as adolescence. This effect forces us to ask the question. Is there a relationship between high school students' critical thinking dispositions and reflective thinking skills? Therefore, the purpose of this study is to determine the relationship between high school students' critical thinking dispositions and reflective thinking skills in terms of some demographic variables. This study, which was designed in a descriptive survey model, was conducted with 388 participants in a high school in the Kartal district of Istanbul in 2019/2020 academic year. In research, personal information form, California critical thinking dispositions inventory and reflective thinking level scale was used as data collection tools. The data obtained were analysed by the SPSS program and then analysed and interpreted the results. The analysis of the data was used Spearman correlation coefficient, point biserial correlation, Mann Whitney U test and Kruskal Wallis H Test. According to the findings, there is a positive and intermediate relationship between critical thinking dispositions and reflective thinking skills. In addition to this, critical thinking dispositions differ in terms of field, reading frequency, web usage purpose and academic level perception of the participants. Reflective thinking skills differ in terms of field, gender, reading frequency, web usage purpose and academic level perception of the participants.

**Keywords**: Critical thinking dispositions, reflective-thinking skills, high school students

[1] PhD Student, Yeditepe University, Institute of Educational Sciences, Doctoral Program in Curriculum and Instruction, İstanbul-TURKEY, E-mail: aergin@itu.edu.tr ORCID ID: 0000-0003-0804-2777

[2] Assoc. Prof.,Yeditepe University, Institute of Educational Sciences, Doctoral Program in Curriculum and Instruction, İstanbul-TURKEY, E-mail: ydiker@yeditepe.edu.tr ORCID ID: -0002-5133-6482

[3] PhD Student, Yeditepe University, Institute of Educational Sciences, Doctoral Program in Curriculum and Instruction, İstanbul-TURKEY, E-mail: esrasezginn@gmail.com ORCID ID: 0000-0002-9877-0657)

[4] PhD Student, Yeditepe University, Institute of Educational Sciences, Doctoral Program in Curriculum and Instruction, İstanbul-TURKEY, E-mail: simge972012@gmail.com ORCID ID: 0000-0002-8740-2322

[5] PhD Student, Yeditepe University, Institute of Educational Sciences, Doctoral Program in Curriculum and Instruction, İstanbul-TURKEY, E-mail: busrabetula@gmail.com (ORCID ID: 0000-0002-3295-0348)-

## Introduction

High school age is a period that includes adolescence in which students step from childhood to youth. Through thinking styles, individuals exhibit one of the behaviours of decision-making, planning, problem-solving, judging or taking action. (Eğmir& Gürbüz, 2018). Individuals who can critically think seek solutions by questioning the situations they face. (Epstein&Kernberger, 2006). Effective use of thinking styles is important in solving the problems we face in our daily lives. With critical thinking, individuals can choose which of the information is useful and make their own decision.

The word "critical" derives from two Greek words "criticos" and "criterion." "Criticos" means discerning judgments and "criterion" means standards. In broad outline, the word means the development of "discerning judgment based on standards" (Özmen, 2006). Facione (2007) defines critical thinking as a rationale, which has a purpose such as solving a problem, interpreting what something, means etc. He also introduces an important aspect of critical thinking. That is to say, that "critical thinking" is not a competition but a collaborative effort (Facione, 2007). John Dewey defined modern thinking in critical thinking. In his definition of reflective thinking, Dewey defines critical thinking as in the light of active, persistent, opposing views or supporting evidence, and identifies the development of careful thinking, without the prejudice of belief or knowledge (Fisher, 2001). Critical thinking is a unique way of thinking. An individual, who has systematic thinking and habit, intellectual lowbrow, empathy, open-mindedness, and courage, examines the facts in intellectual integrity. To put intellectual standards or criteria in the thought e.g. to define the reasons for the criteria, to give the idea to success or the evaluation step, to specify precise, accurate, relevant, deep, meticulous, adequate, open standards). To support the structuring of thinking, to be aware of the components of rational thinking, to transform any component into a disciplined process, to bring standards to thinking, to evaluate the process by the continuous review, to use criteria for this purpose are the things to decide on the effectiveness thinking. (Rudd, 2007). Ennis (2011) listed the characteristics of the critical thinker as follows:

A critical thinker is open-minded and gives importance to alternatives.

Wants to have knowledge.

Evaluates the reliability of resources.

Reveals causes, assumptions and results.

Asks appropriate descriptive questions.

Judges the nature of a judiciary, including reasons, assumptions, evidence, and degrees of support for conclusions.

Questions the truth in a fair way, takes a logical position about an event or belief and can improve this position.

Plausibly formulates hypotheses.

Manages and plans experiences.

Defines the concepts in context.

Presents the results carefully when promised.

Integrates all the above aspects of critical thinking.

Kökdemir (2000) stated the characteristics of individuals with critical thinking skills as follows: people with critical thinking skills have effective communication language, can measure the reliability of resources, have the ability to ask effective questions, have metacognition, discriminate prejudice, and recognize cognitive errors (cited in Korkmaz,2018).

Students need to know how to use the information given to them. In particular, high school students can benefit from the functional use of information while preparing for academic life. (Korkmaz& Yeşil, 2009). For the critical thinking process to proceed correctly, the individual should take responsibility for the thinking process, monitor, and evaluate this process. (Aryani, Rais&Wirevan, 2018). Being aware of oneself thinking process, which is a prerequisite for critical thinking, is directly

related to reflective thinking. Reflective thinking, which is a multidimensional concept involving different skills, and critical thinking skills are intertwined. (Coy&San o, 2012; Shermiss, 1999; Ghanizadeh, 2017).

Reflective thinking is a concept put forward by John Dewey, who carried out basic studies in education on pragmatic philosophy. Dewey (1910) described reflection as a way of thinking; It is an active, continuous and demanding belief or assumed information form which is supported by this way of thinking and in the light of future results (cited Lee, 2005). Reflection is the most important aiding factor in creating solutions for the problems that arise and making the right decision for the solution and it should be developed from this point of view. (Dewey, 1933, Schön, 1987; Ünver, 2003; Ilıman, 2018). Mezirow (1991) defined reflective thinking as follows: "Reflective thinking is a very important part of the learning process that combines past interpretations and new experiences to construct conceptualizations of the future by performing different functions to meet the needs of the individual." According to him, reflective thinking is at the centre of all learning methods such as problem-solving and validity testing. He also stated that reflective thinking consists of four different levels. These are habits, conscious actions (reflection) without reflection, conscious action (reflection) with reflection, and critical reflection. At the end of the effective reflective thinking process, problems can be solved and the experience gained can be shared in the related field (Semerci, 2007). According to Dewey (1933), reflective thinking is continuous, careful and effective thinking. The prerequisite for this way of thinking is that the subject is shaped intensively in mind. There are two elements in the process of reflective thinking: First; confusion, hesitation and doubt; and second is the idea-oriented research and investigation presented (Dewey, 1933). As Dewey mentioned (1933), reflective thinking has four dimensions: 1. The sequence of views in reflective thinking is not simple. Opinions have consecutive, meaningful relationships. An opinion has a connection with the opinion that precedes it and the opinion that follows it and has a causal relationship. 2. Emotions and beliefs related to concepts, phenomena and events are emphasized in reflective thinking. The purpose of reflective thinking is to make and improve the emotions that an individual feel. 3. Reflective thinking is based on beliefs. It causes the logical appropriateness of ideas, thoughts and perceptions, and their acceptance or rejection. 4. As a necessity of reflective thinking, nature, conditions and foundations of a belief should be deliberately explored. (cited by Ilıman,2018).

While there are many pieces of research about the pre-service teachers' critical thinking dispositions in our country, there is not much research at the high school level. When the researches were examined, neither the secondary education level nor the study of both skills was found. In this study, critical thinking dispositions and reflective thinking skills are taken together to emphasize the importance of how high school students can have an impact on community life and how they can take themselves and the society one-step further (Fuad, et al. 2017).

**Significance and Purpose of the Research**

Adolescence, which is a period of transition to adulthood, is a stage in which biological, psychological, mental and social development and maturation occur. Since both positive development and stress are experienced together in adolescence, the young person tries to build an identity during this period and makes a self-perception in this identity process and makes evaluations about the past and plans for the future. The beginning and ending time of adolescence may vary according to the individual, country and social environment. Adolescence is defined as the period between the ages of 10-19 according to the World Health Organization (WHO, 2018). In our country, the 14-18 age group covers the middle period of adolescence and has a very important place in the human life cycle. This is the high school period of adolescents in this age group. In the literature, adolescence is defined as the period of changes in cognitive abilities of a person's behaviour and adolescents can be educated and shaped in this period.

Thinking is one of the most distinctive features that distinguish humans from other living things. Thinking, which is accepted as an element that helps individuals to live more comfortably and consciously, to solve the problems they face more easily and most appropriate and to develop their social and individual, is an important skill for the individual. The individual makes use of thinking to determine the purpose of life, set goals in reaching the goal and make intelligent decisions. The

prerequisite for gaining the power of contemporary, creative, critical, scientific and democratic thinking, assuming responsibility, looking at the problems in a multi-dimensional way, examining the opposing views, providing conciliatory and tolerant characteristics, and determining the type of thinking skills that an individual has in these dimensions to prepare. Once these situations are met, the individual's critical thinking skills can be improved. Because critical thinking is not one of the inherited characteristics of the individual; it can be learned and improved.

In reflective thinking, the aim is to first understand a situation or a problem and then solve the problem better. Reflective thinking occurs when a particular problem is detected. It is therefore evident that reflective thinking can be best observed in the problem-solving process. It is understood that problem solving is one of the most important skills that an individual should have to provide an effective solution for all the problems faced by the individual. (Kızılkaya and Aşkar, 2009). In this respect, it is seen that it is very important to examine in detail the reflective thinking for problem-solving. In the literature, it is found out that there are many studies about reflective thinking skills for problem-solving and critical thinking skills. Previously, there are more studies on teachers and pre-service teachers (Baki, Güç, & Özmen, 2012; Özdemir, Buyruk& Güngör, 2018; Güven&Kürüm, 2004; Şen, 2009; Şahin, Tunca& Ulubey, 2014; Bağcı& Şahbaz, 2012; Açışlı& Açışlı, 2015; Aybek& Aslan, 2017), on primary schools (Bilgiç, 2017; Baş, 2013; Eğmir& Ocak, 2018), on secondary school students. (Tat, 2015; Gündoğdu, 2017; Sarıcan, 2017; Babaoğlu, 2018; Aydın, 2015). There is a large amount of studies done with students' study of science and art centres and with gifted students (Gözeten, 2017; Kaplan, Doruk, ve Öztürk, 2017; Saygılı ve Atahan, 2014; Güneş, 2015), with university students (Sağır& Bertiz, 2016; Gezgin, Yılmaz and Ercan, 2016). However; There are few studies with high school students. (Baş & Kıvılcım, 2013). Besides, no study in the literature establishes the relationship between high school students' critical thinking dispositions, and reflective thinking skills in terms of some demographic variables.

Studies on the reflective thinking and critical thinking skills of high school students are very important. The students who have completed their schooling and come face to face with real life must gain their critical thinking skills and reflective thinking skills. Knowing how much of the required skills our young people who have completed compulsory education and lead them will be guided in terms of knowing whether education has achieved its goals. For this purpose, it is thought that investigating the relationship between high school students' critical thinking dispositions, and reflective thinking skills in terms of some demographic variables will shed light on the future studies by revealing the current situation.

The purpose of this research is to determine the relationship between high school students' critical thinkingdispositions, and reflective thinking skills in terms of some demographic variables. For this purpose, the current research seeks answers to the following questions:

1. What are high school students' critical thinking dispositions and reflective thinking skills?
2. Does the relationship between high school students' critical thinking dispositions and reflective thinking skills differ in terms of gender, grade, field, mother's education level, father's education level, annual book reading frequency, internet usage purpose, internet usage frequency and academic proficiency level?
3. Is there a relationship between high school students' critical thinking dispositions and reflective thinking skills?

## Method

This section includes research model, study group, data collection instruments and data analysis.

### Research Model

This study was designed in a descriptive survey model.According to Büyüköztürk et al. (2012), studies examining relationships and connections are mostly called associational research. These studies focus on testing differences between groups or exploratory, predictive relationships between variables. As it is aimed to investigate whether the relationship between critical thinking dispotions and reflective thinking skills of high school students differs according to gender, grade, field, mother's education level, father's education level, annual book reading frequency, internet usage purpose, internet usage frequency and academic proficiency level, the research was carried out within the framework of descriptive research model. The universe of the research is limited to high school students studying in

a high school in Kartal, and the data is limited to the items included in two measuring tools (critical thinking scale and reflective thinking scale).

**Study Group**

The study group of this research consists of 388 11th and 12th-grade high school students from 3 different fields (Science & Maths, Mother Language & Maths, Foreign language) who are continuing their education in a high school located in the Kartal district of Istanbul in 2019-2020 academic year. The convenience sampling was used in this study. In the easily accessible case sampling technique, the researcher chooses a situation that is close and easily accessible (Yıldırım & Şimşek, 2011). Table 1 presents the distribution of the study group, according to different independent variables.

**Table 1.** The distribution of the study group, according to demographic variables

| **Description** | **f** | **%** |
|---|---|---|
| ***Gender*** | | |
| Male | 177 | 45.62 |
| Female | 211 | 54.38 |
| **Total** | **388** | **100.00** |
| ***Grade*** | | |
| Third-year ($11^{th}$ grade) | 245 | 63.14 |
| Fourth- year ($12^{th}$ grade) | 143 | 36.86 |
| **Total** | **388** | **100.00** |
| ***Field*** | | |
| Science & Maths | 194 | 50.00 |
| Mother Language & Maths | 98 | 25.26 |
| Foreign language | 96 | 24.74 |
| **Total** | **388** | **100.00** |
| ***Mother's Education level*** | | |
| Illiterate | 9 | 2.32 |
| Primary School | 132 | 34.02 |
| Secondary School | 97 | 25.00 |
| High School | 103 | 26.55 |
| University or College | 47 | 12.11 |
| **Total** | **388** | **100.00** |
| ***Father's Education level*** | | |
| Illiterate | 6 | 1.55 |
| Primary School | 94 | 24.23 |
| Secondary School | 112 | 28.87 |
| High School | 118 | 30.41 |
| University or College | 58 | 14.95 |
| **Total** | **388** | **100.00** |
| ***Annual book reading frequency*** | | |
| One-two books | 74 | 19.07 |
| Three-Five books | 128 | 32.99 |
| Six-Ten books | 88 | 22.68 |

| | | |
|---|---|---|
| Eleven books and above | 98 | 25.26 |
| **Total** | **388** | **100.00** |
| ***Internet usage purpose*** | | |
| Do homework | 47 | 12.11 |
| Play a game | 64 | 16.49 |
| To follow social media (Facebook, Twitter, etc.) | 135 | 34.79 |
| Listen to music, watch movies, videos | 97 | 25.00 |
| Research | 45 | 11.60 |
| **Total** | **388** | **100.00** |
| ***Internet usage frequency*** | | |
| Less than one hour per week | 9 | 2.32 |
| 1-5 hours per week | 52 | 13.40 |
| 6-10 hours per week | 78 | 20.10 |
| 10-20 hours per week | 113 | 29.12 |
| More than 20 hours per week | 136 | 35.05 |
| **Total** | **388** | **100.00** |
| ***Academic proficiency level*** | | |
| Insufficient level | 49 | 12.63 |
| Medium level | 263 | 67.78 |
| Sufficient level | 76 | 19.59 |
| **Total** | **388** | **100.00** |

The results in Table 1 indicate that participants, 45.62% are male and 54.38% are female; 63.14% is 11th grade and 36.86% are 12th grade; 50.00% are in science & math field, 25.26% are in mother Language & math field and 24.74% are in the foreign language field. It is indicated that 2.32% participants' mothers are illiterate, 34,02% are primary school graduated, 25% are secondary school graduated, 26,55% are high school graduated and 12.11% are university or college graduated. 1.55% participants' fathers are illiterate, 24.23% are primary school graduated, 28.87% are secondary school graduated, 30.41% are high school graduated and 14.95% are university or college graduated. 19.07% of participant read one or two books, 32.99% read three-five books, 22.68% read six-ten books, 25.26% read eleven books or above in a year. The purpose internet usage of the participants, 12.11% are doing homework, 16.49% are playing a game, 34.79% are following social media (Facebook, Twitter, etc.), 25.00% are listening to music, watching movies, videos, 11.60% are researching. 2.32% of the participants use the internet less than one hour per week, 13.40% use 1-5 hours per week, 20.10% use 6-10 hours per week, 29.12% use 10-20 hours per week and 35.05% use more than 20 hours per week. 12.63% of the participants think she/he is at the insufficient academic level, 67.78% think she/he is at the medium academic level, 19.59% think she/he is at sufficient academic level.

**Data Collection Instruments**

In this study, personal information form, adjective based personality scale, California Critical Thinking Dispositions Inventory and Reflective Thinking Level Scale were used as data collection instruments. Detailed information about the scales is presented below.

*Personal Information Form:* In the personal information form, high school students were asked questions about gender, grade, field, mother's education level, father's education level, annual book reading frequency, internet usage purpose, internet usage frequency and academic proficiency level.

*California Critical Thinking Dispositions Inventory:* The original English version of the California Critical Thinking Disposition Inventory CCTDI (Facione, Facione, and Giancarlo 1998) measures a student's propensity to think critically. The index is comprised of 75 questions that represent 7 categories or scales: truth-seeking, open-mindedness, analyticity, systematicity, critical thinking self-

confidence, inquisitiveness, and cognitive maturity. These 7 "habits of mind" can be thought of as the elements in our character that impel us toward using critical thinking skills. Turkish Version of the California Critical Thinking Disposition Inventory CCTDI-T (Kökdemir, 2003) has been administered to identify preservice teachers' attitudes. After translating to Turkish and analyzing its reliability and validity, it changed to 51 items and 6 factors, which are Analyticity, Open-mindedness, Inquisitiveness, Self-confidence, truth-seeking, Systematicity in this study, the total Cronbach's alpha coefficient of the inventory was 0.79. The Cronbach's alpha coefficient of the sub-scales was 0.37 for truth- seeking, 0.75 for open-mindedness, 0.71 for analyticity, 0.22 for systematicity, 0.62 for self-confidence and 0.62 for inquisitiveness. (Kökdemir, 2003).

*Reflective Thinking Level Scale*: Reflective Thinking Level Scale, which was developed by Kember et al. (2000), was adapted to Turkish by Başol and Evin Gencel (2013) in their study, which consisted of pre-service teachers. The 5-point Likert scale consists of 16 items and has four sub-dimensions including habit, comprehension, reflection and critical reflection. Cronbach's alpha reliability coefficient was found to be between .62-.76 and alpha reliability coefficient of this scale was calculated between .63-.68.

**Data analysis**

The data of critical thinking dispositions and reflective thinking skills were analysed through non-parametric tests because the data sets are not normally distributed as seen table 2. In analyses,Mann Whitney U and Kruskal Wallis H tests were used for determining whether there is a statistically significant difference between the means in unrelated groups, spearman brown and the point biserial correlation coefficient were used for testing the relationships. If a significant difference was found in the results of the analyses, the effect values were calculated and interpreted.

The test of normalityfor the distributionsof the critical thinking dispositions and reflective thinking skill scores are as follows:

**Table 2.** Test of normality of critical thinking dispositions and reflective thinking skills

| | | **Kolmogorov-Simirnov** | | |
|---|---|---|---|---|
| | **N** | **Statistic** | **df** | **P** |
| **Critical thinking dispositions** | 388 | .079 | 388 | .00 |
| **Reflective thinking skills** | 388 | .084 | 388 | .00 |

Since the number of participants was above fifty (n = 388; n> 50), Kolmogorov-Simirnov test was reported and the results showed that the distributions werenot normally distributed. (p <.01)

## Findings

In this section, the findings of the research are presented in a certain order and tables according to the research questions and the results of the data are interpreted.

The findings of the first research question (What are high school students' critical thinking dispositions and reflective thinking skills?) have been shown below.

High school students' critical thinking dispositions and reflective thinking skills were examined and the findings have been shown in Table 2.

**Table 3.** High school students' critical thinking dispositions and reflective thinking skills

| | **N** | **X̄** | **S** | **Minimum** | **Maximum** |
|---|---|---|---|---|---|
| **Critical thinking dispositions** | 388 | 199.06 | 30.44 | 60/64 | 306/360 |
| **Reflective thinking skills** | 388 | 53.24 | 9.32 | 16/51 | 80/306 |

The results in Table 3 indicate that the average of critical thinking dispositions level is 199.06 and the standard deviation of the same variable is 30.44 ($\bar{X}$=199,06, s=30,44). The results of critical thinking dispositions are approximately on average. The highest possible value of this variable is 360 when the highest score of the study group is 306 and the lowest possible value is 60 when the lowest score of the study group is 64.

The average of reflective thinking skills level is 53.24 and the standard deviation of the same variable is 9.32 ($\bar{X}$=53,24, s=9,32). The results of reflective thinking skills are below average. The highest possible value of this variable is 306 when the highest score of the study group is 80 and the lowest possible value is 16 when the lowest score of the study group is 51.

The findings of the second research question (Do the relationship between high school students' critical thinking skills and reflective thinking skills differ in terms of gender, grade, field, mother's education level, father's education level, annual book reading frequency, internet usage purpose, internet usage frequency and academic proficiency level?) is given below.

Firstly, critical thinking skills scores are reported below.

**Table 4.** Kruskall Wallis H results of students' critical thinking disposition levels in terms of field

| **Field** | **N** | **Mean Rank** | **SD** | **$X^2$** | **P** | **Significant difference** | **d** |
|---|---|---|---|---|---|---|---|
| Science&Maths. | 194 | 180.97 | 2 | 6.213 | .045 | Science&Maths - Foreign Language | 32.82 |
| Mother Language&Maths. | 98 | 202.04 | | | | | |
| Foreign Language | 96 | 214.15 | | | | | |
| Total | 388 | | | | | | |

As seen in Table 4 students' critical thinking disposition levels differ significantly according to the field, X2 (SD=2, n=388) =6.213, p<.05. When the order of the groups' averages is taken into consideration, it is seen that the students of the field of foreign language have the highest critical thinking skills. This is followed by the field of mother language and mathematic and then science and mathematics. Tukey test was used to determine the difference between the groups where homogeneity of variance was not provided. As a result of this analysis, it can be said that there is a significant difference between the foreign language and science and mathematics. The effect size for groups is high.

**Table 5.** Man Whitney U results of students' critical thinking disposition levels in terms of gender

| **Gender** | **N** | **Mean Rank** | **Rank Sum** | **U** | **p** |
|---|---|---|---|---|---|
| Male | 177 | 193.75 | 34293.00 | 18540.00 | .903 |
| Female | 211 | 195.13 | 41173.00 | | |
| Total | 388 | | | | |

According to the data in Table 5critical thinking disposition levels of students do not differ significantly in terms of gender, U=18540.00, p>.05.

**Table 6.** Man Whitney U results of students' critical thinking disposition levels in terms of grade

| **Grade** | **N** | **Mean Rank** | **Rank Sum** | **U** | **p** |
|---|---|---|---|---|---|
| $11^{th}$ | 245 | 198.12 | 48540.00 | 16630.00 | .405 |
| $12^{th}$ | 143 | 188.29 | 26926.00 | | |
| Total | 388 | | | | |

According to the data in Table 6 critical thinking disposition levels of students do not differ significantly in terms of grade, U=16630.00, p>.05.

**Table 7.** Kruskall Wallis H results of students' critical thinking disposition levels in terms of mother education level

| Mother Education Level | N | Mean Rank | SD | $X^2$ | P |
|---|---|---|---|---|---|
| Illiterate | 9 | 197.61 | 4 | 5.950 | .203 |
| Elementary graduated | 132 | 193.03 | | | |
| Secondary graduated | 97 | 183.28 | | | |
| High school graduated | 103 | 190.32 | | | |
| University graduated | 47 | 230.36 | | | |
| Total | 388 | | | | |

As seen in Table 7 students' critical thinking disposition levels do not differ significantly according to mother education level, $X^2$ (SD=4, n=388) =5.950, p>.05.

**Table 8.** Kruskall Wallis H results of students' critical thinking disposition levels in terms of father education level

| Father Education Level | N | Mean Rank | SD | $X^2$ | P |
|---|---|---|---|---|---|
| Illiterate | 6 | 164,25 | 4 | 1.604 | .808 |
| Elementary graduated | 94 | 190,28 | | | |
| Secondary graduated | 112 | 195,17 | | | |
| High school graduated | 118 | 191,69 | | | |
| University graduated | 58 | 208,90 | | | |
| Total | 388 | | | | |

As seen in Table 8 students' critical thinking disposition levels do not differ significantly according to father education level, $X^2$ (SD=4, n=388) =1.604, p>.05.

**Table 9.** Kruskall Wallis H results of students' critical thinking disposition levels in terms of reading frequency

| Reading Frequency | N | Mean Rank | SD | $X^2$ | P | Significant difference | d |
|---|---|---|---|---|---|---|---|
| 1-2 per a year | 75 | 176.75 | 3 | 15.722 | .001 | 1-2 per a year - 11 and above per a year | 1.72 |
| 3-5 per a year | 128 | 175.04 | | | | | |
| 6-10 per a year | 88 | 195.99 | | | | 3-5 per a year - 11 and above per a year | 1.79 |
| 11 and above per a year | 97 | 230.37 | | | | | |
| Total | 388 | | | | | 6-10 per a year - 11 and above per a year | 1.28 |

As seen in Table 9 students' critical thinking disposition levels differ significantly according to reading frequency, $X^2$ (SD=3, n=388) =15.722, p<.05.When the order of the groups' averages is taken into consideration, it is seen that the students who read at least 11 books have the highest critical thinking skills. The others follow this. Tukey test was used to determine the difference between the groups where homogeneity of variance was not provided. As a result of this analysis, it can be said that there is a significant difference between 11 and above per a year and the other frequencies. The effect size for eachgroup is high.

**Table 10.** Kruskall Wallis H results of students' critical thinking disposition levels in terms of purpose of web using

| Purpose | N | Mean Rank | SD | $X^2$ | P | Significant difference | d |
|---|---|---|---|---|---|---|---|
| Making homework | 47 | 180.84 | 4 | 15.326 | .004 | Making homework - Researching | 2.29 |
| Playing | 64 | 189.83 | | | | | |
| Following social media | 135 | 185.42 | | | | Playing - Researching | 2.23 |
| Listening music or watching video | 97 | 188.50 | | | | | |
| Researching | 45 | 255.59 | | | | Following social media - Researching | 2.86 |
| Total | 388 | | | | | | |
| | | | | | | Listening music or watching video - Researching | 2.26 |

As seen in Table 10 students' critical thinking disposition levels differ significantly according to the purpose of web using variable, $X^2$ (SD=4, n=388) =15.326, p<.05.When the order of the groups' averages is taken into consideration, it is seen that the students who use the internet for searching have the highest critical thinking skills. The students who use internet for playing, listening to music or watching videos, following social media and lastly making homework, follow this. Tukey test was used to determine the difference between the groups where homogeneity of variance was not provided. As a result of this analysis, it can be said that there is a significant difference between the students researching and the others. The effect size for each group is high.

**Table 11.** Kruskall Wallis H results of students' critical thinking disposition levels in terms of web usage frequency

| Web Usage Frequency (per a week) | N | Mean Rank | SD | $X^2$ | P | Significant difference | d |
|---|---|---|---|---|---|---|---|
| Below 1 hour | 9 | 138.61 | 4 | 22.944 | .000 | Below 1 hour per week - Above 20 hours per week | 3.42 |
| 1-5 hours | 52 | 184.10 | | | | | |
| 6-10 hours | 78 | 155.98 | | | | 1-5 hours per week - Above 20 hours per week | 1.20 |
| 10-2 hours | 113 | 191.95 | | | | | |
| Above 2 hours | 136 | 226.39 | | | | 6-10 hours per week - 10-20 hours per week | 1.41 |
| Below 1 hour | 388 | | | | | | 2.25 |
| | | | | | | 6-10 hours per week - Above 20 hours per week | |
| | | | | | | 10-2 hours per week - Above 20 hours per week | 1.23 |

As seen in Table 11 students' critical thinking disposition levels differ significantly according to web using frequency, $X^2$ (SD=4, n=388) =22.944, p<.05.When the order of the groups' averages is taken into consideration, it is seen that the students who use internet above 20 hours per a week, have the highest critical thinking skills. This is followed by 10-20 hours, 1-5 hours, 6-10 hours and lastly below

1 hour per week. Tukey test was used to determine the difference between the groups where homogeneity of variance was not provided. As a result of this analysis, it can be said that there is a significant difference between the students using internet above 20 hours per a week and each of the others in addition to this, it can be said also, there is a significant difference between the students using internet 6-10 hours and10-20 hours per week/ The effect size for each group is high.

**Table 12.** Kruskall Wallis H results of students' critical thinking disposition levels in terms of academic level perception

| Academic level perception | N | Mean Rank | SD | $X^2$ | P | Significant difference | d |
|---|---|---|---|---|---|---|---|
| Insufficient | 49 | 183.89 | 2 | 6.857 | .032 | Medium - Sufficient | 1.34 |
| Medium | 263 | 186.72 | | | | | |
| Sufficient | 74 | 223.97 | | | | | |
| Total | 388 | | | | | | |

As seen in Table 12 students' critical thinking disposition levels differ significantly according to academic level perception, $X^2$ (SD=4, n=388) =22.944, p<.05.When the order of the groups' averages is taken into consideration, it is seen that the students who think themselves as a sufficient academically have the highest critical thinking skills. The students who think themselves at a medium level and lastly, insufficient level, follow this. Tukey test was used to determine the difference between the groups where homogeneity of variance was not provided. As a result of this analysis, it can be said that there is a significant difference between the students who think themselves at a sufficient and medium level. The effect size of the group is high.

After the analyses about critical thinking dispositions, analyses about reflective thinking skills scores are reported below.

**Table 13.** Kruskall Wallis results of students' reflective thinking levels in terms of thefield

| Field | N | Mean Rank | SD | $X^2$ | P | Significant difference | d |
|---|---|---|---|---|---|---|---|
| Science&Maths. | 194 | 171.65 | 2 | 31.469 | .000 | Science&Maths. - Foreign Language | 9.21 |
| Mother Language&Maths. | 98 | 186.16 | | | | | |
| Foreign Language | 96 | 249.19 | | | | Mother Language&Maths. - Foreign Language | 7.63 |
| Total | 388 | | | | | | |

As seen in Table 13 students' reflective thinking levels differ significantly according to the field, $X^2$ (SD=2, n=388) =31.469, p<.05.When the order of the groups' averages is taken into consideration, it is seen that the students of the field of foreign language have the highest critical thinking skills. This is followed by the field of mother language and mathematic and then science and mathematics. Tukey test was used to determine the difference between the groups where homogeneity of variance was not provided. As a result of this analysis, it can be said that there is a significant difference between the foreign language and science and mathematics and between the foreign language and mother language and mathematics. The effect size of the group is high.

**Table 14.** Man Whitney U results of students' reflective thinking levels in terms of gender

| Gender | N | Mean Rank | Rank Sum | U | p | d |
|---|---|---|---|---|---|---|
| Male | 177 | 173.96 | 30791.00 | 15038.00 | .001 | 3.97 |
| Female | 211 | 211.73 | 211.73 | | | |
| Total | 388 | | | | | |

According to the data in Table 14reflective thinking levels of students differ significantly in terms of gender, U=17959.00, p<.05.When the order of the groups' averages is taken into consideration, it is seen that the girls have the highest critical thinking skills. The effect size of the group is high.

**Table 15.** Man Whitney U results of students' reflective thinking levels in terms of grade

| Grade | N | Mean Rank | Rank Sum | U | p |
|---|---|---|---|---|---|
| 11th | 245 | 188.96 | 188.16 | 15964.00 | .183 |
| 12th | 143 | 204.08 | 204.08 | | |
| Total | 388 | | | | |

According to the data in Table 15reflective thinking levels of students do not differ significantly in terms of grade, U=17959.00, p>.05.

**Table 16.** Kruskall Wallis H results of students' reflective thinking levels in terms of mother education level

| Mother Education Level | N | Mean Rank | SD | $X^2$ | P |
|---|---|---|---|---|---|
| Illiterate | 9 | 206.89 | 4 | 2.726 | .605 |
| Elementary graduated | 132 | 196.80 | | | |
| Secondary graduated | 97 | 179.12 | | | |
| High school graduated | 103 | 203.80 | | | |
| University graduated | 47 | 197.04 | | | |
| Total | 388 | | | | |

As seen in Table 16 students' reflective thinking levels do not differ significantly according to mother education level, $X^2$ (SD=4, n=388) =2.726, p>.05.

**Table 17.** Kruskall Wallis H results of students' reflective thinking levels in terms of father education level

| Father Education Level | N | Mean Rank | SD | $X^2$ | P |
|---|---|---|---|---|---|
| Illiterate | 6 | 173.83 | 4 | 1.964 | .742 |
| Elementary graduated | 94 | 200.55 | | | |
| Secondary graduated | 112 | 186.25 | | | |
| High school graduated | 118 | 192.01 | | | |
| University graduated | 58 | 207.83 | | | |
| Total | 388 | | | | |

As seen in Table 17 students' reflective thinking levels do not differ significantly according to father education level, $X^2$ (SD=4, n=388) =1.964, p>.05.

**Table 18.** Kruskall Wallis H results of students' reflective thinking levels in terms of reading frequency

| Reading Frequency | N | Mean Rank | SD | $X^2$ | P | Significant difference | d |
|---|---|---|---|---|---|---|---|
| 1-2 per year | 75 | 167.93 | 3 | 16.407 | .001 | 1-2 per year - 11 and above per year | 6.95 |
| 3-5 per year | 128 | 177.74 | | | | | |
| 6-10 per year | 88 | 201.46 | | | | | |
| 11 and above per year | 97 | 228.58 | | | | 3-5 per year - 11 and above per year | 5.67 |
| Total | 388 | | | | | | |

As seen in Table 18 students' reflective thinking levels differ significantly according to reading frequency, $X^2$ (SD=3, n=388) =169.407, p<.05.When the order of the groups' averages is taken into consideration, it is seen that the students who read at least 11 books have the highest critical thinking skills. The others follow this. Tukey test was used to determine the difference between the groups where homogeneity of variance was not provided. As a result of this analysis, it can be said that there is a significant difference between 11 and above peryear and the 1-2 books per year and there is also a significant difference between 11 and above per year and the 3-5 books per year and. The effect size of

the group is high.

**Table 19.** Kruskall Wallis H results of students' reflective thinking levels in terms of the purpose of the web usage

| Purpose | N | Mean Rank | SD | $X^2$ | P | Significant difference | d |
|---|---|---|---|---|---|---|---|
| Making homework | 47 | 208.56 | 4 | 12.265 | .015 | Making homework - Following social media | 3.98 |
| Playing | 64 | 194.97 | | | | | |
| Following social media | 135 | 168.70 | | | | | |
| Listening to music or watching video | 97 | 213.95 | | | | Making homework - Listening to music or watching video | 0.56 |
| Researching | 45 | 214.61 | | | | | |
| Total | 388 | | | | | | |
| | | | | | | Following social media - Researching | 6.88 |

As seen in Table 19 students' reflective thinking levels differ significantly according to the purpose of the web using variable, X2 (SD=4, n=388) =12.265, p<.05. When the order of the groups' averages is taken into consideration, it is seen that the students who use the internet for searching have the highest critical thinking skills. The students who use the internet for listening to music or watching videos, making homework, playing and lastly following social media, follow this. Tukey test was used to determine the difference between the groups where homogeneity of variance was not provided. As a result of this analysis, it can be said that there is a significant difference between the students making homework and following social media; there is also a significant difference between students making homework and listening music or watching video; there is also a significant difference between students following social media and researching. The effect size for the first and third group is high as the effect size for the second group is medium.

**Table 20.** Kruskall Wallis H results of students' reflective thinking levels in terms of the web usage frequency

| Web Usage Frequency (per week) | N | Mean Rank | SD | $X^2$ | P |
|---|---|---|---|---|---|
| Below 1 hour | 9 | 160.78 | 4 | 8.521 | .074 |
| 1-5 hours | 52 | 213.67 | | | |
| 6-10 hours | 78 | 165.11 | | | |
| 10-2 hours | 113 | 200.62 | | | |
| Above 2 hours | 136 | 201.17 | | | |
| Total | 388 | | | | |

As seen in Table 20 students' reflective thinking levels do not differ significantly according to web usage frequency, $X^2$ (SD=4, n=388) =8.521, p>.05.

**Table 21.** Kruskall Wallis H results of students' reflective thinking levels in terms of academic level perception

| Academic level perception | N | Mean Rank | SD | $X^2$ | P | Significant difference | d |
|---|---|---|---|---|---|---|---|
| Insufficient | 49 | 155.03 | 2 | 8.026 | .018 | Insufficient - Medium | 4.30 |
| Medium | 263 | 195.36 | | | | | |
| Sufficient | 74 | 212.36 | | | | | |
| Total | 388 | | | | | | |
| | | | | | | Insufficient - Sufficient | 5.64 |

As seen in Table 21 students' reflective thinking levels differ significantly according to academic level perception, $X^2$ (SD=4, n=388) =22.944, p<.05.When the order of the groups' averages is taken into consideration, it is seen that the students who think themselves as a sufficient academically have the

highest critical thinking skills. The students who think themselves at a medium level and lastly, insufficient level, follow this. Tukey test was used to determine the difference between the groups where homogeneity of variance was not provided. As a result of this analysis, it can be said that there is a significant difference between the students who think themselves at a medium and insufficient level and there is also a significant difference between the students who think themselves at a sufficient and insufficient level. The effect size of the group is high.

The findings of the third research question (Is there a meaningful relationship between high school students' critical thinking dispositions and reflective thinking skills?) is given below.
The findings of the third research question have been shown below. For this research question, Spearman Brown Order Differences Correlation coefficient was calculated because the distribution is not normal (please see table 2).

**Table 22.** Correlation results between critical thinking dispositions and reflective thinking skills

| | | **Reflective thinking skills** |
|---|---|---|
| **Critical thinking dispositions** | Spearman's rho | ,309** |
| | Sig. (2-tailed) | ,000 |
| | N | 338 |

** Correlation is significant at the 0.01 level (2-tailed).

As seen in Table 22 the relationship between critical thinking dispositions and reflective thinking skills is significant. Critical thinking dispositions and reflective thinking skills scores are positive in other words, they are increasing and decreasing together. The positive-level relationship between critical thinking dispositions scores and reflective thinking skills scores is also intermediate ($r=-.309$; $p<.05$).

## Results, Discussion and Suggestions

According to the findings of this study, which aims to determine the relationship between high school students' critical thinking dispositions and reflective thinking skills in terms of some demographic variables; critical thinking disposition level differs according to students' field, frequency of reading books, frequency and purpose of using the internet and finally perceived academic level. Reflective thinking skills also differ according to be listed in order variables except for the frequency of using the internet. These differences could be explained since it has a medium level relationship between these two variables (critical thinking dispositions and reflective thinking skills). Reading books and using the internet for the intended purpose are the activities supporting personal development. Critical thinking dispositions and reflective thinking skills are the wanted abilities so these are the results that researchers expected. Although it is foreseen, there is an undesirable situation: students' field. It can be said that the students' differentiation in their skill development according to their fields as a result of the separation of the students allocated to the fields in high school education according to their academic competence rather than according to their interests. This situation results in the inadequacy of some fields and the professions of the graduates of that field, and shows itself in skill development. Regardless of their departments, if we want individuals to develop these skills when they graduate from high school, we should plan what needs to be done before and during and after the instruction. For example, curriculumcan be equiped with these skills, these skills can be considered when deciding on teaching methods and measurement activities.
Different levels of education about critical thinking disposition and reflective thinking skills could be organized and applied for the different field students. Having a significant difference in favour of foreign language students in terms of critical thinking dispositions and reflective thinking skills may be related to those students' educational processes such as curriculum, teaching methods or educational materials. This may be caused by addressing life-related issues, using classroom materials for more social and global problems ,or conducting student-centered studies as result of preparing a communication-based curriculum in foreign language lessons. These possibilities can be explored in future studies. To enhance the ability of critical thinking skills in students of the other fields, lesson study activity could be developed and the study named “Developing students critical thinking ability through lesson study” by Risnanosanti, et al. (2019) can be a guide. It is stated in this research that,

allowing students to discover the concepts themselves can be the basis for improving the quality of learning (Risnanosanti et al.2019).For the development of both skills, it may be necessary to make in the structure of both in-class studies and curriculum. As a first step of these arrangements, examining the curriculum in critical thinking dispositions and reflective thinking skills can contribute to the needs analysis. According to Sarıgöz, (2012) the students required to make students decisions accurately, and to act logically without getting excited in the event of matters so that they should take critical thinking lessons that is applicable beginning in primary school, lasting till high school. In addition to integrating critical thinking dispositions and reflective thinking skills with curricula of existing courses, if they are designed as a new lesson, a curriculum development study is inevitable from primary to high school.

Although the gender variable does not show a significant difference in critical thinking dispositions scores, it is noteworthy that there is a significant difference in reflective thinking skills. Female participants seem advantageous over men in terms of reflective thinking skills. Although social roles are thought to be effective, in our country, there is a research finding that may be contrary to this. In their research, Demirel, Derman and Karagedik (2015) have found that there does not exist a significant difference between the students' reflective thinking skills towards problem-solving and their gender. The participants of this study are secondary school students so this data may indicate that the change may be age-dependent.

From the findings, it is understood that as the frequency of reading increases from the data, both critical thinking dispositions and reflective thinking skills increase. Therefore, we may be able to support our students' skills development by increasing their reading frequency. Hawkins (2012) addressed the acquisition of reading habit in order to awaken critical thinking so that students can think in multiple ways. For this reason, he talked about creating a curriculum for critical thinking in order to give the student the habit of reading. Murphy, Rowe, Rabani and Silverman (2014) addressed the student's habit of reading books, keeping critical thinking alive. Alaqaili (2012) found a positive and significant relationship between reading habits and critical thinking. In their study, Ghabanchi, Behrooznia (2014) found that reading increased critical thinking. The pursuit of an interdisciplinary reading culture in curriculums can make the effort to be mass and centralized. In addition to this, it is clear that giving importance to reading in society will enable to train equipped individuals.Digital resources can also support the development of reading culture.Developing transdisciplinary teaching materials for different interests can improve students' thinking skills as well as their mental processes such as transferring and differentiating. Therefore, in secondary education curriculum, teaching materials and methods suitable for digitization need to apply. The need for an understanding of their multiple literacies is related to the rising importance of digital technologies to youth populations (Bloommer, 2008). Delgado et al. (2018) in their meta-analysis research that include the years 2000-2017, found that the same advantage of paper over digital reading. For this reason, the resources can be diversified (printed or digitally) and the reading frequency can be increased by leaving the students to their preference.

It could be said that while the internet usage aims of individuals with higher critical thinking dispositions are research-based, individuals with higher reflective thinking skills are homework-based in addition to research. It is vitally important to educate and encourage students about internet usage and source to get any kind of information, especially ind0ispensable tools in today’s academic and social life (Dogruer, Eyyam and Meneviş, 2011) so that students can use this, accordance their requirement in their academic studies. The importance of this issue stems from the fact that it is an active factor in skill development as well as keeping pace with and exceeding the digital age.

## References

Açışlı, S., & Açışlı, S. (2015). Öğretmen adaylarının öğrenme stilleri ve eleştirel düşünme eğilimlerinin incelenmesi. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi*, *9*(1), 23-48.

Aloqaili, A. S. (2012). The relationship between reading comprehension and critical thinking: A theoretical study. *Journal of King Saud University-Languages and Translation*, *24*(1), 35-41.

Aryani, F., Rais, M., & Wirawan, H. (2017). Reflective learning model in improving student critical thinking skills. *Global Journal of Engineering Education*, *19*(1), 19-23.

Aslan, S., & Aybek, B. (2018). İlkokul 4. sınıf öğrencilerinin çokkültürlü eğitime dayalı olarak uygulanan etkinlikler ile ilgili görüşlerinin incelenmesi. *Kuramsal Eğitimbilim Dergisi*, 11(1), 58-82.

Aydın, B. B. (2015). *8. sınıf öğrencilerinin matematik başarı güdüsü ile problem çözmeyedayalı yansıtıcı düşünme becerilieri arasındaki ilişki.* Yüksek Lisans Tezi, YeditepeÜniversitesi. İstanbul.

Babaoğlu, H. M. (2018). *5. sınıf ingilizce dersinde allosterik öğrenme modelinin öğrencilerineleştirel düşünme ve problem çözmeye yönelik yansıtıcı düşünme becerilerine etkisi.* Yüksek Lisans Tezi, Siirt Üniversitesi. Siirt.

Bağcı, H., & Şahbaz, N. (2012). Türkçe öğretmeni adaylarının eleştirel düşünme becerileri üzerine bir değerlendirme. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, *8*(1), 1-12.

Baki, A., Güç, F. A., & Özmen, Z. M. (2012). İlköğretim Matematik Öğretmeni AdaylarınınProblem Çözmeye Yönelik Yansıtıcı Düşünme Becerilerinin İncelenmesi. *UluslararasıEğitim Programları ve Öğretim Çalışmaları Dergisi, Cilt*:2 Sayı:3 s.59.

Baş, G. (2013). İlköğretim Öğrencilerinin Problem Çözmeye Yönelik Yansıtıcı Düşünme Becerileri ile Fen Ve Teknoloji Dersi Akademik Başarıları Arasındaki İlişkinin Yapısal Eşitlik Modeli ile İncelenmesi. *Hasan Ali Yücel Eğitim Fakültesi Dergisi*, Sayı:20, s.1-12.

Baş, G., & Kıvılcım, Z. S. (2013). Lise Öğrencilerinin Problem Çözmeye Yönelik Yansıtıcı Düşünme Becerileri ile Matematik ve Geometri Derslerindeki Akademik Başarıları Arasındaki İlişki. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, Cilt: 14, Sayı: 3, s.1-17.

Başol, G. ve Evin Gencel, İ. (2013). Yansıtıcı düşünme düzeyini belirleme ölçeği: geçerlik ve güvenirlik çalışması. *Kuram ve Uygulamada Eğitim Bilimleri.* 13(2), 929-946.

Baydar, S. (2012). Öğrenme stillerine göre lise öğrencilerinin eleştirel düşünme eğilimi (Doctoral dissertation, DEÜ Eğitim Bilimleri Enstitüsü).

Bilgiç, C. (2017). *İlköğretim Öğrencilerin Problem Çözmeye Yönelik Yansıtıcı DüşünmeBecerileri Ve Sosyal Bilgiler Dersi Akademik Başarıları.* Yüksek Lisans Tezi, UşakÜniversitesi. Uşak.

Blommer, B. (2008). Digital Literacy Practices among Youth Populations: A Review of the Literature. Education Libraries: Childrens Resources, 31, 1. https://files.eric.ed.gov/fulltext/EJ824777.pdf

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2011). *Bilimsel araştırma yöntemleri.* Ankara: PegemA Yayıncılık.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö.E., Karadeniz, Ş. ve Demirel, F. (2012). *Bilimsel araştırma yöntemleri.* (11. Baskı). Ankara: Pegem Akademi.

Choy, S. C., & San Oo, P. (2012). Reflective thinking and teaching practices: A precursor for incorporating critical thinking into the classroom? *International Journal of Instruction*, *5*(1).

Demirel, M., Derman, İ. ve Karagedik, E. (2015). A Study on The Relationship Between Reflective Thinking SkillsTowards Problem Solving and Attitudes Towards Mathematics. 7th World Conference on Educational Sciences, (WCES-2015), 05-07 February 2015, Novotel, Athens, Greece.https://core.ac.uk/download/pdf/82623960.pdf

Delgadoa, P., Vargasb, C., Ackermanc, R., Salmeróna, L. (2018). Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension. Educational Research Review. 25, 23-38. https://www.sciencedirect.com/science/article/pii/S1747938X18300101

Doğruer, N., Eyyam, R., Meneviş, I. (2011). The Use ofthe Internet for Educational Purposes. Procedia Social and Behavioral Sciences. 28 (2011) 606 – 611. doi: 10.1016/j.sbspro.2011.11.115. file:///C:/Users/emutlu/Downloads/1-s2.0-S1877042811025547-main.pdf

Eğmir, E, Ocak, G. (2018). Eleştirel Düşünme Becerisi Öğretim Programı Tasarısının Öğrencilerin

Yansıtıcı Düşünme Becerilerine Etkisi. *Kuramsal Eğitimbilim Dergisi*, 11 (3) , 431-456 . DOI: 10.30831/akukeg.335388

Epstein, R. L. & Kernberger, C. (2006). *Critical thinking* (Third Edition). Canada: Thomson Wadsworth.

Eren, E. (2007), *Örgütsel Davranış ve Yönetim Psikolojisi,* Beta Yayınları, İstanbul.

Facione, P. A. (2007). Critical thinking: What it is and why it counts. *The CaliforniaAcademic Press* Retrieved from the Web March, 2009. http://www.insightassessment.com/pdf_files/what&why2006.pdf

Fuad, N. M., Zubaidah, S., Mahanal, S., & Suarsini, E. (2017). Improving Junior High Schools' Critical Thinking Skills Based on Test Three Different Models of Learning. *International Journal of Instruction*, *10*(1), 101-116.

Gezgin, D. M., Yılmaz, F. Ö., & Ercan, Y. (2016). Bilgisayar Programlama Dersi Alan ÜniversiteÖğrencilerinin Problem Çözmeye Yönelik Yansıtıcı Düşünme Beceri DüzeylerininİncelenmesI. *VIII. Uluslararası Eğitim Araştırmaları Kongresi*, (s. 1645-1654).Çanakkale.

Ghabanchi, Z., & Behrooznia, S. (2014). The impact of brainstorming on reading comprehension and critical thinking ability of EFL learners. *Procedia-Social and Behavioral Sciences*, *98*, 513-521.

Ghanizadeh, A. (2017). The interplay between reflective thinking, critical thinking, self-monitoring, and academic achievement in higher education. *Higher Education,* 74(1), 101-114.

Gözeten, İ. (2017). Bilim Ve Sanat Merkezlerinde Öğrenim Gören Öğrencilerin Problem Çözmeye Yönelik Yansıtıcı Düşünme Becerileri.

Güneş, K. (2015). Bilim Sanat Merkezi Öğrencilerinin Problem Çözmeye Yönelik YansıtıcıDüşünme Becerileri, Matematik Dersine Yönelik Tutumları Ve MatematikBaşarılarının İncelenmesi.

Gündoğdu, M. M. (2017). Web 2.0 teknolojileri ile geliştirilmiş işbirlikli öğrenme ortamınınortaokul öğrencilerinin akademik başarıları ile problem çözmeye yönelik yansıtıcıdüşünme becerilerine ve motivasyon düzeylerine etkisi.

Güven, M., & Kürüm, D. (2008). Öğretmen adaylarının öğrenme stilleri ile eleştirel düşünme eğilimleri arasındaki ilişki. *İlköğretim Online*, *7*(1), 53-70.

Hawkins, K. T. (2012). Thinking and reading among college undergraduates: An examination of the relationship between critical thinking skills and voluntary reading.

Ilıman, M. (2018). *Özerk Öğrenme, Yansıtıcı Düşünme Ve Başarı Yönelimleri Arasındaki İlişkiler: İngilizce Dersi Örneği.*Çanakkale Onsekiz Mart Üniversitesi Eğitim Bilimleri Enstitüsü Eğitim Bilimleri Anabilim Dalı Eğitim Programları Ve Öğretim Bilim Dalı. Yüksek Lisans Tezi, Çanakkale.

Kaplan, A., Doruk, M., & Öztürk, M. (2017). Üstün Yetenekli Öğrencilerin Problem Çözmeye Yönelik Yansıtıcı Düşünme Becerilerinin İncelenmesi: Gümüşhane Örneği. *BayburtEğitim Fakültesi Dergisi,* Vol:12, No:23, s.415-435.

Kızılkaya, G., & Aşkar, P. (2009). Problem Çözmeye Yönelik Yansıtıcı Düşünme BecerisiÖlçeğinin Geliştirilmesi. *Eğitim ve Bilim*, Cilt 34, Sayı 154.

Korkmaz, Ö., & Yeşİl, R. (2009). Öğretim Kademelerine Göre Öğrencilerin Eleştirel Düşünme Düzeyleri. *Journal of Kirsehir Education Faculty,* 10(2).

Korkmaz, Z.S. (2018). Eleştirel Düşünme Becerileri Eğitiminin Öğretmenlerin ve Öğrencilerin Eleştirel Düşünme Becerilerine Etkisi, T.C. Atatürk Üniversitesi, Eğitim Bilimleri Enstitüsü, Eğitim Bilimleri Ana Bilim Dalı, Eğitim Programları Ve Öğretim Bilim Dalı. Doktora Tezi. Erzurum.

Kökdemir, D. (2003) Decision Making and Problem Solving Und er Uncertainty (Belirsizlik

Durumlarında Karar Verme ve Problem Çözme), PhD Thesis, Ankara.

Murphy, K. P., Rowe, M. L., Ramani, G., & Silverman, R. (2014). Promoting critical-analytic thinking in children and adolescents at home and in school. Educational Psychological Review, 26, 561-578

Özmen, H. (2009). *Critical thinking.* Retrieved from the Web March 2009. http://www.ctp.bilkent.edu.tr/~cte206/Critical_Thinking_HO_1.pdf

Özdemir, Y., Buyruk, H., & Güngör, S. (2018). Öğretmen Adaylarının Eleştirel Düşünme Eğilimi ile Liderlik Yönelimleri Arasındaki İlişki. *Mersin Üniversitesi Eğitim Fakültesi Dergisi,* 14(2), 548-571.

Risnanosanti, Susyla, D and Syofiana, M. (2019). Developing Students Critical Thinking Ability through Lesson Study. Series: Journal of Physics: Conf. Series 1320 (2019) 012005.IOP Publishing doi:10.1088/1742-6596/1320/1/012005

Sağır, S. U. ve Bertiz, H. (2016). Fen bilimleri öğretmenliği öğrencileri ve pedagojik formasyon fen grubu öğrencilerinin yansıtıcı düşünme becerilerinin karşılaştırılması. Bartin Üniversitesi Egitim Fakültesi Dergisi, 5(2), 385.

Sarıcan, G. (2017). Bütünleşik STEM eğitiminin akademik başarıya, problem çözmeye yönelikyansıtıcı düşünme becerisine ve öğrenmede kalıcılığa etkisi.

Sarıgöz, O. (2012). Assessment of the High School Students' Critical Thinking Skills.Procedia - Social and Behavioral Sciences.46, 5315-5319. https://doi.org/10.1016/j.sbspro.2012.06.430.

Saygılı, G., & Atahan, R. (2014). Üstün Zekalı Çocukların Problem Çözmeye Yönelik YansıtıcıDüşünme Becerilerinin Çeşitlik Değişkenler Bakımından İncelenmesi. *SDÜ FenEdebiyat Fakültesi Sosyal Bilimler Dergisi*, Sayı: 31, s. 181-192.

Shermis, S. S. (1999). *Reflective Thought, Critical Thinking.* ERIC Digest.

Şen, Ü. (2009). Türkçe öğretmeni adaylarının eleştirel düşünme tutumlarının çeşitli değişkenler açısından değerlendirilmesi. *Zeitschrift für die Welt der Türken/Journal of World of Turks*, 1(2), 69-89.

Şahin, S., Tunca, N., & Ulubey, Ö. (2014). Öğretmen adaylarının eğitim inançları ile eleştirel düşünme eğilimleri arasındaki ilişki. *İlköğretim Online,* 13(4).

Tat, O. (2015). Ortaokul Öğrencilerinin Problem Çözmeye Yönelik Yansıtıcı DüşünmeBecerilerini Etkileyen Faktörlerin Hiyerarşik Doğrusal Modeller ile İncelenmesi.

Yıldırım, A. ve Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* (5. Baskı). Ankara: Seçkin Yayıncılık.