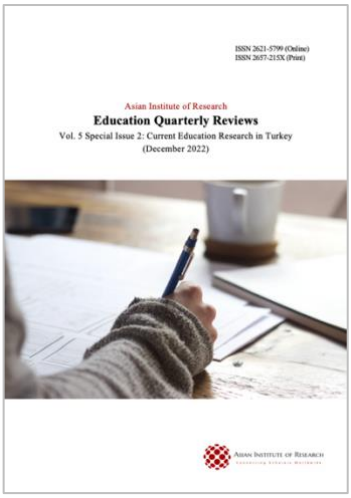

Education Quarterly Reviews

Baş, M., & Bolat, Y. (2022). The Impact of Cognitive Competence on Critical Thinking Skills: An Educational Science Study with School Counsellors. *Education Quarterly Reviews*, Vol.5 Special Issue 2: Current Education Research in Turkey, 53-64.

ISSN 2621-5799

DOI: 10.31014/aior.1993.05.04.605

The online version of this article can be found at:
https://www.asianinstituteofresearch.org/

Published by:
The Asian Institute of Research

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The Asian Institute of Research
Education Quarterly Reviews
Vol.5 Special Issue 2: Current Education Research in Turkey, 2022: 53-64
ISSN 2621-5799

DOI: 10.31014/aior.1993.05.04.605

The Impact of Cognitive Competence on Critical Thinking Skills: An Educational Science Study with School Counsellors

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Abstract
Critical thinking is an important skill type. It has become a growing focus of attention. Based on the growing interest in critical thinking skills, this research examines the relationship of critical thinking with cognitive competence. Data on sub-questions were collected taking into account the main purpose of the research. This study, which is an educational science study, examines the correlational relationship. In this context, 323 school counsellors participated in the research. The data collected using the data tools used in the research (CC and CT) was examined and the results were reached. Research results show that cognitive competence is an important variable in terms of critical thinking ability. It has been concluded that cognitive competence is an important variable for the ability to think critically. The participants had no significant effect on critical thinking and cognitive competence of gender variables with the classroom. Taking into account this result, recommendations have been developed for the more efficient use of cognitive competence in critical thinking.

Keywords: Cognitive Competence, Critical Thinking Skills, Correlation, School Counsellors

1. Introduction

In recent years, a growing number of countries around the world, especially western ones, have prioritized critical thinking (CT here then) growth at all stages of education settings (Cavus & Uzunboylu, 2009; Miri et al., 2007; Ren et al., 2020; Yang & Chou, 2008). CT is becoming an increasingly important aspect of education both on practical and theoretical aspects. In order to satisfy the demands of a constantly evolving world, school education in the twenty-first century is required to provide students with both domain expertise and twenty-first-century skills such as problem solving, critical thinking and decision-making processes (Kong, 2014, 2015). Hence, in today's ever-changing and demanding environment, students must learn higher-order cognitive skills in addition to building their expertise not only for educational perspectives but also for business demands (Aizikovitsh-Udi & Amit, 2011; Masduqi, 2011). That's why CT skills are essential for academic and successful workplace decision-making, leadership, mindful judgement, career performance, and political-social engagement. As there is an increasing importance of gaining CT skills, CT is not seen as a luxury, rather as a demand that cannot be ignored by educators and policy makers. Students in the twenty-first century must learn knowledge comprehension and critical thinking skills in order to succeed in their education life span. The National Research Council (2012)

(USA) described 21st century skills as vital to the learning process in 2012; one of these skills was cognitive, which involves critical reasoning, imagination, executive functioning, and problem-solving ability (National Research, 2012; Papanastasiou et al., 2019). These higher order reasoning and problem-solving skills, CT skills as well as the ability to collaborate and function efficiently in a team, are important for students' educational development (Şendağ & Ferhan Odabaşı, 2009), they must learn knowledge literacy and critical thinking skills. Given that the most important aim of education is to encourage logical intellectual growth, teaching critical thought includes designing practices and building an atmosphere that promotes this goal (Roy & Macchiette, 2016) as they must deal with the demands of a knowledge-based culture.

1.1 Introduce the Problem

Humans' ability to develop their intellectual potential goes back to the first civilizations where knowledge played a part. Despite its popularity in recent times, CT has been a well-established topic and a controversial area of study across disciplines for a long time. It dates back to the period of Socrates (Popil, 2011). It is based on Socratic questioning which is a thought-centered approach that allows people to strengthen their CT skills and engage in analytical dialogue, resulting in self-directed learning and reflection (Masduqi, 2011; Saiz & Rivas, 2011). Descartes applied Socrates' view of CT, which was inspired by Plato, Democritus elucidating the interactions between cause and effect, which was a theme in essays published by Montesquieu and Locke (Rfaner, 2006; Rimiene, 2002). In the beginning of the last century, CT has been regarded as an aggressive, continuous, and deliberate analysis of a belief or alleged form of knowledge in light of the grounds that justify it and the farthest conclusions to which it leads (Dewey, 1997). A variety of CT skills have been also classified by Bloom's taxonomy of educational objectives based on a triangle that integrates the CT skills in any order (Aviles, 1999).

In line with the National Education Association's [NEA] recommended structure the 4Cs is used to express the competencies: CT meaning ability to reason, consider, analyzed and make sound choices, and solve problems; communication in different ways, contexts, and technologies; deciphering meaning and aiming in various situations; collaboration is characterized as the willingness to collaborate in a dynamic, versatile, and able to accomplish shared goals environment, as well as the ability to share responsibility for collective work and appreciation for team members' individual contributions; creativity is a concept used to define, revise, review, and test proposals in order to develop and optimize problem-solving activities cited in (Widana, 2018). Along with the stated four competences, CT is the far most underlying component to encourage logical academic growth by creating an environment facilitative to meeting the demands of the 21st century workforce (Roy & Macchiette, 2016; Short & Keller-Bell, 2021). Many scholars claim that learning CTS in business is important because these skills are needed to cope with the rising complexity of real-world problems (Page & Mukherjee, 2007).

Higher CT abilities or dispositions are correlated with improved learning outcomes according to observational studies undertaken in educational settings (Ren et al., 2020). Dwyer et al., (2014) argues that CT teaching is becoming particularly relevant as it helps learners to develop the much more complex view of the knowledge they experience and facilitates effective judgment and problem-solving in real-world scenarios. The development of these essential skills is aided by pedagogical methods, which indicates to be integrated and emphasized in the curriculum (Widana, 2018), that bases on CT introduced in the last several decades (Bensley & Murtagh, 2011; Butler, 2012). Based on the constructive approach, it is the process of connecting ones' existing knowledge with new learning and creating their own knowledge and mental models as a result of their own experiences and thinking, CT skills training introduces new educational paradigms by changing instructional approaches from what to think to how to think (Behar-Horenstein & Niu, 2011). Since they reflect the conclusions of other people's thought processes, conventional instructions are virtually worthless for teaching higher-order thinking skills. High-leverage critical-thinking activities (Haber, 2020) provide clear guidance on critical-thinking concepts and strategies, intentional practice experiences to bring certain techniques to use, promoting cross-domain transfer, and empowering learners to perform thinking critically through their own. Altaf (2018) suggests some techniques that aid critical thinking in students include posing open-ended questions helps children to think critically, create an atmosphere in the classroom where students are free to ask questions without fear of being punished by their classmates or teachers and send them real-life instances to make them understand the issue better

1.2 What is Critical Thinking (CT)?

Theorists and educators have offered a number of critical thought definitions. CT is a nebulous term of an overabundance of interpretations and definitions. While there is no unified consensus on what constitutes critical thinking, there is enough overlap among the different meanings to enable a reviewer to progress beyond the definitional level (Halpern, 1993). It is defined as a purposeful, self-regulatory judgement that results in perception, study, assessment and inference (Facione, 1990); a systematic approach to learning (Biggs, 1988); a type of thinking in which people apply criteria and systemic view to their thoughts on a regular basis (Paul, 1993); a self-awareness and reflection on one's own and others' thoughts (Şendağ & Ferhan Odabaşı, 2009); metacognitive process, consisting of a number of sub-skills such as analysis, assessment, and inference (Dwyer et al., 2014); a rational, purposeful, and introspective method of problem-solving (Rudd et al., 2000); the ability to think of a solution to a problem or to create something meaningful or innovative out of nothing (Hwang et al., 2007); reflective and reasonable thinking that is focused on deciding what to believe or do (Ennis, 1985); Individuals' entire repertoire of cognitive tasks focus on a particular object, challenge, or condition (Birgili, 2015) intelligent reflective reasoning, with an emphasis on addressing particular issues (Braus & Wood, 1993).

Although it was conceived by Greek philosophers and has been in use since the time of the Greek Empire (Masduqi, 2011), CT has been the subject of many recent educational implementations. This involves considering not only critical issues within disciplinary fields of history, physics, and mathematics, but also considering the social, political, and ethical complexities of daily life in an increasingly dynamic world (Abrami et al., 2008). Students' participation, self-directed learning, authentic learning, team skill development, problem-solving skills, and interdisciplinary research are all current areas of emphasis (Klegeris & Hurren, 2011) in CT education. In other words, emphasized that students having CTSs can solve problems more effectively(Snyder & Snyder, 2008), become laced with self-judgement and self-criticism, be more efficient in the workforce and in their private lives, the analysis of an argument is to make inferences using reasoning and feel more capable at decision making processes. To Facione (1990), the ideal critical thinker is an open-minded, agile, fair-minded in assessment, truthful in facing personal prejudices, conscientious in making decisions, eager to rethink, consistent about problems, orderly in complicated matters, persistent in finding relevant facts, rational in the application of parameters, and concentrated on questioning.

1.3 Cognitive aspects of CT skills

For decades, educational research (Myers & Dyer, 2006; Pithers & Soden, 2000; Terenzini et al., 1995) and programs have emphasized the development of students' critical thinking skills. The body of evidence in cognitive and learning psychology is vast, and it enables us to recognise CT abilities and cognitive performance. CT is generally described as a set of cognitive skills with different dimensions holding improvements on thinking abilities in gradual and cumulative process of learners (Halpern, 1993). CT, according to psychological perspectives (Abrami et al., 2008), involves a mastery of a set of distinct abilities or cognitive operations such as interpreting, foreseeing, observing, and assessing, as well as dispositions, that can be applied in a number of situations. As a comprehensive collection of cognitive tasks performed by individuals in response to a particular object, challenge, or condition (Birgili, 2015); CT refers to any notable learner cognitive behaviour that takes place in a real-world setting.

With the ultimate aim of developing students' reasoning skills (Osburn & Mumford, 2006), hence, we should learn more about the essence of students' cognitive abilities by defining variables that influence their CT progress. According to Yang and Chou (2008) cognitive capacity or competence has been regarded as a prerequisite for enhancing one's CT skills. A learner's understanding and beliefs about a topic or task, as well as the decisions he or she makes in allocating his/her cognitive capacity will increase his/her level of comprehension (Hollingworth & McLoughlin, 2000). Students with high levels of cognitive ability will organize and self-regulate their own learning plans and skills, which are referred to as CT. Thus, students who can improve their metacognitive abilities to the learning process may have a higher degree of understanding and they will be more qualified to draw correlations to previous experiences (Kängsepp, 2011; Özçakmak et al., 2021). However, according to Zimmerman and Campillo (2003), along with cognitive capacity, other traits such as individual resourcefulness and resilience, as well as motivational beliefs such as self-efficacy and self-regulation, innovative thinking, gaining insights are also essential for proficient CT skills.

Bloom (1956) was one of the first to study the cognitive domain, which emphasizes intellectual outcomes. This domain is further segmented into stages or subcategories by Bloom's taxonomy. He proposes that students advance through six phases of learning in order. As a result of which one stage must be completed before moving on to the next. Roy and Macchiette (2016) argue that, in Bloom taxonomy, knowledge, comprehension, and application are among the lower-level processes, while analysis, synthesis, and evaluation are among the higher-level processes. Moreover, Peter (2012) argues synthesis and evaluation are two ways of thinking that they both involve one to look at pieces and to be considered critically. Evaluation, which is similar to critical thinking, is concerned with making a decision or assessment followed by an analysis of an argument or proposition.

1.4 Cognitive presence and CT skills

At the first stage when we need to make it clear what we mean by presence: Lee (2004) defined presence as "a psychological state in which virtual objects are experienced as actual objects in either sensory or nonsensory ways". Lee divides it into three domains as physical (interacting with simulated physical structures and worlds that have a genuine relation to their respective real-world counterparts), social (interacting with the representations of other humans linked by technology), and self-presence (within a simulated world, seeing a reflection of one's own true self-either physically embodied or mentally presumed). Similarly, presence is described by International Society of Presence Research as a part or all of an individual's actual experience which is created and mediated by human-made technologies, and part or all of the individual's understanding fails to adequately recognize the technology's position in the experience (Research, 2000). Garrison et al. (1999)'s Community of Inquiry (CoI) paradigm offers theoretical and realistic perspectives on deep and surface learning methods and outcomes are based on critical thinking. Likewise, Lee (2004), Akyol and Garrison (2011) argue that the presence paradigm has three interrelated systemic elements: social, cognitive, and teaching presence. They state that growth of the community's environment and interpersonal interactions are influenced by social presence; the concept of cognitive presence describes the stages of practical inquiry that contribute to the resolving of a problem or question and finally throughout the course of learning, teaching presence offers leadership.

Participants shift actively from understanding the problem or topic to experimentation, incorporation, and implementation through a continuum of realistic investigation known as cognitive presence (Garrison, 2007). According to Breivik (2016), this definition is consistent with Dewey's understanding of CT, and it is definitely important in the discussion of the CoI paradigm, which claims to be compatible with Dewey's account of inquiry and thinking. Dewey, who introduced social-constructivist views of thinking, offered ideas, models, and principles to foster critical thinking growth (Ültanır, 2012). The CT period, according to Dewey, begins with the understanding of a problem and progresses to the creation of concrete hypotheses and a solution through the exploration of applicable experience (Lee, 2014). Within the same line, from the basic investigation to the final CT and problem solving stage, cognitive presence identifies the learning processes and knowledge construction. The concept of cognitive presence reflects higher-order intelligence learning and implementation and is most closely linked to critical thinking (Garrison et al., 1999). Cognitive presence considers how students solve new challenges, evolve in knowledge, and communicate it to their learning environment.

Cognitive presence is explained through the model of critical thinking or practical inquiry model by Garrison et al. (1999) and it is divided by four phases: triggering events, exploration, integration and resolution (Garrison et al., 2001) all which have been illustrated respectively in Table 1 (Akyol & Garrison, 2011; Kovanović et al., 2015; Lee, 2014; Traphagan et al., 2010):

Table 1: Subcategory of Cognitive presence (Akyol & Garrison, 2011; Lee, 2014)

Category	Meaning	Indicators
Triggering event	In this step, a learning process is triggered by a challenge or dilemma, which is usually implemented by the teacher in a formal instructional environment.	Recognizing the problem
Exploration	Students collect knowledge related to the issue or mission at hand through experimentation,	Divergence and exchanging of ideas,

	brainstorming, and other exercises during this process.	
Integration	Students synthesize and merge various pieces of information in this process after collecting an adequate body of information, while remaining selective and filtering out any unnecessary information.	Connecting ideas, inferences, synthesis, creating solutions
Resolution	The final step is the resolution of the initial dilemma, which is usually accomplished by vicarious behavior and hypotheses development in formal education.	Application to real world

1.1. Research Aim

Critical thinking is important in all areas of individual and academic development, but it has also become an extremely important issue for teacher education, which has a significant share in the education of new generations. This research aims to identify the relationship between teacher candidates' cognitive competencies and critical thinking skills. In the context of this basic goal, the research seeks answers to the following sub-questions:

- Do class and gender variables have a significant and shared impact on participants' CTSs?
- Do class and gender variables have a significant and shared impact on participants' CC?
- What are the levels of cognitive competence according to the classrooms and genders of the participants?
- What effect does in-school-training activities have on the development of critical thinking skills?
- How do information sources benefit the critical thinking skills of students?
- What effect does pre-learning have on solving new problems and engaging critical thinking?
- What contributes to the development of critical thinking ability of students that allow them to create solutions which can be applied to other areas in practice?
- What is the level of cognitive competence in critical thinking?

2. Method

This research examines the relationship between cognitive competence and critical thinking skills in terms of various variables. A correlational research model was used in this research for this purpose. Correlational research models aim to determine the existence or degree of variance between two or more variables (Karasar, 2016, Lodico et al. 2010).

2.1 Population and Sample

In this study, a working group was established by a purposeful sampling method to determine the effect of cognitive competence on critical thinking ability. A purposeful sample allows you to explore the subject in depth, helping to identify the relationships that exist on the subject that is intended to be studied (Tarhan, 2015). In this context, 323 school counsellors participated in the research. The group of participants who are the subject of this study group are undergraduate students who receive psychological counselling and guidance education. This working group consists of students of the Department of Psychological Counselling and Guidance of the Faculty of Education at Mustafa Kemal University in Hatay, Turkey, taking into account four different levels of education. Detailed information about the working group is presented in Table 2.

Table 2: Study Group

	Gender		**Total**	
Class	Male	Female	%	Total
1st	50	37	26,9	87
2st	35	16	15,8	51
3st	56	46	31,6	102
4st	55	28	25,7	83
Total	196	127	100	323

2.3 Data Collection Instruments

In this study, two different data collection tools were used to collect data. Explanatory information about these data tools is provided:
(a) Critical Thinking Skills Scale (CTSsS); Subjects' affective attitudinal dimension of critical thinking was analyzed by Engagement, Maturity, and Innovativeness Critical Thinking Disposition Inventory (EMI critical thinking disposition inventory) developed by (Roberts, 2003). The instrument has three subscales. Cronbach's alphas for the subscales of the EMI critical thinking disposition assessment were 0.75 for Innovativeness, 0.75 for Maturity, and 0.86 for Engagement.
(b) Cognitive Competence Scale (CCS): Data on students' reports of cognitive presence was collected using a cognitive presence scale. The scale was developed by Almasi and Zhu (2020). The scale has four items.
Following permissions offered by authors, participants were asked to reply to the survey by selecting numbers on a Likert scale ranging from 1 to 5, with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The instruments were distributed via Google Forms.

2.4. Data Analysis

The data collection tools and personal information forms used in this research were delivered to the undergraduate students who received guidance and psychological counselling training included in the working group. Since there was no participant error or biased response that would cause data loss in the data collection tools delivered to the working group, the response rates were 100%. Data obtained from measurement tools were subjected to statistical processing via computer. The analysis and results obtained are presented in tables.

3. Results

Research findings and the sub-questions of the research are presented respectively.

1. *Do class and gender variables have a significant and shared impact on participants' CTSs?*
To analyse the levels of impact on participants' CTSs according to the classrooms and genders of the participants, Two-Way Analysis of Variance (ANOVA) was performed. The results of the analysis are presented in Table 3.

Table 3: The level impact on participants' CTSs according to the classrooms and genders of the participants

Source	Sum of Squares	df	Mean Square	F	p
Corrected Model	1,841[a]	7	,263	1,393	,207
Intercept	3850,401	1	3850,401	20392,557	,000
Class	,239	3	,080	,421	,738
Gender	,287	1	,287	1,519	,219
Class * Gender	1,579	3	,526	2,787	,041
Error	59,476	315	,189		
Total	4518,093	323			
Corrected Total	61,318	322			

a. R Squared = ,030 (Adjusted R Squared = ,008)

According to Table 3, class and gender variables seem to have an impact on participants' CTSs. This effect is significant, if not great, on critical thinking skills (p> .05).

2. *Do class and gender variables have a significant and shared impact on participants' CC?*

To analyze the levels of impact on participants' CC according to the classrooms and genders of the participants, Two-Way Analysis of Variance (ANOVA) was performed. The results of the analysis are presented in Table 4.

Table 4: The level impact on participants' CC according to the classrooms and genders of the participants

Source	Sum of Squares	df	Mean Square	F	p.
Corrected Model	3,802[a]	7	,543	1,111	,356
Intercept	3725,427	1	3725,427	7622,572	,000
Class	,797	3	,266	,543	,653
Gender	,310	1	,310	,635	,426
Class* Gender	1,983	3	,661	1,353	,257
Error	153,952	315	,489		
Total	4486,875	323			
Corrected Total	157,753	322			
a. R Squared = ,024 (Adjusted R Squared = ,002)					

According to Table 4, the participants of the classroom and gender variables are subject to participants having no significant effect on critical thinking skills. (p> .05).

3. *What level is the effect of training-in-school activities on the development of critical thinking skills?*
Pearson Correlation Analysis was performed to detect the effect of educational-in-school activities on the development of CTSs. Pearson Correlation Analysis results are offered in Table 5.

Table 5: The level effect of trainings-in-school activities on the development of CTSs

			CTSs	Trainings-in-school activities
Critical Thinking Skills (CTSs)		Pearson Correlation	1	,314**
		Sig. (2-tailed)		,000
		N	323	323

When Table 5 is examined, it is a positive relationship between CTSs and training-in-school activities. The relationship between these two variables shows significance (p > .05).

4. *What level is the contribution of their CTSs to benefit from different-rich information sources of students?*

Pearson Correlation Analysis was performed to detect the effect of critical thinking skills to benefit from different-rich information sources of students. Pearson Correlation Analysis results are offered in Table 6.

Table 6: The level effect of trainings-in-school activities on the development of CTSs

			CTSs	Benefit from different-rich information sources
Critical Thinking Skills (CTSs)		Pearson Correlation	1	,455**
		Sig. (2-tailed)		,000
		N	323	323

When Table 6 is examined, it is a positive relationship between CTSs and benefits from different-rich information sources. The relationship between these two variables shows significance (p > .05).

5.*What level is the effect of pre-learning to solve new problems and CTSs?*

Pearson Correlation Analysis was performed to detect the effect of pre-learning to solve new problems and CTSs. Pearson Correlation Analysis results are offered in Table 7.

Table 7: The level effect of pre-learning to solve new problems and CTSs

			CTSs	Pre-learning
Critical Thinking Skills (CTSs)		Pearson Correlation	1	,499**
		Sig. (2-tailed)		,000
		N	323	323

When Table 7 is examined, it is a positive relationship between pre-learning to solve new problems and CTSs. The relationship between these two variables shows significance ($p > .05$).

6. *What level is the contribution to the development of CTSs to create solutions that can be applied to other areas in practice?*

Pearson Correlation Analysis was performed to detect the contribution to the development of CTSs to create solutions that can be applied to other areas in practice. Pearson Correlation Analysis results are offered in Table 8.

Table 8: The level contribution to the development of CTSs to create solutions that can be applied to other areas in practice

			CTSs	To create solutions that can be applied to other areas in practice
Critical Thinking Skills (CTSs)		Pearson Correlation	1	,575**
		Sig. (2-tailed)		,000
		N	323	323

When Table 8 is examined, it is a positive relationship between creating solutions that can be applied to other areas in practice and CTSs. The relationship between these two variables shows significance ($p > .05$).

7. *What level is the effect of Cognitive Competence (CC) on CTSs?*
Pearson Correlation Analysis was performed to detect the effect of CC on CTSs. Pearson Correlation Analysis results are offered in Table 9.

Table 9: The level effect of CC on CTSs

		CTSs	CC
CTSs	Pearson Correlation	1	,645**
	Sig. (2-tailed)		,000
	N	323	323

When Table 9 is examined, it is a positive relationship between CC and CTSs. The relationship between these two variables shows significance ($p > .05$).

4. Discussion

Research results show that cognitive competence is an important variable in terms of critical thinking ability. It has been concluded that cognitive competence is an important variable for the ability to think critically. It is a positive relationship between CTSs and training-in-school activities. The relationship between CTSs and training-in-school activities shows significance. Besides the relationship between CTSs and the benefit from various information sources. There is a positive relationship between pre-learning to solve new problems and CTSs. The relationship between these two variables shows significance. It is a positive relationship between creating solutions that can be applied to other areas in practice and CTSs. There is a positive relationship between CC and CTSs. The relationship between these two variables shows significance. The participants had no significant effect on critical thinking and cognitive competence of gender variables with the classroom.

These research findings show that cognitive competence has an effect on critical thinking. Because cognitive competence is an important variable in terms of critical thinking ability. An individual must have the ability to think critically to fully understand the scientific concepts underlying the problem he/she is facing and be able to analyse this problem correctly (Levesque, 2011). In addition, individuals with cognitive competence can use their critical thinking skills more effectively. In general, competencies such as critical thinking, problem-solving, cognitive competence, flexibility and adaptation are very important within the subject area that constitutes this field (Lee & Lee, 2020).

By using learning-teaching processes, the individual who learns can develop their critical thinking skills. In this research, there is a positive relationship between CTSs and training-in-school activities. It is already known that the ability to move and activity-based learning environments are necessary for the development of CTSs (Brookfield et al., 2005). The ability to solve problems is often associated with the processes of CTSs, analytical reasoning and designing decision-making processes. CTSs can solve problems more effectively (Snyder & Snyder, 2008). CTSs strengthens CC along with cognitive creativity (He, 2015). For this reason, CT and CC should be developed through activity-based educational processes. Higher levels of CTSs in individuals are associated with learning in the educational and learning processes (Ren et al., 2020). Therefore, a well-organized learning-teaching process can give students a high level of CTSs. It can be said this situation can be favorable for the development of cognitive competence. Because when individuals receive critical thinking training, they can increase their tendency to think critically and their critical thinking skills. This will also increase their cognitive competence (Murphy et al., 2014).

Teachers and school counsellors who support CT in their classrooms make significant contributions to the cognitive development of students and increase the positive attitude towards CT. When CTSs are regularly used in classes, students' participation in the process of critical thinking tends to increase (Seferoğlu & Akbıyık, 2006). This situation unquestionably reveals the importance of CT activities in the classroom. In addition, ensuring access to rich information resources for the individual plays a beneficial role in the development of the CTSs. The enrichment of information resources that the individual will use and have access to will contribute to the individual's ability to interpret and analyze by improving the existing critical thinking window of the individual. Besides, CTSs and CCs should be developed not only with artificial problems in the school environment, but also with the problems that individuals face in their daily lives (Sternberg, 2003).

5. Suggestions

Since CT is becoming increasingly important in life skills, it is inevitable that a person who is learning will have this skill set. It is necessary to create learning environments where the learner can share and evaluate the thoughts of the individual with others, and to organize learning and teaching activities aimed at understanding the perspectives of others. In particular, learner-centered and group-based learning environments can play a role to help develop the individual in this regard.

CT is the main educational goal of today's educational programs. In the context of this goal, it should be taken into account that individuals with cognitive competence will achieve significant development in terms of CT. In this way, significant progress can be made in the personal and professional development of other learning individuals, such as school consultations, which are the subject of this study.

Individuals who can use CT effectively in their lives are individuals with critical thinking skills and critical thinking tendencies. The cognitive competence of these individuals also differs significantly from other individuals. That is why the acquisition of CTSs and decencies should be among the goals of modern educational programs, and thinking skills should be the main position in the learning process, classroom, learning environments, and learning-teaching processes should be organized accordingly.

6. Limitations

This research is limited to participants' views on cognitive competence and critical thinking skills. The results were reached by taking into account the data collected by the data collection tools used to identify these views. Discussions and suggestions are included using these results.

Acknowledgements. This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

Conflict of interest. The authors have no conflicts of interest to declare. All co-authors have seen and agree with the contents of the manuscript and there is no financial interest to report. We certify that the submission is original work and is not under review at any other publication.

References

Abrami, P. C., Bernard, R. M., Borokhovski, E., Wade, A., Surkes, M. A., Tamim, R., & Zhang, D. (2008). Instructional interventions affecting critical thinking skills and dispositions: A stage 1 meta-analysis. *Review of Educational Research, 78*(4), 1102-1134. https://doi.org/10.3102/0034654308326084

Aizikovitsh-Udi, E., & Amit, M. (2011). Developing the skills of critical and creative thinking by probability teaching. *Procedia - Social and Behavioral Sciences, 15*, 1087-1091. https://doi.org/10.1016/j.sbspro.2011.03.243

Akyol, Z., & Garrison, D. R. (2011). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology, 42*(2), 233-250. https://doi.org/10.1111/j.1467-8535.2009.01029.x.

Almasi, M., & Zhu, C. (2020). Investigating students' perceptions of cognitive presence in relation to learner performance in blended learning courses: A mixed-methods approach. *Electronic Journal of e-Learning, 18*(4), 324-336. DOI: 10.34190/EJEL.20.18.4.005

Altaf, M. (2018). *Teach how to think not what to think*. Daily Times. https://dailytimes.com.pk/314636/teach-how-to-think-not-what-to-think/

Aviles, C. B. (1999). Understanding and Testing for" Critical Thinking" with Bloom's Taxonomy of Educational Objectives.

Behar-Horenstein, L. S., & Niu, L. (2011). Teaching critical thinking skills in higher education: A review of the literature. *Journal of College Teaching & Learning (TLC), 8*(2). DOI https://doi.org/10.19030/tlc.v8i2.3554.

Bensley, D. A., & Murtagh, M. P. (2011). Guidelines for a Scientific Approach to Critical Thinking Assessment. *Teaching of Psychology, 39*(1), 5-16. https://doi.org/10.1177/0098628311430642

Biggs, J. (1988). The role of metacognition in enhancing learning. *Australian Journal of education, 32*(2), 127-138.

Birgili, B. (2015). Creative and critical thinking skills in problem-based learning environments. *Journal of Gifted Education and Creativity, 2*(2), 71-80. DOI: 10.18200/JGEDC.2015214253.

Bloom, B. (1956). A taxonomy of cognitive objectives. *New York: McKay*.

Braus, J., & Wood, D. (1993). *Environmental Education in the Schools: Creating a Program that Works!* (Vol. 2). North Amer Assn for Environmental.

Breivik, J. (2016). Critical thinking in online educational discussions measured as progress through inquiry phases: A discussion of the cognitive presence construct in the community of inquiry framework. *International Journal of E-Learning & Distance Education, 31*(1), 1.

Brookfield, S. D., Tennant, M. & Pogson, P. (2005). Theory and methods of educating adults. New York: Wiley.

Butler, H. A. (2012). Halpern Critical Thinking Assessment Predicts Real-World Outcomes of Critical Thinking. *Applied Cognitive Psychology, 26*(5), 721-729. https://doi.org/10.1002/acp.2851

Cavus, N., & Uzunboylu, H. (2009). Improving critical thinking skills in mobile learning. *Procedia - Social and Behavioral Sciences, 1*(1), 434-438. https://doi.org/10.1016/j.sbspro.2009.01.078

Dewey, J. (1997). *How we think*. Courier Corporation.

Dwyer, C. P., Hogan, M. J., & Stewart, I. (2014). An integrated critical thinking framework for the 21st century. *Thinking Skills and Creativity, 12*, 43-52. https://doi.org/10.1016/j.tsc.2013.12.004

Ennis, R. H. (1985). A logical basis for measuring critical thinking skills. *Educational leadership, 43*(2), 44-48.

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

Garrison, D. R. (2007). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks, 11*(1), 61-72.

Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The internet and higher education, 2*(2-3), 87-105.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of distance education, 15*(1), 7-23.

Haber, J. (2020). *It's Time to Get Serious About Teaching Critical Thinking*. Inside HigherEd. https://www.insidehighered.com/views/2020/03/02/teaching-students-think-critically-opinion

Halpern, D. F. (1993). Assessing the effectiveness of critical-thinking instruction. *The journal of general education, 42*(4), 238-254.

He, W. (2015). Developing problem-solving skills with case study in a conceptual management course. *Journal of Business Case Studies (JBCS), 11*(2), 57-70.

Hollingworth, R. W., & McLoughlin, C. (2000). Developing first year science students' problem solving skills: Can we do it online. *ASCILITE Australia*.

Hwang, W.-Y., Chen, N.-S., Dung, J.-J., & Yang, Y.-L. (2007). Multiple representation skills and creativity effects on mathematical problem solving using a multimedia whiteboard system. *Journal of Educational Technology & Society, 10*(2), 191-212.

Karasar, N. (2016). *Bilimsel araştırma yöntemleri* [Scientific research methods (30th ed)). Nobel Publishing.

Kängsepp, P. (2011). Impact of Asking Support Questions on Grades 4 and 7 Students Reading Comprehension. *Creative Education 2*(4). DOI:10.4236/ce.2011.2405.

Klegeris, A., & Hurren, H. (2011, Dec). Impact of problem-based learning in a large classroom setting: student perception and problem-solving skills. *Adv Physiol Educ, 35*(4), 408-415. https://doi.org/10.1152/advan.00046.2011

Kong, S. C. (2014). Developing information literacy and critical thinking skills through domain knowledge learning in digital classrooms: An experience of practicing flipped classroom strategy. *Computers & Education, 78*, 160-173. https://doi.org/10.1016/j.compedu.2014.05.009

Kong, S. C. (2015). An experience of a three-year study on the development of critical thinking skills in flipped secondary classrooms with pedagogical and technological support. *Computers & Education, 89*, 16-31. https://doi.org/10.1016/j.compedu.2015.08.017

Kovanović, V., Gašević, D., Joksimović, S., Hatala, M., & Adesope, O. (2015). Analytics of communities of inquiry: Effects of learning technology use on cognitive presence in asynchronous online discussions. *The internet and higher education, 27*, 74-89. https://doi.org/10.1016/j.iheduc.2015.06.002.

Lee, K. M. (2004). Presence, explicated. *Communication theory, 14*(1), 27-50.

Lee, S.-M. (2014). The relationships between higher order thinking skills, cognitive density, and social presence in online learning. *The internet and higher education, 21*, 41-52. https://doi.org/10.1016/j.iheduc.2013.12.002

Lee, B. & Lee, Y. (2020). A study examining the effects of a training program focused on problem-solving skills for young adults. *Thinking Skills and Creativity, 37*. https://doi. org/10.1016/j.tsc.2020.100692

Levesque, A. A. (2011, Winter). Using clickers to facilitate development of problem-solving skills. *CBE Life Sci Educ, 10*(4), 406-417. https://doi.org/10.1187/cbe.11-03-0024.

Masduqi, H. (2011). Critical thinking skills and meaning in English language teaching. *Teflin Journal, 22*(2), 185-200.

Lodico, M. G., Spaulding, D. T., & Voegtle, K. H. (2010). *Methods in educational research: From theory to practice*. John Wiley.

Miri, B., David, B.-C., & Uri, Z. (2007). Purposely Teaching for the Promotion of Higher-order Thinking Skills: A Case of Critical Thinking. *Research in Science Education, 37*(4), 353-369. https://doi.org/10.1007/s11165-006-9029-2

Murphy, P. K., Rowe, M. L., Ramani, G. & Silverman, R. (2014). Promoting critical-analytic thinking in children and adolescents at home and in school. *Educational Psychology Revi¬ew, 26*(4), 561–578. https://doi.org/10.1007/s10648-014-9281-3

Myers, B. E., & Dyer, J. E. (2006). The influence of student learning style on critical thinking skill. *Journal of agricultural education, 47*(1), 43.

National Research, C. (2012). *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century. Committee on Defining Deeper Learning and 21st Century Skills*, James W. Pellegrino and Margaret L. Hilton, Editors. Board on Testing and Assessment and Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

Osburn, H. K., & Mumford, M. D. (2006). Creativity and planning: Training interventions to develop creative problem-solving skills. *Creativity Research Journal, 18*(2), 173-190. https://doi.org/10.1207/s15326934crj1802_4

Özçakmak, H., Köroğlu, M., Korkmaz, C. & Bolat, Y. (2021). The effect of metacognitive awareness on academic success. *African Educational Research Journal, 9*(2), 434-448.

Page, D., & Mukherjee, A. (2007). Promoting critical-thinking skills by using negotiation exercises. *Journal of Education for Business, 82*(5), 251-257. https://doi.org/10.3200/joeb.82.5.251-257

Papanastasiou, G., Drigas, A., Skianis, C., Lytras, M., & Papanastasiou, E. (2019). Virtual and augmented reality effects on K-12, higher and tertiary education students' twenty-first century skills. *Virtual Reality, 23*(4), 425-436. https://doi.org/10.1007/s10055-018-0363-2

Paul, R. (1993). *Critical thinking: How to Prepare students for a rapidly changing world*. Foundation for Critical Thinking; 1st edition.

Peter, E. E. (2012). Critical thinking: Essence for teaching mathematics and mathematics problem solving skills. *African Journal of Mathematics and Computer Science Research, 5*(3), 39-43. https://doi.org/10.5897/AJMCSR11.161.

Pithers, R. T., & Soden, R. (2000). Critical thinking in education: A review. *Educational Research, 42*(3), 237-249. https://doi.org/10.1080/001318800440579.

Popil, I. (2011, Feb). Promotion of critical thinking by using case studies as teaching method. *Nurse Educ Today, 31*(2), 204-207. https://doi.org/10.1016/j.nedt.2010.06.002

Ren, X., Tong, Y., Peng, P., & Wang, T. (2020). Critical thinking predicts academic performance beyond general cognitive ability: Evidence from adults and children. *Intelligence, 82*. https://doi.org/10.1016/j.intell.2020.101487 Research, I. S. f. P. (2000). *The concept of presence: explication statement*.

Rfaner, S. (2006). Enhancing thinking skills in the classroom. *Humanity & Social Sciences Journal, 1*(1), 28-36.

Rimiene, V. (2002). Assessing and developing students' critical thinking. *Psychology Learning & Teaching, 2*(1), 17-22.

Roberts, T. G. (2003). *The influence of student characteristics on achievement and attitudes when an illustrated web lecture is used in an online learning environment*. University of Florida.

Roy, A., & Macchiette, B. (2016). Debating the issues: A tool for augmenting critical thinking skills of marketing students. *Journal of Marketing Education, 27*(3), 264-276. https://doi.org/10.1177/0273475305280533

Rudd, R., Baker, M., & Hoover, T. (2000). Undergraduate agriculture student learning styles and critical thinking abilities: Is there a relationship? *Journal of agricultural education, 41*(3), 2-12.

Saiz, C., & Rivas, S. F. (2011). Evaluation of the ARDESOS program: An initiative to improve critical thinking skills. *Journal of the Scholarship of Teaching and Learning, 11*(2), 34-51.

Seferoğlu, S. S. & Akbıyık, C. (2006). Teaching critical thinking. *H.U. Journal of Education, 30*(2006), 193-200.

Short, M. N., & Keller-Bell, Y. (2021). Essential skills for the 21st century workforce. In *Research Anthology on Developing Critical Thinking Skills in Students* (pp. 97-110). IGI Global.

Snyder, L. G., & Snyder, M. J. (2008). Teaching critical thinking and problem solving skills. *The Journal of Research in Business Education, 50*(2), 90.

Sternberg R. J. (2003) Creative thinking in the classroom. *Scandinavian Journal of Educational Research, 47*(3), 325-338. DOI: 10.1080/00313830308595

Şendağ, S., & Ferhan Odabaşı, H. (2009). Effects of an online problem based learning course on content knowledge acquisition and critical thinking skills. *Computers & Education, 53*(1), 132-141. https://doi.org/10.1016/j.compedu.2009.01.008

Tarhan, Ö. (2015). Sosyal bilgiler öğretmeni adaylarının politik okuryazarlığa ilişkin görüşleri. *Akademik Sosyal Araştırmalar Dergisi, 3*(9), 649-669. http://dx.doi.org/10.16992/ASOS.538

Terenzini, P. T., Springer, L., Pascarella, E. T., & Nora, A. (1995). Influences affecting the development of students' critical thinking skills. *Research in higher education, 36*(1), 23-39.

Traphagan, T. W., Chiang, Y.-h. V., Chang, H. M., Wattanawaha, B., Lee, H., Mayrath, M. C., Woo, J., Yoon, H.-J., Jee, M. J., & Resta, P. E. (2010). Cognitive, social and teaching presence in a virtual world and a text chat. *Computers & Education, 55*(3), 923-936. https://doi.org/10.1016/j.compedu.2010.04.003

Ültanır, E. (2012). An epistemologic glance at the constructivist approach: Constructivist learning in Dewey, Piaget, and Montessori. *International Journal of Instruction, 5(2), 195-207.*

Widana, I. W. (2018). Higher order thinking skills assessment towards critical thinking on mathematics lesson. *International Journal of Social Sciences and Humanities (IJSSH)*. https://doi.org/10.29332/ijssh.v2n1.74

Yang, Y.-T. C., & Chou, H.-A. (2008). Beyond critical thinking skills: Investigating the relationship between critical thinking skills and dispositions through different online instructional strategies. *British Journal of Educational Technology, 39*(4), 666-684. https://doi.org/10.1111/j.1467-8535.2007.00767.x

Zimmerman, B. J., & Campillo, M. (2003). Motivating self-regulated problem solvers. In J. E. Davidson & R. J. Sternberg (Eds.), *Motivating Self-Regulated Problem Solvers* (pp. 233-262). Cambridge University Press.