

Teaching the 21st Century Learning Skills with the Critical Thinking Technique Based on the Argumentation Method

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Abstract

In today's world, rather than students who memorize information and only perform assigned tasks, education is more oriented towards raising inquisitive individuals with a strong consciousness. Contemporary education, thus, seeks to provide students with the abilities to think critically and analytically, to question or prove with arguments, and to build causal relationships between subjects in order to use the knowledge learned when needed. Taking all these expectations into account, teaching critical thinking skills and techniques based on the argumentation method can help students progress both cognitively and behaviorally. To this end, the goal of this qualitative case study is to provide students with the 21st century learning skills using the critical thinking technique on the basis of argumentation-based learning. The research group comprises of 40 students from Hatay Mustafa Kemal University's Faculty of Education. In the study, a semi-structured interview form was employed to gather data. As a result of the research, two main conclusions were made. Firstly, subjects can be better comprehended through classes that incorporate the use of ideas, views, proof, or evidence. Such classes can be taught in greater depth and without much difficulty. Furthermore, students' speaking and oral abilities, as well as comprehension skills, increase in sessions taught using the argumentation method and critical thinking strategies. Yet, it should be noted that in order to attain these results, lessons should be planned in accordance with the mentioned methods.

Keywords: Argumentation method, critical thinking, the 21st century learning skills, proving

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Introduction

The twenty-first century is a transformational one with a surge in scientific studies in a range of areas, such as economy and professions, sociocultural research, industrial and technical field, and politics, so with this quick development and transmission of knowledge, both individual attributes and the qualities and expectations placed on people change at a rapid pace (Uyar-Çiçek, 2021). In this regard, research shows that the one of the most important competencies of this century is self-development not only in but also outside of school within all domains of learning, which are cognitive, emotional, and psychomotor (Aydın & Tan-Şişman, 2021; Beers, 2011; Cansoy, 2018; Kylonen, 2012).

From their first breath to the last, people utilize the 21st century skills in their whole lives, particularly in their careers after graduating school (Aydın-Ceran, 2021). These skills are predicated on the reality that people have a profession, they develop themselves in that field, and they raise their success in a progressive manner by continuously improving in their career throughout their life.

The primary goal of 21st century life skills is to provide individuals with fundamental skills that have been determined or reported by various institutions and organizations, such as the Partnership for 21st Century Skills (P21), the Assessment and Teaching of 21st Century Skills (ATCS21), North Central Regional Educational Laboratory (NCREL), National Educational Technology Standards (NETS/ISTE), American Association of Colleges and Universities (AACU), Organization for Economic Cooperation and Development (OECD) and National Research Council NRC (Kalemkuş, 2021). These skills and the organizations that report on them are addressed and explained in detail in the paragraphs that follow.

Partnership for 21st Century Skills (P21): The P21 is a reference framework for assuring quality in vocational schools that strives to provide students with literacy skills in real-life areas so that they can develop themselves after graduation. The initiative, designed to teach 21st-century life skills, is now being implemented in 21 states throughout the United States and is partnered by 33 institutions (Gelen, 2017). The partnership encapsulates three different categories of skills, which are learning and renewal skills, life and career skills, and information, media, and technology skills (Voogt & Roblin, 2010). Firstly, learning and renewal include all aspects of interaction, cooperation, creative problem-solving, and critical thinking. Secondly, professional qualities including adaptability and resilience, self-management and entrepreneurship, social and intercultural competence, and leadership are included in career and life skills. Lastly, information, media, and technological literacy are recognized as the final classification of skills. The P21 main topics on which the 21st century skills are based were identified language-related subjects, positive and social sciences, and civics (Kylonen, 2012; Partnership for 21st Century Learning, 2007; Trilling & Fadel, 2009). To further elucidate the first two, language-related subjects include reading, language arts, acquiring other

languages, and knowing the English language, whereas the aforementioned sciences include mathematics, economics, geography, and history.

The Assessment and Teaching of the 21st Century Skills (ATCS21): Developed by the Assessment and Teaching of the 21st Century Skills group in 2009, the project divides the 21st century skills into four subskills as *ways of thinking*, *ways of working*, *tools for working*, and *life on earth*. First, skills labeled as ways of thinking include creativity and innovation, critical thinking, problem solving and decision making along with metacognition or learning to learn, whereas skills described as ways of working include communication and cooperation or teamwork in short (Griffin et al., 2012). Information literacy and information and communication technology (ICT) literacy are tools for work, and life on earth is the last subskill group, which covers citizenship, life and career skills, and personal and social responsibility (Binkley et al., 2010). The ATCS21 initiative, differing slightly from the others, also placed some emphasis on students while assessing the 21st century skills and concentrating on the importance of schools to education. In order for learners to successfully navigate the modern world and the workplace after graduation, the project contends that schools' incentives need to be raised.

North Central Regional Educational Laboratory (NCREL): With the slogan of “no child left behind”, the 21st century skills framework was jointly developed by NCREL and Metiri Group in 2003 as a result of two years of meticulous and effective work, which is intended to examine previously published projects and reports, frameworks required or established at national and international levels, and research done in the area of education (NCREL & The Metiri Group, 2003). The skills of the 21st century include a variety of properties, such as literacy in a wide range of fields like digital technology, ideation, critical and creative thinking, problem solving, effective communication, management, and effective use of mass media (NCREL & The Metiri Group, 2003). One of the NCREL skills is *digital age literacy*, which includes visual, mother tongue, and information literacy, basic mathematics, science, economic, and technological literacy, use of it for communication and learning, global awareness and multicultural literacy, and the ability to understand global events and problems. The capacity to manage complicated thoughts and solve challenges that individuals cannot overcome is referred to as *creative thinking*, which focuses on the goal of adapting and coping with complex events and self-management, to make new productions out of curiosity, creativity and risk taking with the properties of high-level thinking and reasoning. Moreover, individuals' ability to work as a group or as a team, cooperation and interpersonal adaptation skills, learning together, establishing positive relationships or communication, using technology consciously and responsibly, and personal, social, and social responsibility skills are all components of *effective communication*. Lastly, *high efficiency* is characterized by the ability to plan and execute a project, prioritize outcomes, effectively use technology in problem solving, organize

and deal with problems, effectively employ real-world tools, and generate informative, intelligent, and high-quality goods in accord (NCREL & The Metiri Group, 2003).

National Educational Technology Standards (NETS/ISTE): The National Educational Technology Standards (NETS) and the International Society for Technology in Education (ISTE) have devised these skills to help students, instructors, and administrators use technology more successfully and efficiently in their personal and professional lives. These competencies indicate that communication-related technologies should unquestionably be the focal point of teaching in all educational institutions (Partnership for 21st Century Skills, 2009). NETS/ISTE established student standards in 2007 as creativity and innovation, critical thinking, problem solving and decision making, communication and teamwork, digital citizenship, technology applications and ideas, research and knowledge fluency (ISTE, 2007). Then, in 2016, NETS/ISTE modified the predefined competencies and the seven key skills, emphasizing that education for students should make their life simpler and that acquiring 21st century skills should be student-centered. As the revised ISTE (2016) 21st century skills report is analyzed, it is clear that the document puts more of an emphasis on students as empowered learners and views them as technological or digital information producers, innovative designers, effective communicators, and computational logic thinkers. In line with these, empowered learners are those who possess the knowledge and abilities to design their own learning settings, employ technology in those areas, and establish their own learning goals (ISTE, 2016). Digital citizenship, secondly, is the recognition of one's rights, obligations, and chances to exist, study, and work in a connected digital environment while also acting in a safe, ethical, and legal manner, whereas thirdly, a knowledge constructor is someone with the capacity to develop original works, the ability to use digital technologies to create worthwhile learning experiences for others and oneself, and the capacity for critical thought (ISTE, 2016). Furthermore, an innovative designer is someone who uses a variety of technologies to pinpoint issues and find solutions by coming up with original, innovative, or practical ideas during the design process, and the goal of being a computational thinker is to raise people who can devise strategies, solve issues, and take advantage of technology (ISTE, 2016). Sixthly, raising people who express themselves creatively via a variety of materials and digital media is the goal of becoming a creative communicator, and lastly, training for using digital technologies to enhance learning while cooperating with local and international teams is known as being a global collaborator (ISTE, 2016).

When the 21st century skills report, updated by ISTE (2016), is examined, it can be seen that the report focuses more on students and they are updated as technological or digital information producers, innovative designers, effective communicators and individuals who think with computational logic.

American Association of Colleges and Universities (AACU): It is the framework in which the skills required by the graduates of a higher education institution are determined by the American association of Colleges and Universities. According to the report, individuals generally start a career in their field after graduating from a higher education institution. However, it may be possible for an individual to succeed in a profession primarily by acquiring a sustainable and lifelong understanding (AACU, 2007). These skills, which are determined by the Association of American Colleges and Universities, must be sustainable for life. They are the skills of individuals who have responsibilities for nature or natural life, socio-cultural structure, certain basic knowledge-practices-social responsibilities and have adopted the principle of progressivism. At the heart of these skills, which are required to be found in higher education graduates, there are firstly knowledge, then skills, experience and solving problems by being aware of them, having and using science and technology as well as literacy related to all values and branches of science that may be necessary in life. In the report, while higher education graduates are required to be successful at the highest level in their fields of expertise, they are also required to be literate at the least basic level of knowledge in related fields other than their fields of expertise and in other fields that may be necessary for them.

Organization for Economic Cooperation and Development (OECD): The OECD and the Portuguese government jointly held a summit on the future of education called ‘Skills for a Digital World’ in Porto on June 28-29, 2018. The aim of this summit was to develop the imagination of students in education, to enable them to participate in today’s digital education world, and to seek answers to how the knowledge, attitudes, values and behaviors that students need can be developed in today’s education system. At the OECD (2018) summit, the skills that students should have in the 2030s were tried to be estimated and three categories were determined to increase the skills of students in digital and social fields in those years. The first of these categories is to take responsibility by dealing with difficulties and problems. The second is that students can learn and apply ideas such as being open to innovations in all areas of life, creating innovative applications, coping with problems or difficulties. The third is to enable students to make self-assessment by improving their skills such as self-control, self-efficacy, taking responsibility and problem solving. The OECD 2030 learning framework, jointly prepared by a community of government representatives, researchers, thought leaders, academics, educators and experts in various fields, determined by leaders, administrators, teachers, students, parents, universities and local organizations, aims to understand how students should guide their lives and futures and it is a guide that determines the knowledge, behavior, values and attitudes that may be necessary for the development of the world, the welfare and future of societies. This guide presents not only individual requirements or competencies, but also some of the must-haves that may be necessary for the education of the future (OECD, 2018).

The most important of these essential requirements is that the individual should not only work in one specific field, but should have a multidisciplinary education understanding. In other words, they should both know their own area of expertise and have literacy specific to other areas. Thus, the individual should be able to look at subjects or events through the eyes of researchers in different fields.

National Research Council (NRC): NRC is a framework developed by combining the initials of Science, Technology, Engineering, Mathematics (STEM) fields. NRC is a comprehensive research prepared by NRC officials by holding symposiums, congresses, workshops and scientific meetings between 2005-2009 on what the necessary skills should be for individuals' working life. In the research, it was tried to determine what the skills and characteristics should be in the STEM education in the 21st century information society. In the research, it has been determined that there are three types of skills that may be required or should be found in the individual. The first of these skills is *cognitive skills* such as critical thinking, analytical thinking, problem solving, reasoning, creativity, the second is *interpersonal skills* such as personal and social communication skills, social skills, teamwork, problem solving, coping with difficulties and the third is *intrapersonal skills* such as self-management, self-regulation, personal development, responsibility, lifelong learning, and adaptation (Soland et al., 2013). According to the NRC skills framework, reasoning, analytical thinking, judgment and decision making are at the center of cognitive skills, listening, persuasion, self-expression, effective use of gestures and facial expressions, respecting the opinions of individual are at the center of interpersonal skills, self-development, planning, effective use of time, self-regulation and self-control are at the center of intrapersonal skills (National Research Council, 2011). It is also stated that with the combination of the skills in these three dimensions determined in the research, there will be a permanent and deep learning in the mind.

Argumentation-Based Learning

Argumentation is a process in which reasons and evidence are used to support or refute a claim that has been put forward (Toulmin, 2003). Its foundation dates back to Aristotle's rhetorical art 2500 years ago (Freeley & Steinberg, 2013). The method gained popularity and started to be used as a method after Toulmin's work titled 'The Uses of Argument' published in 1958 (Driver et al., 2000; Erduran, Simon & Osborne, 2004). The model developed by Toulmin includes a claim about a topic or opinion, grounds supporting this claim with various evidence, reasons for linking the claim with the grounds, supports to make the arguments stronger, and finally, rebuttals used to indicate the situations in which the claims cannot be realized (Erduran et al., 2004).

As a concept or definition, argumentation is a reasoning process in which claims, grounds and warrant components are used and arguments are created with these components (Toulmin, 2003), an individual activity through thinking and writing, or a social activity within a group (Driver et al.,

2000), and reasoning that aims to increase the acceptability of the ideas by the audience or readers before making a logical judgment (Van Eemeren et al., 1996). The argument that we encounter a lot in the argumentation process can be expressed as the series of speeches made to explain the opposition between two opposing situations or the activities performed to reach logical and coherent decisions (Kaya & Kılıç, 2008), or the structures that individuals create to express and justify the claims put forward (Sampson & Clark, 2008).

Toulmin's Argumentation Model is powerful in terms of evaluating arguments and consists of six variables: claim, grounds, warrant, qualifier, rebuttal and backing (Jimenez-Aleixandre et al., 2000; Bell & Linn, 2000). The order of the argument structures according to Toulmin's model:

Grounds: Statements that help reach the claim. Grounds are evidence used to show facts about an event and to support a claim.

Claim: Claims that contain reasons to justify the grounds. The argument consists of at least two components, the claim and grounds. Arguments are used to persuade the other party.

Warrant: It provides justification for the relationship between the grounds and the claim. Claim, grounds and warrant are the basic building blocks of these components that make up Toulmin's model.

Backing: Backing ensures the accuracy and credibility of the grounds. It is used when grounds are not accepted.

Rebuttal: It refers to situations where the claim is not valid. It includes exceptions.

Qualifier: It specifies the conditions under which the claim can be accepted. Except as specified by the qualifier, the claim is not valid.

It can be said that there is a spiral relationship between Toulmin's argument structures. Grounds support the claim, warrant provides a link between the grounds and the claim, backing strengthens the warrant, and qualifier indicates the situations where the claim is not true, and creates the limits of the claim (Toulmin, 1958; Osborne et al., 2004).

In classroom environments where argumentation-based learning technique is used, students use scientific theories, grounds and evidence to defend their claims about the subject or refute other claims (Simon et al., 2006). With the argumentation-based learning approach, individuals question the ideas or information they have previously developed in their minds. Individuals find the grounds required for this technique by reasoning or critical thinking in accordance with the academic mindset. At the end of learning, conceptual changes occur in individuals as a result of both defending and refuting ideas.

When the literature is examined, it has been determined that the researches on argumentation-based learning are mostly limited in number and mostly focused on numerical/computational courses or subjects, while the studies on verbal fields are almost nonexistent. For this reason, the main purpose of this research is to create a resource for the field and to provide students with critical thinking skills in the argumentation-based teaching principles and methods course of 21st century learning skills that have not been studied before, and to contribute to the field in this regard. With the research, it is planned that the 21st century skills of teachers, academicians or trainers will provide students with critical thinking skills on the basis of argumentation.

Critical Thinking

Critical thinking is the process of understanding, observing or making sense of events based on evidence (Sarigöz & Özkara, 2015; Sarigöz, 2014). According to Paul (1984), it is a disciplined and self-controlled way of thinking that reveals perfect thinking about a particular field or form of thinking. According to Scheffer & Rubenfeld (2000), it is the art of thinking about what you are thinking while you are thinking about improving your way of thinking. In this regard, critical thinking is a high-level thinking skill on subjects such as realizing, analyzing, developing realistic criteria about the subject or subjects, questioning the accuracy of the subjects. In order for the individual to make the right decisions in life, it is necessary to have critical thinking skills (Sarigöz & Bolat, 2018).

The common ground of the methods to be used in critical thinking teaching is to enable students to be active in their own learning, to look at an event or phenomenon from more than one perspective, and to be participative in group work that supports cooperation (Mastrian & McGonigle, 1999). There are 5 basic methods scientifically proven to provide effective and efficient results in teaching critical thinking (Şenşekerci & Bilgin, 2008). These are the Six Thinking Hats Method, the Brainstorming Method, the Questioning Method, the Intellectual Norms Activity and the Critical Media Literacy Training Method (Baştıpçı, 2018; Şenşekerci & Bilgin, 2008).

Method

Purpose and Model of the Research

The aim of this research is to enable students to gain the 21st century learning skills with critical thinking method based on argumentation-based learning. In the research, the “case study” method, one of the qualitative research methods, was used in order to determine and analyze the opinions of prospective teachers studying in different departments about what the 21st century learning skills are. Case study is a research method that is used to reveal the existing situation as it is, based on “how” and “why” questions, which allows the researcher to examine a phenomenon or event in depth (Yıldırım & Şimşek, 2021).

Study Group of the Research

The study group of the research consists of 40 students studying in different departments and taking the Adult Education and Lifelong Learning course taught as an elective course in Hatay Mustafa Kemal University Faculty of Education.

Data Collection Tool

Before collecting the data required for the research, that is, before starting the study, the necessary permission for the research (E-30013534-302.08.02-107341) was obtained from the Dean of the Faculty of Education, Hatay Mustafa Kemal University. Afterwards, in the research, the teacher candidates were taught 21st century learning skills for 6 weeks, two hours a week, and they were provided with information about 21st century learning skills with critical thinking methods (brainstorming method, questioning method, 6 hats thinking method, intellectual norms activity method, media literacy training method) based on argumentation method. Then, the opinions of the candidates about the subject were received using the interview approach method. In the research, the interview form was used while receiving the opinions of the teacher candidates. The interview form approach is a type of approach that provides time flexibility to the researcher and the interviewer, and in which the interviewer has the freedom to both ask pre-prepared questions and ask additional questions in order to get more detailed information about these questions, while remaining loyal to the subject or areas for which they have prepared beforehand (Karasar, 2016; Yıldırım & Simsek, 2021). In this study, a semi-structured interview form was used. In semi-structured interviews, although the interview questions are prepared in advance by the researcher, it may be necessary to think and ask new questions according to the progress in the interview (Yıldız-Bıçakçı et al., 2017). Semi-structured interviews also allow the participants to reorganize and discuss the questions created by providing partial flexibility during the interview (Ekiz, 2003).

Descriptive analysis and content analysis were used in the analysis of the research data collected through the interview form. With the descriptive analysis, the necessary concepts in the answers were placed under the determined themes, the concepts were ordered by coding and taking their frequencies, and the sub-themes were determined with the content analysis. In descriptive analysis, the data are placed under predetermined themes, while in content analysis, sub-themes and themes belonging to the codes are extracted from the data (Yıldırım & Şimşek, 2021).

Table 1. Teacher candidates' views on 21st century learning skills

Theme	21st Century Learning Skills Expressions	F
Education and training	Digital technologies, use of technology	31
	Technology literacy	29
	STEM	17
	Nature, natural life	10
	Sociocultural structure	6
	Guidance	3
Understanding and comprehension	Creativity, innovation	28
	Social responsibility	19
	Self-Sufficiency	16
	Qualified personnel, workforce	12
	Coping with difficulties and problems	10
	Self-control	8
	Graduation from a school, a program	7
Motivation	Being information literate	4
	Motivation	32
	Increasing success	23
	The desire to achieve	12
	Activating requests, hobbies	8
	Concentration	5
Reinforcement and forgetfulness	Willingness to improve and evolve	2
	Critical thinking	27
	Following the technology	25
	Learning to learn, knowing how to learn	17
	Collaboration, sharing	9
	Trying to be successful all the time	5

Table 1 includes the themes and expressions related to the opinions of the teacher candidates on 21st century learning skills. Based on these themes and expressions, a semi-structured draft interview form consisting of 4 questions was created. Hereupon, the form was revised with the help of faculty members in educational sciences who do research on teaching, method and technique, and the semi-structured interview form was finalized after necessary corrections were made.

The questions in the semi-structured interview form were determined as follows.

1. What do you think about teaching 21st century learning skills with critical thinking skills based on the argumentation method?
2. What do you think about the effect of teaching 21st century learning skills with critical thinking skills based on the argumentation method on understanding and comprehension?
3. What do you think about the effect of teaching 21st century learning skills with critical thinking skills based on the argumentation method on increasing student motivation?
4. What do you think about the effect of teaching 21st century learning skills with critical thinking skills based on the argumentation method on reinforcement and forgetfulness?

Findings

The findings regarding the questions in the semi-structured interview form asked to the teacher candidates in the study were evaluated and interpreted in this section. The interview forms obtained from the opinions of the teacher candidates participating in the research were listed and named as (T1, T2, T3, T4, ...).

Question 1. What do you think about teaching 21st century learning skills with critical thinking skills based on the argumentation method?

Most of the teacher candidates stated that especially the events with documents, films, photographs or evidence can be better understood with critical thinking skills and can give a different perspective to the event or subjects than expected. They also stated that individuals who are critical of events and try to prove events in scientific ways can make more stable decisions by thinking more logically over time. Some of the teacher candidates argued that it would be more logical to use evidence-based learning in numerical/computational lessons, while some teacher candidates are of the opinion that critical thinking skills can be used in all areas of education, yet it would be more logical to use the argumentation method only in subjects that can be documented or proven.

“...the events that can be proven in the social sciences are usually events related to geography or documents in the field of history. Therefore, since the lessons taught with the argumentation method and critical thinking method require high intellectual skills, students can gain a different perspective especially on historical events.” (T17).

“...I think individuals who do research or make decisions by combining the argumentation method with critical thinking skills begin to think more logically and scientifically over time.” (T8).

“...argumentation method is a method based on proof or evidence. It can also be used easily in many fields of social sciences. However, it would be more appropriate to use it not in social sciences, but in science courses with proof in numerical/computational departments or in different areas of provable positive sciences.” (T21).

“...especially for subjects that will be handled by the argumentation method, it is necessary to redesign classes or rearrange methods according to their properties. If the deficiencies of the classes are completed and the method is made available for use, the argumentation method can be easily used in all areas by combining it with other methods.” (T37).

“...21st century skills can be acquired by students using the argumentation method. However, I believe that as a second method, it will contribute more to the student if it is taught through discussion method rather than critical thinking skills.” (T13).

Teacher candidates think that 21st century learning skills can be easily taught with critical thinking skills based on the argumentation method. However, there are also teacher candidates who believe that the teaching of 21st century learning skills by the method of argumentation-related discussion will also have a positive impact on teaching.

Question 2. What do you think about the effect of teaching 21st century learning skills with critical thinking skills based on the argumentation method on understanding and comprehension?

Since the argumentation method is a method based on ideas, opinions, understanding, proof or evidence, the topics covered in the courses should be explained by proving them with documents or ideas. Moreover, when the topics covered with these methods are also handled with critical thinking techniques, it will be ensured that the students understand the topics down to the smallest detail without leaving any question marks in their minds. Moreover, the conversation and speech abilities of the students who explain the topics in the classroom and discuss them with their friends will also improve. All these will help the individuals' mind to develop, and will also improve their ability to understand and comprehend.

"...in the lessons taught with argumentation-based critical thinking skills, students can understand and comprehend the subjects better as they constantly generate ideas, try to prove everything and discuss. However, for all these events and defenses, it is necessary for the students to have developed skills such as their readiness, expression skills and speaking ability, especially their persuasion ability." (T6).

"...if the environments in which these methods will be used or applied are not an oppressive and authoritarian environment, the methods can be easily used in all areas of social sciences and students can better understand and comprehend the subjects thanks to these methods." (T19).

"...if the classes are made into groups of several people for the topics to be covered with the critical thinking method depending on the argumentation method, the students in the group can better understand and comprehend by discussing with each other or by collaborating and explaining the issues to each other." (T28).

"...as there will be a culture of continuous discussion and thinking among the students in the lessons taught with critical thinking skills depending on the argumentation method, the topics will be discussed in every aspect, down to the smallest details, even their positive and negative sides. This, in turn, will enable students to better grasp and understand the subjects in every aspect." (T35).

It can be said that the argumentation method, together with critical thinking techniques, will positively affect students' understanding and comprehension. In addition, students can develop not only their comprehension skills, but also other skills such as effective speaking, rhetoric and expression skills.

Question 3. What do you think about the effect of teaching 21st century learning skills with critical thinking skills based on the argumentation method on increasing students' motivation?

The teaching of 21st century learning skills with critical thinking methods based on the argumentation method in the lessons, and especially the fact that the subjects are related to digital technologies, coping with difficulties, nature, natural life, graduating from a university, qualified personnel and workforce attracted the attention of teacher candidates beyond measure. Another important issue here is that teacher candidates who are about to graduate or start work life should also concern themselves with issues such as workforce, graduation and qualified personnel. For this reason, the teacher candidates were more motivated for the topics covered since they were in their area of interest or related to them.

"... in the lessons taught with the argumentation method, students have to be more careful both to listen to the other person very well and to develop a counter-view, as they try to refute the opinion of the other person. This, of course, increases the motivation of all students in the lessons taught with this method." (T20).

"...the students who will be prepared for the lessons according to these methods will focus more on the subjects as they will constantly plan what to say, how to respond to the ideas and thoughts of the other person, how to refute the ideas of the other person and how to defend what is told, and this situation will increase the motivation of the student." (T12).

"...according to the argumentation method and the critical thinking method, students should listen carefully to the topics their friends are talking about or defending. For this, all students must listen to what is told and produce ideas and information which they will use to defend their opinions. All these will make students more motivated for the subject." (T29).

"... teaching with critical thinking skills based on the argumentation method or students' defending their ideas against other ideas is a stressful situation and puts students under serious stress. Since students who are under stress have to develop ideas both to understand what the other person is saying and to refute what is being told, their motivation will increase along with stress and they will be more motivated for the subjects." (T1).

The desire to win a sweet competition in students can increase motivation and lead students to success. A little stress will increase motivation, and this type of stress can also bring success. However, while little stress brings success, too much stress can disrupt the student's physiological and psychological balance. Excessive ambition and desire to win can sometimes lead to undesirable results for students. For this reason, especially teachers should be very careful in such lessons and intervene where necessary in the lessons to prevent in advance all events that may develop negatively.

Question 4. What do you think about the effect of teaching 21st century learning skills with critical thinking skills based on the argumentation method on reinforcement and forgetfulness?

Reinforcement in education can be explained as motivating the student during the lesson, as well as being perceived as repeating the previously covered topics, encouraging learning, motivating and giving attention to the topics covered, or making routine repetitions about the topics covered. Forgetfulness is the forgetting of a learned subject over time as a result of not being repeated. In places where there is reinforcement, forgetfulness is minimized or even almost nonexistent. Because researching or repeating a subject eliminates forgetfulness. Since the argumentation method is a method that depends on evidence, proving and generating ideas, thus thinking, reinforcement is a necessary condition in the subjects taught with critical thinking methods based on the argumentation method, while forgetfulness becomes a rare or even non-existent situation due to these reinforcements.

“...reinforcement is the repetitions made in order not to forget a previously learned subject or to learn if there are deficiencies in the previously learned subjects. While I was learning 21st century learning skills, I listened to the opinions of my friends and developed new ideas for their defense. While doing this, I put a lot of effort into thinking at a higher level and being motivated. I think it is very difficult to forget a subject that is learned by constantly thinking, contemplating, trying to keep in mind and repeating in this way.” (T15).

“... I was very excited while listening to the lessons with the method of argumentation and critical thinking. I was listening to what was being taught very carefully and paying attention to everything that was told in case I could come across a different idea at any moment. I think that I will not forget what I learn in a lesson in which I am so attentive and motivated for the rest of my life.” (T31).

“...we were not so excited and so careful in the previous lessons. In particular, the groups trying to refute each other’s ideas or arguments and defending their ideas against each other prompted all my classmates to be more careful and to constantly reinforce each topic discussed. This, I think, eliminated our forgetfulness problem. I think that teaching the lessons with these methods will enable students to better understand, reinforce and think about the subjects, and not to forget the subjects covered for a long time.” (T27).

Since the topics to be covered with the argumentation method and critical thinking theories are given to the students before the lessons, the students do research on the given or determined topics before they come to the lesson and increase their readiness. Therefore, while researching the subjects and teaching the subjects in the classroom, what they learned is reinforced and their forgetfulness decreases.

Conclusion and Discussion

Argumentation method is a learning method that aims to develop the individual's thinking skills such as critical thinking, creative thinking, problem solving, analytical thinking, decision making, causation, deep thinking and more in-depth questioning. The argumentation method is based on believing scientific claims by justification, rather than just believing scientific claims. In the research, the teacher candidates stated that their critical thinking skills improved thanks to the argumentation method. In some studies (Türkoğuz & Cin, 2013; Öğreten, 2014; Demir, 2006; Yeşildağ-Hasançebi & Günel, 2013; Tahiroğlu, 2006; Demircioğlu & Uçar, 2015), it has been concluded that argumentation-based teaching improves the individual's critical thinking skills and increases academic success.

In the research, as a result of the opinions of the teacher candidates, it has been concluded that the demonstrable or provable situations or events can be better understood by the students, the subjects with evidence can be better grasped with critical thinking methods and skills, and the students can develop different perspectives and more logical thoughts. In some studies, the vital thing in the lessons taught using the argumentation method is that the topics include critical thinking during the discussions, they are based on proof and whether the ideas defended in the discussions can be refuted or not. According to Kuhn (1991-2010), the quality of the topics covered depends on claims, grounds, warrants and rebuttals, and carefully determined arguments with these features increase the motivation of students by improving their quality of thinking. In a study conducted by Topçu (2008), it was concluded that teacher candidates mostly supported the grounds they created during the discussions with warrants and tried to prove those grounds. In a study carried out by Torun and Açıkgül-Fırat (2020), it was concluded that the teacher candidates defended their grounds by conducting high-level thinking during a discussion. Hence, since the topics covered by the argumentation method are based on proving and refuting, the individuals who will be involved in the discussion according to this method should think at a high level, keep their motivation high and use their minds very well, especially so that their claims are not refuted by the other party.

In the research, it has been concluded that when the discussion method is added to the methods and techniques used in the lessons taught with the argumentation method and critical thinking methods, the subjects can be learned in a more in-depth and detailed manner without leaving any question marks in the minds. In a study conducted by Birdal, (2019), it was inferred that teacher candidates acquire more in-depth information while preparing for the lessons that will be taught with the argumentation method, and they place the information they have acquired in their minds based on proof and evidence. In a study conducted by Dori, Tal and Tsaushu (2003), it was concluded that the students' decision-making skills, and, accordingly, their thinking skills improved in the lessons taught using the argumentation method. Based on the data of those studies, it can be said that when the

argumentation method is used with the right techniques and methods, it improves the students' skills such as in-depth learning, high-level thinking and decision making.

Subjects such as qualified personnel, graduation, workforce, nature and technology related to 21st century learning skills attract the attention of teacher candidates and all individuals and all students with future plans. Since 21st century learning skills consist of future-oriented, attention-grabbing topics, and the topics are taught with the argumentation method and critical thinking techniques, it has been found out in the research that students' high-level thinking skills and likewise their motivation for lessons will increase in lessons taught in this way. In some studies (Simon & Richardson, 2009; Nussbaum, 2002), it has been concluded that choosing the topics to be taught using the argumentation method from technological topics, remarkable topics or daily life increases the interest and motivation of the students in the course.

In the research, it has been concluded that students' motivation, interests, desires and attention regarding the subjects will be higher in the lessons taught with the argumentation method and critical thinking methods in schools, unlike traditional methods. In addition, in the research, it has been concluded that the students can constantly discuss the subjects among themselves and exchange ideas, therefore the reinforcers and reinforcements on the subjects covered in the lessons will constantly increase and this will lead to a decrease in the forgetfulness, and the knowledge and positive behaviors will be acquired in a more permanent way.

In the research, some basic skills that should be possessed by teachers who will teach their lessons with the argumentation method and critical thinking techniques were determined by the teacher candidates. These are skills such as teachers being a good observer, solving questions, listening to students' ideas, respecting the ideas produced, having strong communication skills, knowing the subjects in depth and clearly, having a grasp of other subjects related to the subject covered, making the points to be evaluated more prominent and having up-to-date information on the subject (Aydoğdu, 2017; Tahiroğlu, 2006; Republic of Turkey Ministry of National Education, 2013; Rojas-Drummond & Mercer, 2003; Saygılı, 2015; Mcneill & Pimentel, 2009). In addition, in the research, it has been concluded that teachers who want to teach the lessons according to these methods have also trained themselves in subjects such as correcting the misconceptions about the subject, making the lesson more productive, creating awareness, permanent learning by reducing forgetfulness, self-confidence and self-reliance, increasing motivation and better understanding of the subject.

Recommendations

In the classrooms or environments where the lessons will be taught with the argumentation method and critical thinking skills, a safe and comfortable environment should be created (Yaşar, 1998). In fact, before starting any lessons in the classroom, an environment should be created where

there are basic rules such as being respectful to each other, obeying the rules and not making personal attacks.

It is very important to determine and plan the topics so that the topics to be covered by the argumentation method can be suitable for proof and discussion. The topics to be taught with this method should be determined by considering factors such as students' readiness, physical conditions of the school, success level, access and use of technology, the number of students in the classroom, access to information and the duration of the lessons.

Each student should be given as much time and opportunity as possible to defend their opinion, evaluate the arguments being defended, or express themselves, furthermore, students should be encouraged by the teacher to create arguments, generate ideas, and participate in discussions.

Learning and teaching methods and techniques such as argumentation method, discussion method, critical thinking methods and skills are provided to teacher candidates in the teaching principles and methods courses in education faculties. Teacher candidates take these courses mostly in theory at universities. Therefore, both the argumentation method and critical thinking techniques as well as other methods and techniques that teacher candidates can use throughout their teaching life should be given to all teacher candidates in education faculties of universities on an applied basis.

All teachers, teacher candidates or academicians who regard themselves as inadequate in terms of methods and techniques and in other subjects needed and used in education or who want to improve themselves should be provided in-service trainings on all methods and techniques needed and necessary and this should be provided by institutions and organizations (Kardaş, 2013).

When the studies on the argumentation method or the literature are reviewed and examined, it is obvious that there are a limited number of studies in the field of social sciences, and the studies and research were mostly conducted in science or numerical/computational fields. Therefore, the number and type of studies in the field of social sciences related to or based on the argumentation method should also be increased.

Conflict of Interest

The author declares that he has no conflicts of interest.

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