

Teacher Candidates' Critical Thinking Tendencies Research in Turkey: A Content Analysis

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Abstract In this study, empirical studies related to the tendency think critically of teacher candidates in Turkey were examined. These studies were evaluated systematically by means of thematic content analysis. In research the WEB OF SCIENCES, ERIC, SCOPUS, EBSCO and ULAKBIM databases were scanned for the years 2012-2017, and 45 academic articles were examined. It was found out that studies are concentrated in the screening and relational model and work in a limited number of experimental models. Furthermore, it was observed that the relationships between individual variables and the tendencies of critical thinking were positive and significant. Some findings reached the conclusion that experimental intervention programs are effective. Teacher candidates' critical thinking tendencies were generally low. In addition to the studies, common findings on whether socio-demographic variables make a difference were rarely encountered.

Keywords Critical Thinking, Teaching, Candidate Teacher, Thematic Content Analysis

1. Introduction

Critical thinking is among the discussion topics of educational organizations. The development of students, who are the raw material of educational organizations, and the emergence of their potentials or differences are achieved by having interrogative and sceptical thinking characteristics because one of the main objectives of education is to help students to learn and to improve their success. Dewey indicates that the main objective of education is to think about learning. In this context, modern education systems aim to improve the thinking skills of teachers and students while creating education programs [1]. Critical thinking skills in education and training are based on the individual's ability to identify problems and to question the knowledge [2]. To make individuals gain

critical thinking skills is among the common assumptions for education. Indeed, in the education literature, the critical thinking skill is expressed as a metacognitive thinking skill. Metacognitive skills are defined as the individual's interpreting and logical reasoning abilities [3].

Critical thinking focuses on cognitive skills such as analysis, interpretation, inference, explanation, evaluation, and reasoning [4, 5]. Critical thinking is a concept that aims to be logical, to think reflectively and to focus on the work [6]. In other words, critical thinking is the ability of people to discuss [7]. According to Paul and Elder it is people's ability to take responsibility for the ideas put forward by them [8]. Despite these definitions, Tishman, Jay and Perkins regard critical thinking disposition as a tendency to search, take intellectual risk and clarify the problem rather than cognitive skills. In this context, critical thinking ability can be expressed as the way people evaluate their thoughts and perceptions about the world and events [9].

Critical thinking studies have generally focused on critical thinking tendency (CTT) and skills [10]. While CTT is considered as an individual's motivation for critical thinking, the critical thinking skill is based on the individual's decision making and reasoning skills for the solution of a problem [11]. On the other hand, critical thinking skills have been identified with problem solving skills [4, 12, 13, 14] because critical thinking skills consist of the processes of understanding and identifying the problem, deciding to solve and solving the problem for an individual to deal with the problems faced. In this respect, it can be stated that both concepts are related to each other and that it is not possible to make a complete distinction between these two concepts.

There are many components within the scope of critical thinking. Paul, Elder, and Bartell based the essence of the concept on four important components considering the definitions of critical thinking in the literature [15]. These are the ability to deal with reasoned discourse, reasoning ability in the context of intellectual standards, the skills including analytical inference, and commitment to basic values including certain characteristics and tendencies.

Kennedy, Fisher, and Ennis argue that CTT is based on the assumptions related to a certain problem. These assumptions consist of the clarification of problems, searching for options, open-mindedness, the analysis of inductive and deductive logic, and the investigation of the validity and reliability of information [16]. Tishman, Jay and Perkins indicated that the components of critical thinking tendency are open-mindedness, ability to find problems, ability to conceptualize problems, ability to develop and interpret plans and strategies, seeking for truth, and ability to use and reflect mental processes [9].

In Turkey, education programs' objectives include raising individuals who are able to think critically, interrogatively and reflectively. The Ministry of National Education (MoNE) has listed content knowledge, pedagogical content knowledge and legislation knowledge in the professional knowledge which is included in the general competencies of the teaching profession. Among these competencies, content knowledge emphasizes teachers' interrogative, theoretical, methodological and factual knowledge in their fields [17]. Therefore, it can be said that it is attempted to address CTT as an important approach in education. Critical thinking tendencies were generally low. In addition to the studies, common findings on whether socio-demographic variables make a difference were rarely encountered.

There are many studies on teachers' CTT in the national literature. It was observed that the relationships between CTT and argumentative writing instruction [18], individual innovativeness [19], environmental ethics approaches ([20], academic achievement [21], media literacy [22], creative thinking [23], problem solving and teacher self-efficacy [24], and learning styles [25] were examined in the studies. In this context, studies on teachers' CTT, tendencies, study subjects, research methods, findings, and results should be discussed with a holistic approach. Studies carried out on this subject are considered important in terms of revealing the strengths and weaknesses of the literature and shedding light on the studies that are likely to be carried out in the future. On the other hand, they will be helpful for researchers who will carry out studies in this regard with respect to filling theoretical gaps and application-related gaps in the studies on CTT. In this context, the aim of this study was to reveal the tendencies of the studies on teachers' CTT. Within the scope of this aim, the problem of the research is as follows: "What are the tendencies of the studies on teachers' critical thinking tendencies in the national literature?"

2. Materials and Methods

This is a thematic content analysis (meta-synthesis) study, one of the types of content analysis. In the thematic content analysis, themes are created from independent studies carried out on the basis of the same subject, and these studies are evaluated together. Comments are

created in this context [26]. The findings and results in similar studies are discussed from a critical point of view. Analysis and interpretation are performed within the scope of the selection criteria determined [27]. The thematic content analysis provides those who carry out studies on that issue with an opportunity to see different dimensions of articles as a whole and saves time for researchers in new studies [28].

2.1. Data Selection Criteria

The tendencies in the studies revealing teacher candidates' CTT were examined in this study. Some article selection criteria were determined to identify these studies. These criteria are (i) the fact that the articles were published in peer-reviewed journals, (ii) the fact that the studies were carried out in teacher training programs in Turkey sample, (iii) the fact that they were published between the years 2012-2017, (iv) and the fact that the articles were scanned in the WEB OF SCIENCES, ERIC, EBSCO, SCOPUS and ULAKBIM databases. The most important reason for the selection of articles between 2012 and 2017 is that there has been a very substantial increase in the studies on teacher candidates' critical thinking tendencies since 2012. In this research were analyzed to publish in 45 studies between 2012 and 2017 for years. The studies that were scanned in peer-reviewed journals and the relevant databases in the last five years were included in the studies to see the tendencies in studies more clearly. "Critical thinking", "teacher candidates' critical thinking tendencies", "critical thinking skills", "critical thinking dispositions" were used as keywords in this study. The articles examined in the study are indicated in the references section.

3. Findings

The In this section, the methods in the studies analyzed, the subjects examined, and the levels of the relationship of CTT with different individual and contextual variables are revealed, respectively.

3.1. Method and Design

Every as it is seen in Table 1, the studies carried out consist of 18 descriptive screening studies, 18 relational studies and 9 experimental studies. It was determined that quantitative research methods were used in all of the studies reached. It was observed that the CTT scale which was developed by Facione, P. A., Facione, N. C. and Giancarlo [58] and adapted into Turkish by Kökdemir [59] was mainly used in the studies. The use of a similar scale in many studies made it easier to comment on common findings. In these studies, the main research fields related to teacher candidates' CTT are as follows:

Table 1. Distribution of Studies by Methods and Designs

Method	Design	f
Quantitative	Relational	18
	Alkın-Şahin, Tunca and Ulubey [29], Aybek, [30], Bulgurcuoglu [31], Berber [32], Cansoy and Turkoglu, [24], Cetin [25], Demir and Kaya [33], Karagöl and Bekmezci [21], Karaman [22], Karasakaloğlu, Karacaloğlu and Özelçi [34], Karataş and Başbay [35], Kezer, Oğurlu and Akfırat [36], Kırmızı, Fenli and Kasap [37], Oğuz and Sariçam [38], Özgür [19], Saka [20], Ülger [23], Yenice [39].	
	Descriptive	
	Açıslı [40], Akgun, Duruk [41], Aybek and Aslan [42], Bağcı and Şahbaz [43], Bakır [44], Bilen, Ercan and Akcaozoglu [45], Coşkun [46], Çınardal, Çınardal, Çatak [47], Geçit and Akarsu [48], Incikabi, Tuna and Biber [49], Kartal [50], Kizilet [51], Küçük and Uzun [52], Maltepe [53], Ocak, Eymir and Ocak [54], Seyhan Yucel [55], Sendag, Erol, Sezgin and Dulkadir [56], Turan [57].	18
	Experimental	9
	Akyüz, Samsa-Yetik and Keser [31], Arsal [32], Arsal[34], Çakmak and Civelek [18], Demirbag, Unisen and Yesilyurt [35], Ekici [36], Eren and Akinoğlu [33], Temel [37], Toy and Ok [38].	
Total		45

In screening studies, teacher candidates' CTTs were mainly examined by causal comparison analysis according to sociodemographic variables, grade, department, academic achievement, graduated high school, family's economic condition and the regions they live in. In relational studies, potential relationships between CTT and locus of control, individual innovativeness, academic achievement, media literacy, reading strategies, metacognitive competence, general self-efficacy, creative thinking, cognitive awareness, problem solving, teacher self-efficacy, attitudes towards reading, educational beliefs, and characteristics of hopelessness were examined. In experimental studies, the effects of different methods and techniques applied on critical thinking tendency were investigated. These are argumentative writing instruction, problem-based learning, and critical thinking education, teaching the course content based on critical thinking, micro teaching, meta-cognitive guidance, and participation in online communities. In these experimental studies, the effects of the methods that were considered to improve teacher candidates' CTT were examined.

3.2. Regarding the Levels of CTT

It is observed that teacher candidates' levels of CTT have been revealed in the studies. Most of the studies examined used similar measurement tools while measuring teacher candidates' CTT. Therefore, their CTTs have been addressed as a common finding. In the measurement tools developed [59], teacher candidates' CTTs were classified as low, medium and high according to the scores received. In the studies, CTTs of the vast

majority of them were found to be low. CTT was found to be at a medium level in two studies. In the studies, the dimensions of CTT were addressed as self-confidence, truth-seeking, analyticity, open-mindedness, systematicity, and inquisitiveness. In the studies, it was determined that teacher candidates' analyticity tendencies among these dimensions were perceived at a higher level compared to other dimensions. On the other hand, it was determined that truth-seeking and systematicity characteristics, which are the subdimensions of teacher candidates' critical thinking tendencies in the studies, were perceived at a lower level compared to other dimensions.

3.3. Findings Regarding the Levels of CTT According to Socio-demographic Variables

In the studies on teacher candidates' critical thinking tendencies, there are some findings revealing whether CTT often differs according to gender. However, it cannot be said that there is a consistency between the results of the findings of these studies in which gender variable was examined. In 14 studies analyzed, it was determined that CTT did not differ according to gender. In 7 studies, it was determined that there were significant differences in favor of male teachers.

In 11 studies analyzed, it was determined that teacher candidates' CTT did not differ according to the grade levels; however, in 4 studies, it was determined that their CTT differed significantly. There are 8 studies revealing that teacher candidates' CTTs differ according to the department they study. In these studies, it is observed that the CTT levels of teacher candidates in verbal departments are higher compared to teacher candidates in numerical departments.

3.4. Findings Regarding the Relationships of CTT with Some Individual Variables

Studies examining the relationships between the critical thinking tendencies of teacher candidates and different variables were carried out. In these studies, it was revealed that there were positive and significant relationships between teacher candidates' critical thinking tendencies and teacher candidates' attitudes towards reading books, philosophical beliefs about education, learning styles, problem-solving skills, creative thinking styles, media literacy awareness, general self-efficacy, academic achievement, metacognitive reading awareness, metacognitive competence levels, teacher self-efficacy, readiness for self-directed learning, having environmental ethics, and individual innovativeness levels. In this context, it was observed that there were positive and significant relationships between teacher candidates' CTT and individual variables. Furthermore, it was determined in some studies that CTT predicted teacher self-efficacy, readiness for self-directed learning, attitudes towards

environmental ethics and individual innovativeness. On the other hand, there are results indicating that the external locus of control and hopelessness variables negatively predict the CTT.

3.5. Findings Regarding the Experimental Studies on CTT

It was determined that experimental studies were carried out to improve the critical thinking tendencies of teacher candidates. In 9 studies analyzed, it was observed that experimental methods were used. Four experimental studies revealed that different methods and techniques for learning had positive effects on teacher candidates' CTT. These methods are discussion-based writing, problem-based learning, ensuring self-regulation in online learning, and micro teaching [60, 61, 18, and 62]. On the other hand, in five experimental studies, it was determined that some methods aiming at improving teacher candidates' CTT were not effective. These methods are inquiry-based learning, implementation of education program in the context of CTT, ensuring participation in online learning communities, and problem-based learning [63, 64, 65, 66, and 67].

4. Discussion and Conclusion

Some common results were achieved in this study, in which 45 different articles analyzing teacher candidates' CTT were examined. CTTs were examined by using quantitative methods. The screening and relational models of quantitative methods were frequently used. However, experimental models were rarely used in the studies. There are similar results in review studies carried out in the field of educational sciences. Indeed, in their review study on critical thinking tendency, İşlek and Hürsen [68] determined that quantitative research methods were intensely used in the studies and that the sample consisted of students. Erdem [69] carried out a study to analyze articles published in educational journals and found a similar result. Similarly, in the studies in which Ulutaş and Ubuz [70], Sözbilir, Güler and Çiltaş [71] examined the studies carried out in different mathematics education fields, they determined that quantitative research methods were frequently used. Similarly, McMillian [72] reviewed twenty-seven studies examining the effects of teaching methods, courses, programs and general university experiences on university students' critical thinking tendencies. The authors determined that experimental designs were used in only two studies and that these studies consisted of pre-test and post-test control group designs. In this context, the studies examined show that the positivist paradigm has an effect on educational science studies. Nevertheless, it can be stated that the fact that experimental studies have been studied considerably

less often indicates that studies revealing the cause-and-effect relationships do not attract researchers' interest.

In the studies, common findings on whether socio-demographic variables make a difference were rarely encountered. These findings, which are inconsistent with each other, stand out in the fields such as gender, economic level, grade level, ongoing department, and academic achievement. Furthermore, in the studies analyzed, it was observed that individual variables that might be potentially associated with teacher candidates' CTT were examined. The fact that these variables had positive and significant associations with CTT was revealed in the studies. According to these common findings, it was observed that teacher candidates' educational beliefs, innovativeness, and openness to learning, problem solving competencies, feelings of self-efficacy and self-consciousness could contribute to the development of CTT.

Of experimental studies, discussion-based writing, problem-based learning, meta-cognitive guidance provided in online learning, and micro-teaching methods increase CTT. Furthermore, the participation of individuals in guidance activities and group discussions that enable them to monitor, regulate and evaluate their own studies develops their CTT. In their study, Pithers and Soden [2] indicate that the productivity of teachers in education and training activities and in staff development initiatives depends on the development of teachers' teaching and learning understandings. Thus, empirical studies on critical thinking tendency should focus on teachers' understandings and teaching approaches. In the study in which McMillan [72] examined the studies on university students' critical thinking tendencies, the researcher stated that certain teaching or course requirements were not used to develop students' critical thinking skills in the studies. However, the researcher concluded that students' attendance in school developed critical thinking. However, the author argues that the lack of a common definition for critical thinking tendency in the studies and the absence of a common criterion to measure critical thinking tendency prevent determining a road map that will develop students' critical thinking tendencies.

In some studies analyzed, it was observed that there was an increase in CTT of the groups administered with an intervention program although it was limited, in the studies in which there was no significant difference between experimental groups and control groups. The courses taught by inquiry-based learning, the creation of a positive climate such as asking questions to improve CTT and participation in thought processes, and the participation in online learning communities in which they can discuss freely may contribute positively to CTT. Unlike these findings, in some studies, it was observed that inquiry-based learning, implementation of education

program in the context of CTT, ensuring participation in online learning communities, and problem-based learning did not lead to a change in teacher candidates' CTT. Indeed, Kember [73] suggests that teachers' teaching understanding can be evaluated from two broad perspectives, teacher-centered/content-focused, and student-centered/learning-oriented. Teacher-centered orientation is based on the teaching assumption of giving information or transmitting structured information. However, student-centered orientation includes the beliefs that teaching facilitates the insights that promote conceptual change and intellectual development. In this context, it can be said that student-focused understanding improves the inquiry skills of students and contributes to the formation of a positive learning environment.

5. Recommendations

Based on the fact that teacher candidates' CTTs are generally at low levels, it may be suggested to include critical thinking courses in the faculties of education and teacher training programs. Furthermore, the methods and techniques aiming at developing subject-based critical thinking tendencies can be used in courses. Furthermore, intervention programs may be effective in the development of teacher candidates' CTT. In this regard, the programs that can create effective awareness in teacher candidates can be developed or curricula can be created for it. In the studies analyzed, it was observed that the relationships between individual variables and CTT were positive and significant. These variables were discussed in a broad conceptual framework. However, it can be said that individuals' awareness of their different characteristics, their beliefs about their competencies and their cognitive skills come to the forefront on the basis of them. Thus, these variables for the development of CTT can be taken into account.

In the studies analyzed, it was observed that there was a limited number of intervention programs to improve CTT. Experimental studies can be further focused in this regard. On the other hand, it may be suggested to investigate potential individual and contextual variables that may lead to the positive development of CTT.

Policymakers can address CTT as an important topic in teacher training programs and can organize programs on this basis. Those at the practitioner level can give more importance to studies that develop critical thinking in the activities they perform.

Notes

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