MIDDLE SCHOOL TEACHERS' CRITICAL THINKING SKILLS AND AWARENESS TOWARDS TEACHING CRITICAL THINKING SKILLS

(Research article)

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Abstract

It is very critical for teachers to gain awareness about the acquisition of critical thinking skills in the educational process. Given the scarcity of existing literature on teaching critical thinking skills and teachers' perceptions and views on the place of these skills in curricula, however, the present study is of great importance. An explanatory mixed methods design, which involves the mixing of quantitative and qualitative methods, was employed in the study. As a measurement tool, the critical thinking skills scale and the semi-structured interview form were employed together. The data was measured by the level of compliance. The quantitative study group consisted of 469 classroom teachers who were determined using non-random sampling, while the qualitative study group comprised of 20 teachers who were selected via maximum variation sampling. Teachers demonstrated a high level of perception towards critical thinking skills. Furthermore, it was found that years of teaching experience and branch variables were significant predictors of critical thinking skills, whereas gender was not a significant predictor. Teachers reported that critical thinking skills are teachable, while emphasizing that they are best taught in coordination with the course content. The challenges faced by teachers when teaching critical thinking skills include inadequate curriculum, overcrowded classrooms, inadequate teachers, and anxiety about falling behind curriculum pacing.

Keywords: critical thinking, teaching critical thinking, curriculum

1. Introduction

The educational processes have experienced considerable transformations in recent years. The term "critical thinking skills" has become more visible. Consequently, critical thinking skills have been incorporated into school curricula. Critical thinking involves a process of inquiry. Poor quality education and unqualified teachers may be related to a lack of well-trained teachers cultivated in line with the main goals and principles of National Education. The major criticisms here are rote-based learning methods and a lack of training activities for supporting students' mental development or higher-order thinking skills in the context of 21st century skills. Thus, outcome-based education emerged. Several definitions emerge in the literature. Ay and Akgöl (2008) characterize critical thinking as a process of investigating and/or assessing thoughts with a predetermined goal in mind as well as a process of mixing of objective knowledge and skills. In the meantime, this process is related to the integrity of these emerging knowledge, skills, and attitudes. In another definition, critical thinking consists of questioning, examining, evaluating, and making judgments on the basis of certain criteria, not accepting any visible, read, or obtained information as it is without questioning (Semerci 2000). It is not just enough for students to have knowledge of a particular subject to evaluate a phenomenon from multiple perspectives and make decisions. One of the fundamental objectives of the educational process is to encourage students to gain more in-depth knowledge.

The cultivation of students' critical thinking is of vital importance in that students can thus use their own mental processes effectively and analyze, synthesize, or evaluate. The acquisition of such thinking skills, especially at an early age, can foster students' problem-solving skills in the future. At this point, schools are the most influential agents for teaching critical thinking skills. Besides that, developed countries abandon subject-centered curricula and encourage student-centered curricula that can effectively promote students' thinking skills (Hunter, 1991). As a matter of fact, student-centered curriculum has also recently been adopted in our country.

The acquisition of critical thinking skills is vital for teachers. A teacher therefore should be well-equipped and know which strategy or method can leverage students' thinking skills and how to build a suitable learning environment. It is incorrect to claim that teachers have competence in teaching thinking skills. Given the current teacher education programs, they cannot be expected to acquire these skills. Therefore, further studies should also delve into the critical thinking skills teaching and the effective incorporation of those skills into in-service training programs for teachers (Lewis and Smith, 1993). Enhancing students' critical thinking skills is an important topic. In this frame, teaching processes leveraging these skills, research, and practices that support the use of methods and techniques should be included (Torff, 2006). It is thus thought that this study will shed light on the role of thinking skills in the educational process.

Critical thinking skills should be taught with careful planning and coordination. Coordination of teachers, critical thinkers, and administrators is also very critical in this regard (Wright, 1992). A broader view of teaching critical thinking skills can be linked to the integration of knowledge and skills (Walker and Finney, 1999). Teaching critical thinking skills with greater emphasis on theory will not build critical thinking skills. Therefore, apart from being taught in the form of skills and dispositions, it should also be well-practiced. Nowadays, critical thinking emerges as a trend that is frequently expressed in education programs but has very serious limitations in its application. Therefore, the studies to be carried out for the active application of critical thinking skills are very important.

There is a large body of literature analyzing skills such as problem-solving skills, creative, reflective and critical thinking at various grade levels (Akdemir, 2019; Altıntaş et al. 2018; Aybek, Aslan 2017; Sezer et al., 2022; Tunçer, Sapancı, 2021). It is important to have that so many studies on thinking skills in terms of determining whether teachers have thinking skills. However, teaching these skills and revealing whether they are gained by students is more important in terms of teaching process. Therefore, it is an important problem that the teaching of critical thinking skills does not take enough place in the curriculum. Based on this problem, this research aims to reveal the importance of teaching critical thinking skills. Nevertheless, limited research has examined teachers' perceptions and views on teaching of higher-order thinking skills and their place in the curriculum. More importantly, this study is expected to contribute to curriculum development. The skill levels and opinions of middle school teachers, who train students at a stage where abstract thinking skills are just beginning to form, are critically important. This is because critical thinking skills should be built on the basis of abstract thinking. The present study therefore attempts to identify middle school teachers' critical thinking skills as well as their views on teaching of these skills. This study sought to answer the following sub-questions:

Sub-problems of the study

- What is the middle school teachers' level of critical thinking skills?

- Do middle school teachers' critical thinking skills differ based on gender, teaching experience years and branch?
- What are the middle school teachers' views on teaching critical thinking skills?
- What are the middle school teachers' views on the place of critical thinking in the curriculum?

2. Method

2.1. Research Design

An explanatory mixed methods design was utilized. In the explanatory mixed method, quantitative data is gathered first, followed by qualitative data collection to justify the quantitative data obtained (Creswell, 2009). By using the mixed method, it is aimed to eliminate the limitations of quantitative and qualitative paradigms and to benefit from the strengths of both. In this respect, the mixed method design collects different data types, analyzes and sample groups in a single study (Morse, 2010). In addition to that, the central premise of using mixed methods research is that it makes the most of the strengths of each data type while neutralizing their shortages, thereby increasing the credibility of the research (Yıldırım and Şimşek, 2013). The qualitative data were employed to evaluate, present and clarify the numerical data obtained from the quantitative data. Therefore, the complementarity characteristic of the mixed method, was provided. As a measurement tool, the critical thinking skills scale and the semi-structured interview form were employed together. The results were evaluated by the level of compliance.

1.1. Quantitative Dimension

This dimension sought to investigate middle school teachers' level of critical thinking skills. To this end, since the study aimed to determine an existing situation, scanning model was used. The screening model focuses on collecting data, with an emphasis on specific characteristics of any group (Büyüköztürk et al. 2013). Screening models also aim to define, analyze and interpret the existing situation of individuals or groups (Cohen, Manion and Morrison, 2007).

1.1.1. Quantitative Study Group

The universe of the research encompasses middle school teachers working in Merkezefendi and Pamukkale districts of Denizli province. The sample includes 469 middle school classroom teachers, who were determined through non-random convenience sampling, working in public schools in Denizli. Convenience sampling involves more readily available participants while saving time in the data collection process. (Büyüköztürk et al. 2013). Table 1 shows the demographic data of participants.

Table 1. *Demographic Data*

Demographic Variables	Groups	Frequency	Percentage
Gender	Female	261	55.7
	Male	208	44.3
	0-5 Years	69	14.7
	6-15 Years	101	21.5

Years of teaching experience	16-24 Years	222	47.3
	25 Years or More	77	16.4
Branch	Science	71	15.1
	English	51	10.9
	Mathematics	83	17.7
	Religious Culture	41	8.7
	PCG	35	7.5
	Physical Education	29	6.2
	Social Studies	81	17.3
	Turkish	78	16.6

1.1.2. Quantitative Data Collection Tool

The "Critical Thinking Scale" adapted by Ağdacı (2018) from the "Critical Thinking Scale" of Semerci (2000) was employed in the study. The scale is based on 43 items, followed by a five-point Likert type. There are 5 sub-dimensions regarding the items constituting the total scale. These sub-dimensions are decision-making with 16 items, self-regulation with 9 items, self-confidence with 7 items, evaluation with 6 items, and self-control with 5 items. The 5 factors of the overall scale explain 67.43% of the total variance. This result is sufficient in terms of meeting all the items in the scale. In the reliability study of the scale, the overall reliability coefficient of the scale was 0.915, and the reliability coefficients were reported as 0.955 for the sub-dimension of decision making, 0.914 for the sub-dimension of self-regulation, 0.875 for the sub-dimension of self-confidence, 0.900 for evaluation, and 0.823 for self-control.

Additionally, the Cronbach's Alpha coefficient was calculated. As a result, the reliability coefficient for the wholescale was found to be .84. A Cronbach Alpha coefficient between .80 and 1.00 indicates that the scale is "highly reliable" (Büyüköztürk et al. 2013). To conclude, the critical thinking scale is highly reliable for the sample group. Given the reliability coefficients for the sub-dimensions, it is .86 for decision-making; .87 for self-regulation; .79 for self-confidence, .81 for evaluation, and .82 for self-control. The reliability coefficients are presented in Table 2.

Table 2. *Cronbach's Alpha Reliability Coefficients*

Critical Thinking Skills and Sub-dimensions	Number of Items	Cronbach's Alpha
Decision-making	19	.86
Self-Regulation	9	.87

Self-Confidence	7	.79
Evaluation	6	.81
Self-Control	5	.82
Critical Thinking Skills	43	.84

1.1.3. Quantitative Data Collection and Analysis

In attempt to collect the quantitative data, 21 schools in the two districts determined within the framework of the study were visited and the scales were handed out to the participants and the participants were informed. 502 out of 600 forms distributed in schools were found appropriate for evaluation. The data obtained from 33 forms that were partially filled out were not included and were excluded from the scope of the study. The remaining 469 forms were taken into account. The scale of the present study is comprised of 43 items using a 5-point Likert. Critical thinking skills consists of 5 sub-dimensions: decision making, self-regulation, self-confidence, evaluation and self-control. In this respect, each sub-dimension's level of competency were identified and the participants' total scores were calculated. In addition to that, analyzes were conducted to see if the data were normally distributed. Accordingly, skewness-kurtosis coefficients were investigated and Kolmogorov-Smirnov test were performed. The results are tabulated below.

Table 3. *The Normality Test Results*

Scale	X	Sd	Kurtosis		Skewness		K-S Test
			Coefficient	Standard Error	Coefficient	Standard Error	
Decision-making	58.86	9.666	225	-.708	113	-.057	p=0.446
Self-Regulation	33.39	5.663	225	-.052	113	-.641	p=0.262
Self-Confidence	26.76	5.114	225	-1.099	113	-.170	p=0.236
Evaluation	23.99	3.522	225	-.566	113	-.429	p=0.163
Self-Control	19.48	3.670	225	-.054	113	-.754	p=0.169
Total	162.50	18.194	225	-.488	113	.089	p=0.840

1.2. Qualitative Dimension

This study employed phenomenological design. The objective of the phenomenology pattern is to describe the essence of a phenomenon by prioritizing lived experiences. Remarkably, phenomenological research differs from other qualitative research in that it prioritizes experience. In this respect, teachers' experiences promote the quality of the data. In addition to that, this phenomenological design addresses the question of "What is the meaning,

structure, and importance of any lived phenomenon for these individuals?" It is intended to define how individuals view, define, and make meaning of certain phenomena, how they approach and express the phenomenon (Patton, 2002). Phenomenological research focuses on phenomena that we are aware of but do not have a thorough understanding of (Yıldırım & Şimşek, 2011). Critical thinking skills are the phenomenon of the study.

1.2.1. Qualitative Study Group

The participants were listed based on volunteerism, and teachers who examined and evaluated the curriculum related to their fields were selected. The maximum variation sampling method was employed to determine the study group. This sampling method makes it possible to collect information from as many cases as possible on the subject under investigation. Heterogeneity is sought from various aspects within the sample. Within this diversity, common points are tried to be determined (Yıldırım, Şimşek, 2013). In this study, the opinions of teachers from different branches on the teaching of critical thinking skills were determined as a common point. In the study, the branch was determined as the field of diversity, and equal number of teachers working in different branches were selected, considering the rate of participation in the survey. The study group consists of 20 teachers working in eight middle schools. 3 of the participants work in Mathematics, 4 in Turkish, 3 in Social Studies, 2 in Science, 2 in English, 2 in PCG, 2 in Physical Education, and 2 in Religious Culture. Participants' names were kept confidential and code names were used.

1.2.2. Qualitative Data Collection Tool

A semi-structured interview form was employed to collect the data. In such methods, participants are asked to reply to questions prepared in advance by the researcher. In addition, drilling questions are used to obtain more in-depth information and collect more detailed data during the interview process, so that in-depth data can be collected (Glesne, 2012). Drilling interviewing questions were used whereby it was intended to obtain in-depth data on the teaching of critical thinking skills. The semi-structured interview form was developed by the researcher and employed in the study. When developing the questions in the interview form, opinions of the two faculty members, one of whom is an expert in the field of education and training and the other one is an expert in the field of measurement and evaluation, were taken. Experts were selected, considering whether they had prior experience of phenomenological study. This is important because phenomenology focuses on the study of participants' lived experiences. Further, phenomenology focuses on revealing the elements that form the basis of this experience, and in this sense, it represents an original dimension within the tradition of qualitative research (Yılmaz & Şahin, 2016). Following the development of interview questions, schools where the research would be conducted were determined and interviews were carried out. Suitable places in schools for interviews were determined as interview rooms with the permission of the school administration. The interviews were performed face-to-face using the semi-structured interview form. All interviews were taped and the participants' permission was obtained. The interviews lasted between 45 minutes and 1 hour. In the interview form, open-ended questions were formulated, and the participating middle school teachers were invited to reply to some of the questions below:

1) Why do you think teaching critical thinking skills is important?

2) Are middle school curricula sufficient to develop critical thinking skills?

3) Do you think that the learning outcomes related to critical thinking in the middle school curriculum can help students get access to new-fast changing updated information? If so, why?

4) Do you encounter problems in teaching the learning outcomes related to critical thinking that are expected to be gained in the middle school curriculum? If so, what are these problems?

1.2.2. Qualitative Data Analysis

Content analysis" was employed to analyze the qualitative data. Some of the strategies adopted in the literature were implemented to measure the validity and reliability of the study. Participant confirmation and in-depth interviewing were conducted for internal validity (credibility). For participant confirmation, the interviews were transcribed in a computerized environment, and the articles were printed out. Subsequently, the participants were interviewed. Thus, necessary corrections were made through their guidance, and the data was made suitable for analysis. A consistency analysis was performed for internal reliability. For the consistency analysis, an expert was asked to evaluate the entire study in terms of consistency. As a result, it was announced that the study formed a coherent structure as a whole. Further, confirmation was made for external reliability. The raw data and meaning units of the study were shared with the expert who conducted the consistency study for external reliability. In this respect, expert opinion was taken on the meaning units that emerged.

3. Findings

3.1. Findings of the First Sub-problem

The study first examined middle school teachers' levels of critical thinking skills and their opinions. Data regarding the sub-problem is stated in Table 4.

Table 4. *Critical Thinking Skills of Middle school Teachers*

	N	$\overline{X}$	Sd	Level
Decision-making	469	3.68	0.60	Agree
Self-regulation	469	3.71	0.63	Agree
Self-confidence	469	3.82	0.73	Agree
Evaluation	469	3.99	0.58	Agree
Self-control	469	3.89	0.73	Agree
Critical Thinking	469	3.78	0.42	Agree

As seen from the table above, the average scores of the middle school teachers' critical thinking skills and sub-dimensions are 3.68 for decision-making skills, 3.71 for self-regulation skills, 3.82 for self-confidence skills, 3.99 for evaluation skills, 3.89 for self-control skills, and 3.78 for critical thinking skills on the overall scale. These findings may imply that middle school teachers think that they have exceptional critical thinking skills.

3.2. Findings of the Second Sub-Problem

Second, the study investigated whether the critical thinking skills of middle school teachers differed in terms of gender, years of teaching experience and branch variables. The gender comparison is tabulated in Table 5.

Table 5. *Comparison of Middle school Teachers' Critical Thinking Skills by Gender*

Dimensions	Gender	N	Mean	Sd	Sd	t	p
Decision-making	Female	261	3.67	0.61			
	Male	208	3.68	0.59	467	.-113	.910

Self-regulation	Female	261	3.70	0.65			
	Male	208	3.72	0.60	467	.-405	.683
Self-confidence	Female	261	3.85	0.74			
	Male	208	3.78	0.71	467	.917	.357
Evaluation	Female	261	3.99	0.61			
	Male	208	4.01	0.55	467	.-352	.725
Self-control	Female	261	3.86	0.76			
	Male	208	3.93	0.69	467	.-903	.363
Critical Thinking	Female	261	3.77	0.44			
	Male	208	3.78	0.40	467	-144	.884

As seen above, no meaningful difference was observed between the average scores of female teachers ($\bar{x}$=3.67; Sd=0.61) and the average scores of male teachers ($\bar{x}$=3.68; Sd=0.59) in the decision-making skills (t=-.113 p>0.05). In the self-regulation skills, the average scores of female teachers were calculated as ($\bar{x}$=3.70; SD=0.65) and male teachers' mean scores were calculated as ($\bar{x}$=3.72; Sd=0.60), and no meaningful difference was detected between them (t=.-405; p>0.05). No meaningful difference between female teachers ($\bar{x}$=3.85; Sd=0.74) and male teachers ($\bar{x}$=3.78; Sd=0.71) were observed in the sub-dimension of self-confidence skills (t=0.917; p>0.05). In the sub-dimension of evaluation skills, the average scores of female teachers were found ($\bar{x}$=3.99; Sd=0.61) and male teachers' mean scores were ($\bar{x}$=4.01; Sd=0.55), and no meaningful difference was found between them (t=.-352; p>0.05). Referring to the sub-dimension of self-control skills, female teachers' average scores were ($\bar{x}$=3.86; SD=0.76) and the average scores of male teachers were ($\bar{x}$=3.93; Sd=0.69), and no meaningful difference was found between them (t=.-903; p>0.05).). For the total scores of the critical thinking skills scale, the average scores of female teachers were ($\bar{x}$=3.77; Sd=0.44) and male teachers' mean scores were ($\bar{x}$=3.78; Sd=0.40), and no meaningful difference was detected between them (t=-.144; p>0.05). It can thus be implied that the gender variable is not a significant predictor of any sub-dimension of critical thinking skills or the whole scale.

Table 6. *Comparison of Middle school Teachers' Critical Thinking Skills by Years of teaching experience*

Dimensions	Group	N	Mean	Sd	Sd	F	p	Difference
Decision-making	0-5 Years	69	3.64	0.59	3-465	4.863	**.002**	**2>4** **3>4**
	6-15 years	101	3.76	0.52				
	16-24 years	222	3.72	0.56				

	25 years+	77	3.45	0.55			
Self-regulation	0-5 Years	69	3.70	0.62	3-465	1.088	.354
	6-15 years	101	3.80	0.68			
	16-24 years	222	3.66	0.67			
	25 years +	77	3.72	0.63			
Self-confidence	0-5 Years	69	3.64	0.82	3-465	5.354	**.001**	**2<1** **2>4** **3>1** **3<4**
	6-15 years	101	3.95	0.71			
	16-24 years	222	3.89	0.69			
	25 years +	77	3.61	0.65			
Evaluation	0-5 Years	69	3.94	0.48	3-465	4.551	**.004**	**2>4**
	6-15 years	101	4.12	0.44			
	16-24 years	222	4.02	0.43			
	25 years +	77	3.81	0.41			
Self-control	0-5 Years	69	3.91	0.73	3-465	1.491	.216
	6-15 years	101	4.02	0.74			
	16-24 years	222	3.83	0.71			
	25 years +	77	3.88	0.76			
Critical Thinking	0-5 Yıl	69	3.73	0.48	3-465	5.617	**.001**	**2<1** **2>4** **3>4**
	6-15 yıl	101	3.88	0.39			
	16-24 yıl	222	3.79	0.43			
	25 yıl +	77	3.64	0.37			

As outlined in Table 6, the average scores of the teachers with 0-5 years of teaching experience were calculated as ($\bar{x}$=3.64; Sd=0.59), those with teaching experience, ranging from 6 to 15 years, were reported as ($\bar{x}$=3.76; Sd=0.52), those with teaching experience, ranging from 16 to 24 years, were reported ($\bar{x}$=3.64; Sd=0.52). $\bar{x}$=3.72; SD=0.56), and those with 25 years or more on the job were calculated as ($\bar{x}$=3.45; Sd=0.55) in the sub-dimension of

decision-making skills. The analysis of variance highlighted a meaningful difference between the teachers with 6-15 years and with 16-24 years of experience, and those with 25 years or more on the job, in favor of the teachers with 6-15 and 16-24 years of experience on teaching(F=4.863; p=.002 <0.05). In brief, teachers with 25 years or more on the job are prone to adopt a negative perception of decision-making skills. Given the findings of teachers' critical thinking skills on self-regulation skills, the average scores of teachers with teaching experience, ranging from 0 to 5 years, were ($\bar{x}$=3.70; Sd=0.62), those with 6-15 years of experience on teaching were ($\bar{x}$=3.80; Sd=0.68), those with 16-24 years of experience on teaching were ($\bar{x}$=3.66; Sd=0.67), and the average scores of teachers with 25 years or more experience on the job were reported as ($\bar{x}$=3.72; Sd=0.63). After conducting variance analysis, no meaningful difference was seen between the variables (F=1.088; p=.354>0.05). The results indicated that teachers' self-regulation skills did not differ in terms of years of teaching experience variable. In addition to that, the study examined whether the variable of years of teaching experience had an impact on self-confidence skills. Consequently, the average scores of the teachers with 0-5 years of experience on teaching were reported as ($\bar{x}$=3.64; Sd=0.82), those with 6-15 years of experience on teaching were calculated as ($\bar{x}$=3.95; Sd=0.71), those with 16-24 years of experience on teaching were reported as ($\bar{x}$= 3.89; Sd=0.69), and those with 25 years or more of experience on the job were calculated as ($\bar{x}$=3.61; Sd=0.65). As a result of the variance analysis performed, a meaningful difference was seen between teachers with 6-15 years of experience on teaching and those with 0-5 years of experience on teaching and 25 years or more of experience on the job in favor of teachers with 6-15 years of experience on teaching. Likewise, a meaningful difference was seen between teachers with 16-24 years of experience and those with 1-5 years of experience and 25 years or more of experience. The difference was in favor of teachers with 16-24 years of experience (F=5.354; p=.001<0.05). This result can be interpreted implying that teachers have problems with self-confidence skills in the first and last years of the profession. Given the teachers' average scores for evaluation skills, the average scores of the teachers with 0-5 years of on experience were reported as ($\bar{x}$=3.94; Sd=0.48), teachers with experience, ranging from 6 to 15 years, were calculated as ($\bar{x}$=4.12; Sd=0.44), those with 16-24 years of experience were reported as ($\bar{x}$= 4.02; Sd=0.74), and teachers with 25 years or more of experience were reported as ($\bar{x}$=3.81; Sd=0.41). The study investigated whether teachers' evaluation skills differed based on the years of teaching experience variable, and consequently a meaningful difference was observed between the teachers with teaching experience, ranging from 6 to 15 years, and teachers with 25+ years of experience on teaching in favor of the teachers with teaching experience, ranging from 6 to 15 years, (F=4.551; p=.004<0.05). The average scores of the teachers with 0-5 years of experience for the sub-dimension of self-control skills were reported as ($\bar{x}$=3.91; Sd=0.73), those with 6-15 years of experience were reported as ($\bar{x}$=4.02; Sd=0.74), those with 16-24 years of experience on teaching were reported as ($\bar{x}$=3.83; Sd=0.71), and those with 25 years and more of experience on the job were calculated as ($\bar{x}$=3.88; Sd=0.76). The study examined whether the teachers' self-control skills differed according to the years of experience variable, and consequently no significant difference was detected (F=1.491; p=.216>0.05). After conducting analyzes on the overall scale of critical thinking skills, the average scores of teachers with 0-5 years of experience were reported as ($\bar{x}$=3.73; Sd=0.48), those with 6-15 years of experience were ($\bar{x}$=3.88; Sd=0.39), those with 16-24 years of experience were ($\bar{x}$=3.79; Sd=0.43), and the average scores of teachers with 25 years or more of experience on teaching were ($\bar{x}$=3.64; Sd=0.37). Following a series of analyses performed to see if the general critical thinking skills of the teachers differed based on the years of teaching experience variable, a meaningful difference was observed between the teachers with 16-24 years of experience on teaching and those with 25 years or more of experience on teaching in favor of the teachers with 16-24 years

of experience. Similarly, a meaningful difference was observed between teachers with 6-15 years of experience on teaching and teachers with experience, ranging from 0 to 5 years, and 25 years or more of experience on the job. The difference was in favor of the teachers with 6-15 years of experience. In summary, the teachers had the highest level of critical thinking skills in the middle of their professional seniority.

The variance analysis concerning the comparison of middle school teachers' views on critical thinking skills based on branch variable are illustrated in Table 7.

Table 7. *Comparison of Middle school Teachers' Critical Thinking Skills by Branch*

Dimensions	Group	N	Mean	Sd	Sd	F	p	Difference
Decision-making	Science	71	3.59	0.59				
	English	51	3.74	0.51				
	Mathematics	83	3.75	0.62				
	Religious Culture	41	3.41	0.54				
	PCG	35	3.66	0.60	3-465	1.877	.071	
	Physical Education	29	3.63	0.65				
	Social Studies	81	3.72	0.66				
	Turkish	78	3.74	0.57				
Self-regulation	Science	71	3.54	0.64				
	English	51	3.75	0.67				
	Mathematics	83	3.78	0.50				
	Religious Culture	41	3.65	0.67	3-465	1.543	.151	
	PCG	35	3.80	0.54				
	Physical Education	29	3.54	0.57				
	Social Studies	81	3.78	0.57				
	Turkish	78	3.71	0.63				
	Science	71	3.59	0.72				
	English	51	4.09	0.77				

		N	Mean	SD	df	F	p	
Self-confidence	Mathematics	83	4.06	0.62	3-465	3,680	**.001**	**2<1** **2>4** **2>8** **3>1** **3<4** **3>8**
	Religious Culture	41	3.61	0.61				
	PCG	35	3.81	0.70				
	Physical Education	29	3.80	0.88				
	Social Studies	81	3.83	0.74				
	Turkish	78	3.75	0.71				
Evaluation	Science	71	3.93	0.57	3-465	.851	.546	
	English	51	4.06	0.53				
	Mathematics	83	4.01	0.52				
	Religious Culture	41	3.82	0.52				
	PCG	35	4.02	0.59				
	Physical Education	29	4.01	0.58				
	Social Studies	81	4.00	0.60				
	Turkish	78	4.06	0.53				
Self-control	Science	71	3.68	0.73	3-465	2.719	**.009**	**2<1** **2>4** **2<6** **2>8**
	English	51	4.20	0.69				
	Mathematics	83	3.93	0.76				
	Religious Culture	41	3.89	0.74				
	PCG	35	3.92	0.76				
	Physical Education	29	3.83	0.69				
	Social Studies	81	3.96	0.72				
	Turkish	78	3.77	0.75				

Critical Thinking	Science	71	3.64	0.40				
	English	51	3.90	0.41				2<1
	Mathematics	83	3.87	0.43				2>4
	Religious Culture	41	3.60	0.38	3-465	3.492	.001	5>4
	PCG	35	3.79	0.36				7>4
	Physical Education	29	3.72	0.43				8>4
	Social Studies	81	3.82	0.47				
	Turkish	78	3.78	0.37				

As reported above, the average scores of science teachers for the sub-dimension of decision-making skills were reported as ($\bar{x}$=3.59; Sd=0.59), the average scores of English teachers were reported as ($\bar{x}$=3.77; Sd=0.51), the average scores of mathematics teachers were reported as ($\bar{x}$=3.75; Sd=0.62), religious culture teachers' average scores were reported as ($\bar{x}$=3.41; Sd=0.54), PCG teachers' average scores were calculated as ($\bar{x}$=3.66; Sd=0.60), physical education teachers' average scores were calculated as ($\bar{x}$=3.63; Sd=0.65), social studies teachers' average scores were reported as ($\bar{x}$=3.72; Sd= 0.66) , and the average scores of Turkish teachers were reported as ($\bar{x}$=3.74; Sd=0.57). Following the analysis of variance, no meaningful difference was observed among the teachers according to the branch variable (F=1.877; p=.071>0.05). The average scores of the teachers in the sub-dimension of self-regulation skills were found to be ($\bar{x}$=3.54; Sd=0.64) for science teachers, ($\bar{x}$=3.75; Sd=0.67) for English teachers, ($\bar{x}$=3.78; Sd=0.50) for mathematics teachers, ($\bar{x}$=3.65; Sd=0.67) for the religious culture teachers, ($\bar{x}$=3.80, Sd=0.54) for PCG teachers, ($\bar{x}$=3.54; Sd=0.57) for physical education teachers, ($\bar{x}$=3.78; Sd=0.57) for social studies teachers, and ($\bar{x}$=3.71; Sd=0.63) for Turkish teachers. After conducting the analysis of variance for self-regulation skills, no meaningful difference was observed between the variables (F=1.543; p=.151>0.05). The study sought to find out whether the branch variable had an effect on self-confidence skills. The results implied that the average scores were ($\bar{x}$=3.59; Sd=0.72) for science teachers, ($\bar{x}$=4.09; Sd=0.77) for English teachers, ($\bar{x}$=4.06; Sd=0.62) for mathematics teachers , ($\bar{x}$=3.61; Sd=0.61) for religious culture teachers, ($\bar{x}$=3.81; Sd=0.70) for PCG teachers, ($\bar{x}$=3.80, Sd=0.88) for physical education teachers, ($\bar{x}$=3.83; Sd=0.74) for social studies teachers, and ($\bar{x}$=3.75; Sd=0.71) for Turkish teachers. Upon the completion of the analysis of variance, a meaningful difference was detected between English teachers and science, religious culture and Turkish teachers in favor of English teachers, and between mathematics teachers and science, religious culture and Turkish teachers in favor of mathematics teachers. Looking at the results obtained in the evaluation skills, it was observed that the average scores of the science teachers were ($\bar{x}$=3.93; Sd=0.57), the average scores of the English teachers were ($\bar{x}$=4.06; Sd=0.53), the average scores of the mathematics teachers were ($\bar{x}$=4.01; Sd=0.52), the average scores of the religious culture teachers were ($\bar{x}$=3.82; Sd=0.52), the PCG teachers' average scores were ($\bar{x}$=4.02; Sd=0.59), the physical education teachers' average scores were

($\bar{x}$=4.01; Sd=0.58), the social studies teachers' average scores were ($\bar{x}$=4.00; Sd=0.60) , and the average scores of Turkish teachers were ($\bar{x}$=4.06; Sd=0.53). As a result of the analysis of variance, no meaningful difference was found among the teachers (F=.851; p=.546<0.05). Given the results of self-control skills, the average scores of the science teachers were calculated as ($\bar{x}$=3.68; Sd=0.63), the average scores of the English teachers were calculated as ($\bar{x}$=3.75; Sd=0.67), the average scores of the mathematics teachers were calculated as ($\bar{x}$=4.20; Sd=0.69), the average scores of the religious culture teachers were calculated as ($\bar{x}$=3.89; Sd=0.74), the PCG teachers' average scores were calculated as ($\bar{x}$=3.92; Sd=0.76), the physical education teachers' average scores were calculated as ($\bar{x}$=3.83; Sd=0.69), the social studies teachers' average scores were calculated as ($\bar{x}$=3.96; Sd=0.72) , and the average scores of Turkish teachers were calculated as ($\bar{x}$=3.77; Sd=0.75).The analysis of variance found a meaningful difference between English teachers and Science, Religious Culture, Physical Education and Turkish teachers in favor of English teachers (F=2.719; p=.009<0.05). According to the analyzes conducted for the overall scale, the average scores were found to be ($\bar{x}$=3.64; Sd=0.40) for science teachers, ($\bar{x}$=3.90, Sd=0.41) for English teachers, ($\bar{x}$=3.87; Sd=0.43) for mathematics teachers, ($\bar{x}$=3.60, Sd=0.38) for religious culture teachers, ($\bar{x}$=3.79; Sd=0.36) for PCG teachers, ($\bar{x}$=3.72; Sd=0.43) for physical education teachers, ($\bar{x}$=3.82; Sd =0.47) for social studies teachers, and ($\bar{x}$=3.78; Sd=0.37) for Turkish teachers. The analysis of variance declared a meaningful difference between English teachers and Science and Religious Culture teachers in favor of English teachers, between PCG teachers and Religious Culture teachers in favor of PCG teachers, between Social Studies teachers and Religious Culture teachers in favor of Social Studies teachers, and between Turkish teachers and Religious Culture teachers in favor of Turkish teachers (F=3.492; p=.001<0.05).

3.3. Findings of the Third Sub-Problem

Fourthly, the study dwelt on the problems encountered by middle school teachers when teaching critical thinking skills. The findings highlighted two themes, namely, teacher and/or student related problems and curriculum related problems. In the theme of teacher and/or student related problems, teacher inadequacies were repeated seven times, overcrowded classrooms were repeated six times, student inadequacies were repeated six times, and classroom pressure was repeated five times. In the theme of curriculum related problems, on the other hand, the participants repeated inadequacy of curriculum seven times, and anxiety about falling behind curriculum pacing eight times.

Table 8. *The Challenges Faced by Teachers in Teaching Critical Thinking Skills*

Themes	Codes	Frequency
Teacher and/or student related problems	Teacher Inadequacies	7
	Overcrowded Classrooms	6
	Student Inadequacies	6
	Classroom Pressure	5
Curriculum related problems	Inadequate curriculum	11
	Anxiety about falling behind curriculum pacing.	8

Teachers strongly emphasized the inadequacies in curriculum and relatedly in learning outcomes. For instance, T16, who pointed out the inadequacies in the learning outcomes of critical thinking skills in the curriculum, remarked, "*There are already many learning outcomes, including basic language skills, apart from critical thinking skills, and the time is limited. If we intend to teach critical thinking skills, we cannot complete the subjects. Besides, the examples of activities are not enough to teach critical thinking skills in the curriculum.*" T17, who found the learning outcomes insufficient, commented as follows: "*Critical thinking skills should be planned together with the lessons. Thus, the time limitation is partially removed. Because the subjects address real life, the child will already use critical thinking in his/her daily life. For this reason, it should be given with lessons without being disconnected from life.*" The T17, which had problems in the teaching of critical thinking, said, "*There is a time shortage due to the fact that the curriculum has been prepared hastily and without taking the opinions of the teachers who are the implementers of the curriculum. Since the learning outcomes are given with the concern of pacing during class time allocated for them, studies and activities that require conversation and discussion cannot be adequately covered in overcrowded classrooms.*" Self-criticizing the teaching of critical thinking, T4 said, *"I do not have enough knowledge about teaching critical thinking. Especially when we consider today's students, it will not be easy to construct a group having poor questioning skills through short-term in-service course information."* Likewise, referring to the inadequacy of the curriculum, T6 reported, "*There are too many learning outcomes. The time is not enough. If we attempt to gain critical thinking skills, we cannot complete the subjects. Moreover, there are no examples of activities in the curriculum to promote critical thinking skills.*"

3.4. Findings Regarding the Fourth Sub-Problem

Fourthly, the study dwelt on the problems encountered by middle school teachers when teaching critical thinking skills. The findings highlighted two themes, namely, teacher and/or student related problems and curriculum related problems. In the theme of teacher and/or student related problems, teacher inadequacies were repeated seven times, overcrowded classrooms were repeated six times, student inadequacies were repeated six times, and classroom pressure was repeated five times. In the theme of curriculum related problems, on the other hand, the participants repeated inadequacy of curriculum seven times, and anxiety about falling behind curriculum pacing eight times.

Table 9. *The Challenges Faced by Teachers in Teaching Critical Thinking Skills*

Themes	Codes	Frequency
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4. Conclusion and Discussion

The quantitative data indicates that middle school teachers' perceptions of critical thinking are high. Likewise, they exhibited high levels of perception in terms of sub-dimensions. Previous studies also reported high level of critical thinking dispositions (Aldan Karademir, 2013; Cengiz, 2004; Comrade, 2009; Duğan and Aydın, 2018; Erdoğan, 2012; Hofreiter, Monroe and Stein, 2007; Karali, 2012; Kong, 2014; Özdemir 2005; Quitadamo, 2002; Şahhüseyinoğlu, 2007; Tok, 2008; Yıldırım, 2009; Yeşilpınar, 2011). Aldan Karademir (2013) employed the Critical Thinking Skills scale and concluded that teacher candidates' skill levels were above the medium level. Narin (2009) reported that teachers' level of critical thinking disposition were high. Other studies reported moderate or low levels of critical thinking disposition (Akdere, Korkmaz, 2009; Altuntaş et al., 2018; Argon and Selvi, 2011; Arslan and Ancın, 2016; Beşoluk and Önder, 2010; Can and Kaymakçı, 2015; Göbel, 2013; Gülveren, 2007; Saçlı and Demirhan, 2008; Türnüklü and Yeşildere, 2005; Zayif, 2008). As Türnüklü and Yeşildere (2005) noted, the low quality of the curriculum activities might be the reason.

Gender was not reported as a significant predictor. Many studies in the relevant literature also revealed that gender had no significant effect on critical thinking skills (Akar 2007; Çetin 2008; Özdemir 2005; Tufan 2008; Uluyol 2011) and yielded the same results (Arslan, 2016; Aybek and Aslan, 2017; Ekinci and Aybek, 2010; Karalı, 2012; Khandaghi, Pakmehr and Amiri, 2011; Kawashima and Shiomi, 2007). On the other hand, according to the studies revealing the gender differences, the differences were generally in favor of female teachers. Ay and Akgöl (2008), Gülveren (2007), Sağlam and Büyükuysal (2013) concluded similar results. In a broad sense, the reason why gender has not a significant impact on critical thinking skills may be because this situation can change depending on the selected participants and other variables. The reason why it is not in favor of female teachers may be because women are not

given the opportunity for critical thinking in society or because women's rights and thoughts in society do not allow critical thinking or are given insufficiently.

Given the data investigating teachers' critical thinking skills by years of teaching experience variable, it is seen that the years of teaching experience variable is a significant predictor for the overall scale or for the sub-dimensions. In this respect, pre-service teachers with 6-15 and 16-24 years of experience yielded greater mean scores compared to those with 1-5 and 25 years or more teaching experience. It can thus be implied that teachers are more competent in critical thinking during their most productive years. Aslan (2016) and Akdemir (2019), who found a meaningful difference between teachers' critical thinking skills and seniority, revealed that as teachers' seniority and experience increased, their critical thinking skills also increased. Yalçınkaya and Tonbul (2002) revealed that critical thinking dispositions did not differ according to seniority. On the other hand, Ağdacı (2018), Caldwell (2012) and Yıldırım (2009), found no significant difference between the professional seniority of teachers and their critical thinking skills. In a similar vein, Karadeniz (2006) found no meaningful relationship between professional seniority and teachers' critical thinking dispositions. In view of the results obtained, the reason why professional seniority does not differ significantly may be because teachers have the same task distribution and responsibilities regardless of their experience.

Given the data investigating whether the critical thinking skill differed by the branch variable, it was concluded that the branch variable was an effective factor. English teachers, in particular, demonstrated a higher level of critical thinking skills. Many studies examining the effect of the branch variable on critical thinking skills revealed that the branch was not a significant predictor. Korkmaz (2009) sought to determine the critical thinking dispositions and levels of teachers and found that the branch was not a significant predictor in this regard. Gelen (2002) argued that the branch variable did not yield any significance in terms of critical thinking skills. Ekinci and Aybek (2010) revealed that the curricula used by pre-service teachers were not effective in enhancing high-order thinking skills.

The qualitative data on middle school teachers' critical thinking skills shows that teachers generally consider critical thinking skills teachable. In a similar vein, Halpern (1997) announces critical thinking skills as identifiable and teachable. For this reason, teaching critical thinking skills during the middle school process, which is the period when abstract thinking skills are acquired, is vital. In this context, it becomes more important to know how to teach the knowledge rather than which knowledge will be taught. The teachers stressed the importance of the development of critical thinking skills. The basic assumption that led to the emergence of this thought is that if people take a wider perspective on any process, they can also evaluate the perspectives of other people (Aybek, 2006). Thus, this result obtained in the study is consistent with the results of the literature. It is seen that most teachers are competent in teaching high-order thinking skills at a limited level. The importance of teaching thinking skills, especially critical thinking skills, is accepted by all educators (Van Gelder, 2005). Given primary and middle school curricula, it is seen that critical thinking skills are one of the important common skills that should be gained. Therefore, it is very important to be able to take a common and determined stance to promote critical thinking skills. Given the relevant literature on the subject, it is observed that students cannot achieve the learning outcomes of critical thinking skills at a sufficient level. Although acquiring critical thinking skills is regarded as one of the important goals of the curricula, almost all of the teachers report that primary and middle school curricula are insufficient in developing critical thinking skills. Although the critical thinking skill is a common skill in all courses, inadequacies in curricula reported by teachers are a significant outcome of the study.

Most teachers participating in the study claim that critical thinking skills should be planned in coordination with the course content. Ruggiero (1988) stipulates that the thinking process is different for each subject area or lesson, and therefore, thinking skills should be taught in the context of any lesson or subject area. Teaching critical thinking skills independently of the course or subject cannot achieve the desired goal. This is because it will not be enough for the students to acquire the skills that emerge in the context of the course. Permanence of critical thinking skills can be achieved by practicing and gaining experience. Associating critical thinking skills with the course content and planning it together can be seen as a significant factor that can boost students' interest, desire, and motivation regarding the course (cited in Doğanay and Ünal, 2006). The results obtained are similar to the findings of Ruggiero. It is observed that the teachers participating in the study especially prefer science and social studies courses, which are based on the interdisciplinary approach, to cultivate their critical thinking skills. However, it would be not a correct approach to propose that critical thinking skills can be developed within a single course. This is because although the courses represent each discipline, they intertwine with each other. Thinking skills such as critical thinking also complement this relationship (Paul, 2005; cited in Semerci, 2000). Since the participants of the present study suggested conducting more than one lesson for the development of critical thinking skills, the findings of the existing literature confirm the present study.

The participants mentioned that they preferred six hat thinking, discussion, question-answer, brainstorming, and problem-solving methods. Lipman (1988) noted that the discussion method is the most appropriate method for the development of critical thinking skills whereby an inquiry-driven classroom can be created and students can be encouraged to analyze and evaluate different ideas. In addition to that, posing open-ended questions, finding similarities and differences, creating a cause-effect relationship, finding the main idea, and analysis-synthesis can gain and leverage high-order thinking skills (Demir et al., 2011). According to Halpern (1997), critical thinking skills cannot be obtained through traditional teaching approaches, and problem solving methods are very effective in developing critical thinking skills. Likewise, the results obtained in regards to the methods and techniques used are consistent with the literature.

The research participants remarked that individuals with critical thinking skills are inquisitive, researcher, evaluate multiple perspectives, establish cause-effect relationships, and respect different ideas. Ennis (1987) defines individuals who can think critically as those who can define reasons and assumptions, who have an open mind, can express their personal views on any subject, can judge the nature of the discussion, and who strive to obtain information correctly. The results indicate great similarities with the arguments of Ennis. All teachers participating in the study pointed out that factors such as family, environment, society and culture were critically important in cultivating critical thinking skills. Özdemir (2005) suggests that factors such as family attitude, environmental characteristics, socio-economic level, friendship group, and teacher's approach all play a crucial role in this regard.

One of the major findings obtained in the study is related to the challenges teachers face in developing their critical thinking skills. They reported the challenges as inadequate curriculum in terms of content, overcrowded classrooms, teacher shortages, and anxiety about falling behind curriculum pacing. The literature also yielded similar results. Onosko (1991) identified obstacles to the development of higher order thinking as passive roles of students, overcrowded classrooms, broad, superficial content knowledge, teachers' own lack of planning time, and students who only have to recall, utter and write the knowledge. Specifically, the barrier of overcrowded classrooms stressed by the participants both negatively impacts a suitable

learning environment where individual differences are considered and leads to classroom management problems among teachers. In short, the results are consistent with the literature.

4.1 Recommendations

It has been revealed that there is a need for training on teaching critical thinking skills of teachers. Therefore, it is needed in-service training to improve teachers' critical thinking skills and increase their competence in teaching these skills.

The applications for the development of critical thinking are not included sufficiently in the curricula examined during the research process. In this framework, it is recommended to give more places to the content in curriculum development studies.

The opinions and competencies of teachers for their critical thinking skills were discussed by this study. By conducting studies on teacher candidates, it can be ensured that they gain the competencies related to the teaching of such skills before the service.

This study has been applied for secondary school teachers. Since critical thinking skills and teaching require continuity in the program, studies for other teaching levels can be carried out.

4.2 Ethical Text

"In this article, the journal writing rules, publication principles, research and publication ethics, and journal ethical rules were followed. The responsibility belongs to Ahmet Kanmaz for any violations that may arise regarding the article. " Ethics committee approval within the scope of the research. It has been taken from the Pamukkale University Ethıcs Commıttee with the decision numbered 2022/235571 on 25.01.2022. There is no conflict of interest between the authors.

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