

Technological Pedagogical Content Knowledge Competencies of Social Studies Teachers: The Case of the City of Karabük¹

Research Article

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ABSTRACT

The basic purpose of the present study was to examine the Technological Pedagogical Content Knowledge (TPCK) qualifications of social studies teachers in terms of some variables. A total of 77 social studies teachers who worked in Karabük city center and in its districts in 2015-2016 Academic Year participated in the present study. The quantitative and qualitative data collection tools were employed in the study. To collect the quantitative data, the Technological Pedagogical Content Knowledge (TPCK) Scale that was developed by Pamuk, Ergun and Ayas (2012) was used. The interview form that was developed by Aksin (2014) was used as the qualitative data collection tool. The SPSS 20.0 Program was used in analyzing the quantitative data. Frequency and percentage values, Mann Whitney U-test, Kruskal Wallis H-test, Independent Sample t-test, One-Way Variance Analysis (ANOVA) were employed in the analyses of the study data. The results of the present study showed that social studies teachers considered themselves as competent at a moderate level in the Technological Knowledge sub-dimension of the TPCK, and they considered themselves as competent at a high level in other sub-dimensions of the scale. The TPCK scores of the social studies teachers who participated in the study did not show significant differences according to the gender and occupational service years variables; however, there were significant

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differences in the knowledge and skills levels in using technology dimension and in the weekly average time spent on computer dimension. As a result of the research, it was determined that social studies teachers considered themselves adequate in all sub-dimensions of the TPCK. However, as a result of the semi-structured interviews conducted with teachers, teachers also had positive attitudes towards the use of technology in the teaching process, and they faced some problems in the effective use of the TPCK in the teaching process.

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Keywords:

Social Studies Teachers, Technological Pedagogical Content Knowledge (TPACK), Technological Literacy

Introduction

The ever-developing information technology has shaped the viewpoints of people about themselves and about others; and parallel to this, it has also made it inevitable to change and develop in the field of education at the same speed (Karadeniz, 2014). For this reason, in an environment where life, learning and working styles are changing in a fast pace, it is not possible to remain stable for the educational system that has the mission of preparing individuals to life (Şenel and Gençoğlu, 2003). The fact that education and training have a dynamic structure with all their relevant dimensions requires that the duties of teachers and their qualifications required for this task are questioned continuously in these processes (General Management for Teacher Training [OYGM], 2006). In this context, it is necessary that students should improve their basic knowledge and skills; and the teachers of social studies lesson, which is an important subject in elementary school period, need to develop themselves in technological sense. However, the fact that teachers have only technological knowledge does not mean that they will perform efficient technology integration in teaching processes. In this respect, Heafner (2004) claimed that technology was not adequate in efficient social studies teaching; and emphasized that efficient technology integration would be influential in developing the knowledge and skills of students and in increasing their motivation.

The basic aim in integrating technology into teaching processes is enabling students to use technology as they use their pencils, books or maps. However, integrating technology to education is only a small part of this work (Çakır and Yıldırım, 2009). Çakır (2015) emphasized that it is important that the technology teachers choose in teaching processes serves the main purpose and that teachers should make this choice in an accurate manner to increase the productivity of teaching processes. Because, the important thing is how teachers use this technology in their classes rather than the frequency of using it in teaching processes.

It is necessary that teachers have Technological Pedagogical Content Knowledge to perform an efficient technology integration. The TPCK concept, which was brought into the literature by Mishra and Köhler (2006), refers to knowledge that is beyond technology, pedagogy and content knowledge. Turkish Educational Association (2009) defined TPCK as "Having knowledge on integrating the curriculum and subject field, how to teach the program, the basic concepts, tools and structures of the field and the content to be taught with technology".

It is not possible to think that the fast change that occurs in the whole world with presenting the knowledge, values and skills brought with the interaction of people in the time dimension to the service of

the new generation is not reflected in the social sciences classes (Aykaç, 2011). In this sense, an efficient technology integration in social studies teaching will contribute to the realization of the cognitive and affective targets intended for students. Social studies teachers should ensure that students who are integrated with technology in their daily lives participate more actively in the lessons by integrating modern teaching methods and techniques with technology; and for this reason, it is very important that social studies teachers have Technological Pedagogical Content Knowledge for the purpose of making the learning of students become more effective.

It is noteworthy that the studies conducted on the TPCKs of social studies teachers are few in number in the literature (Bal and Karademir, 2013; Aksin, 2014). When considered in this respect, we believe that the present study will contribute to the relevant literature. In this study, the pedagogical knowledge of social studies teachers and how they integrated technology into their subjects in the city of Karabük was examined. In this context, the purpose of the study was to determine the TPCK competencies of Social studies teachers in Karabük in 2015-2016 Academic Year. For this purpose, the problem statement and the sub-problems of the study have been defined as follows.

Problem Statement

What are the Technological Pedagogical Content Knowledge (TPCK) competencies of Social Studies teachers in Karabük?

Sub-Problems

1. What are the Technological Pedagogical Content Knowledge (TPCK) of Social studies teachers?

a) What are the competence levels of the Social studies teachers in *Technological Knowledge (TK)*, *Pedagogical Knowledge (PK)*, *Content Knowledge (CK)*, *Technological Pedagogical Knowledge (TPK)*, *Technological Content Knowledge (TCK)*, *Pedagogical Content Knowledge (PCK)*, *Technological Pedagogical Content Knowledge (TPCK)*?

b) Do the Technological Pedagogical Content Knowledge (TPCK) competence levels of the social studies teachers vary according to their *genders*, *professional seniority*, *knowledge and skill of using technology*, *weekly time spent on computer*?

2. What are the viewpoints and how is usage of the social studies teachers in Technological Pedagogical Content Knowledge (TPCK) components?

a) What are the viewpoints and usage of the social studies teachers in *Technological Knowledge (TK)*, *Pedagogical Knowledge (PK)*, *Content Knowledge (CK)*, *Technological Pedagogical Knowledge (TPK)*, *Technological Content Knowledge (TCK)*, *Pedagogical Content Knowledge (PCK)*, *Technological Pedagogical Content Knowledge (TPCK)*?

Method

Study Model

In the present study, the Explanatory Design, which is among the mixed method types, was employed to determine the TPCK competences of social studies teachers. In this design, after quantitative data are collected and analyzed, qualitative data are collected. In fact, qualitative data are collected mainly

to increase quantitative data. In general, the analyses of the data are related to each other, and the findings are combined in the discussion part. This design is beneficial in examining already-present relations when study variables are not known, in testing a theory and in generalizing qualitative findings to a specific mass (Creswell, 2003/Baki and Gokce).

Universe and Sampling

The universe of the study consisted of the social sciences teachers who worked in public schools of the MoNE. The analyzable universe of the present study consisted of 77 social studies teachers who worked in Karabük City Center and in its Districts.

Table 1. Demographic Characteristics of the Social Studies Teachers who Participated in the Study

	<i>Demographic Features</i>	<i>f</i>	<i>%</i>
<i>Gender</i>	Female	44	55.8
	Male	33	44.1
<i>Professional Seniority</i>	0-5 year	18	23.3
	6-10 year	8	10.3
	11-15 year	16	20.7
	16-20 year	20	25.9
	21-25 year	7	9.0
	26 year and above	8	10.3

In Table 1, the distribution of the demographical characteristics of the 77 social studies teachers, who were included in the sampling, are given. In this respect, 55.8% of the teachers, who participated in the study, were male, and 44.1% were female. Most (25.9%) of the social studies teachers had professional seniority of 16-20 years.

Data Collection Tool

Both qualitative and quantitative data collection tools were employed in the present study. The Technological Pedagogical Content Knowledge (TPCK) Scale, which was developed by Pamuk, Ergun, Çakır, Yılmaz and Ayas (2012), was employed as the quantitative data collection tool. The required permissions were received from the researchers to collect the quantitative data. As a result of the reliability analysis, which was carried out by the researcher, the reliability coefficient of the scale was determined to be 0.95. The scale consisted of 7 sub-dimensions and had a total of 37 items. In this respect, the scale consisted of *Technological Knowledge* (4 items), *Content Knowledge* (8 items), *Pedagogical Knowledge* (4 items), *Pedagogical Content Knowledge* (6 items), *Technological Pedagogical Knowledge* (7 items). The α reliability coefficient of the whole scale was 0.95. It was determined that the 7 sub-dimensions, which were defined in the validity study, explained 70.14% of the whole variance (Pamuk et al., 2012). The Interview Form, which was prepared by Aksin (2014), was employed as the qualitative data collection tool.

Collecting the Data

The total number of the social studies teachers, who worked in the Karabük city center and its districts was obtained. Then these teachers were contacted, and the data were collected with e-mails or by hand according to the preferences of the teachers. The scale was delivered to the teachers by hand by going

to their institutions in Karabük city center. It was delivered to the teachers working in the districts through e-mails. The average answering time of each scale was fifteen minutes. Finally, the responses given by the teachers were analyzed qualitatively and quantitatively.

Analysis of the Data

The data that were obtained by applying the TPCK scale to the social studies teachers were recorded to the SPSS 20.0 program database and were then analyzed. The percentage, frequency, average and standard deviations of each sub-dimension of the TPCK competencies of the social studies teachers were computed and the descriptive statistics were made.

For the purpose of determining which statistical methods to use in the analysis of the data, statistical methods were determined by considering the kurtosis and skewness values of the points and the demographic characteristics. According to the gender variable, which had two categories, in the comparison of the sub-dimensions of the TPCK Self-Efficacy Scale, the Independent Samples *t*-Test was employed in the sub-dimensions that showed normal distribution (*Technological Knowledge*, *Technological Pedagogical Knowledge* and *Technological Pedagogical Content Knowledge*); and in the sub-dimensions where the scores were not distributed normally (*Content Knowledge*, *Pedagogical Knowledge*, *Pedagogical Content Knowledge*, *Technological Content Knowledge*), the nonparametric Mann-Whitney U test, which is an alternative of the *t*-test, was employed. According to the “*service years and levels of knowledge and skills in using technology*”, which has more than two categories, the Kruskal Wallis test, which is one of the non-parametric statistical methods, was used. Similarly, in the sub-dimensions where the distribution was normal according to the “*weekly average time spent on computer*” variable, which had more than two categories (*Technological Knowledge*, *Pedagogical Knowledge*, *Technological Pedagogical Knowledge*, *Technological Content Knowledge* and *Technological Pedagogical Content Knowledge*), the One-Way Analysis of Variance (ANOVA); and in the sub-dimensions where the distribution was not normal (*Content Knowledge*, *Pedagogical Content Knowledge*), the Kruskal Wallis test, which is one of the non-parametric statistical methods.

In qualitative analysis of the study, the data were collected by employing the Interview Form (Appendix 3). Each interview form that was responded by the teachers was encoded (e.g. T6; F [Female], T7; M [Male]) and was then analyzed. The findings that were obtained in line with the responses of the teachers were supported with sample sentences of the teachers. A general result was obtained by analyzing each question in the interview form in this way.

Findings

Findings on the Quantitative Part of the Study

Table 2. Frequency distributions of the Social studies teachers on knowledge and skill of using technology

	<i>f</i>	%
Inadequate	5	6.5
Not bad	19	24.7
Adequate	41	53.2
Very good	12	15.6
Total	77	100.0

In this context, 6.5% of the social studies teachers stated that they felt inadequate in using technology, 24.7% said they were not bad, 53.2% considered themselves adequate, and 15.6% considered them very good. Teachers consider themselves as adequate in using technology, and among these teachers, only 5 social studies teachers consider themselves as inadequate in using technology.

Table 3. Frequency distributions of social studies teachers in terms of weekly time spent on computer

<i>Time</i>	<i>f</i>	<i>%</i>
0-5 hours	31	40.2
6-10 hours	26	33.7
11-20 hours	20	25.9
Total	77	100.0

When Table 3 is examined it is seen that 40.2% of the social studies teachers spend 0-5 hours weekly on computer, 33.7% 6-10 hours and 25.9% 11-20 hours at the computer. Although most of the teachers consider themselves as adequate in technological terms, the lack of time spent on computer is noteworthy.

Technological Pedagogical Content Knowledge Adequacy Levels of Social Studies Teachers

A total of 5 categories were determined for each TPCK sub-dimension for the purpose of determining TPCK adequacy levels of the social studies teachers, which are:

- Between 1.....1,80 Very low
- Between 1.....1,81 Low
- Between 2,61.....3,40 Moderate
- Between 3,41.....4,20 High
- Between 4,21.....5,00 Very high

Table 4. Technological pedagogical content knowledge adequacy levels of social studies teachers

Technological Knowledge							
	Very Low	Low	Moderate	High	Very High	X	S
Range	1-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00		
f	-	8	7	44	18	3.07	,769
%	-	10.4	9.1	57.2	23.4		
Content Knowledge							
Range	1-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00		
f	-	1	-	37	39	4.45	,563
%	-	1.3	-	48.1	50.7		
Pedagogical Knowledge							
Range	1-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00		
f	-	1	3	39	34	4.28	,587
%	-	1.3	3.9	50.7	44.2		
Pedagogical Content Knowledge							
Range	1-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00		
f	-	1	-	43	33	4.36	,541
%	-	1.3	-	55.8	42.9		

Technological Pedagogical Knowledge					
Range	1-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
f	-	-	11	47	19
%	-	-	14,3	61,0	24,7
Technological Content Knowledge					
Range	1-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
f	-	4	2	41	30
%	-	5.2	2.6	53.2	39.0
Technological Pedagogical Content Knowledge					
Range	1-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00
f	-	-	4	48	25
%	-	-	5.2	62.3	32.5

According to Table 4, of 10.4% of the social studies teachers consider themselves to have a low-level adequacy in the Technological Knowledge sub-dimension, 9.1% consider themselves as moderate, 57.2% as high, and 23.4% as very highly adequate. In the Content Knowledge sub-dimension, 50.7% of the social studies teachers considered themselves as very highly adequate. In the Pedagogical Knowledge sub-dimension, 1.3% considered themselves as adequate at a low level, 3.9% considered themselves as adequate at a moderate level, and 50.7% considered themselves as adequate at a high level. In the Pedagogical Content Knowledge sub-dimension, 55.8% of the social studies teachers considered themselves as highly adequate. In the Technological Pedagogical Knowledge sub-dimension, 14.3% of the social studies teachers considered themselves as competent at a moderate level, 61.0% of the social studies teachers considered themselves as highly competent. In the Technological Content Knowledge sub-dimension, 5.2% of the social studies teachers considered themselves as competent at a low level, 2.6% of the social studies teachers considered themselves as competent at a moderate level, and 53.2% of the social studies teachers considered themselves as competent at a high level. In the Technological Pedagogical Content Knowledge sub-dimension, 5.2% of the teachers who participated in the study considered themselves as competent at a moderate level, and 62.3% of the teachers who participated in the study considered themselves as competent at a high level.

In this respect, although the social studies teachers, who participated in the present study, considered themselves as competent at a moderate level in the Technology sub-dimension, most of the teachers considered themselves competent at a high level in other sub-dimensions.

Table 5. The *t*-Test results of social studies teachers in technological knowledge, technological pedagogical knowledge and technological pedagogical content knowledge according to gender

	Gender	N	* <i>M</i>	<i>S</i>	<i>Sd</i>	<i>t</i>	<i>P</i>
Technology Knowledge	Female	33	13,90	2,32	75	-3,53	,001
	Male	44	15,81	2,36			
Technological Pedagogical Knowledge	Female	33	16,06	2,30	75	-,015	,988
	Male	44	16,06	2,20			

Technological Pedagogical Content Knowledge	Female	33	29,03	3,66	75	-1,31	,192
	Male	44	30,09	3,36			

According to Table 5, the highest value of the male teachers was determined in the Technological Pedagogical Field Knowledge ($\bar{x}=30,09$), the lowest value was determined in Technological Knowledge dimension ($\bar{x}=15,81$); and the highest value of the female teachers was determined in the Technological Pedagogical Field Knowledge ($\bar{x}=29,03$), and the lowest value was determined in the Technological Knowledge dimension. Although there was a significant difference between the male and female Social sciences teachers in Technological Knowledge sub-dimension [$t(75) = .001, p < .05$], no significant differences were detected in the *Technological Pedagogical Knowledge* [$t(75) = .988, p > .05$] and *Technological Pedagogical Field Knowledge* [$t(75) = .192, p > .05$] sub-dimensions. In other words, although the TPCI competencies of the female and male teachers differed significantly in the Technological Knowledge dimension, no significant differences were detected in the Technological Pedagogical Knowledge and Technological Pedagogical Field Knowledge.

Table 6. The Mann Whitney u-test results of the content knowledge, pedagogical knowledge, pedagogical content knowledge, and technological content knowledge competencies of the social studies teachers according to gender

	Gender	N	Mean Rank	Sum of Rows	Mann Whitney U	p
Content Knowledge	Female	33	34,71	1145,5	584,500	,138
	Male	44	42,22	1857,5		
Pedagogical Knowledge	Female	33	36,68	1210,5	649,500	,419
	Male	44	40,74	1792,5		
Pedagogical Content Knowledge	Female	33	37,47	1236,5	675,500	,598
	Male	44	40,15	1766,5		
Technological Content Knowledge	Female	33	33,76	1114,0	553,000	,069
	Male	44	42,93	1889,0		

When Table 6 is examined, it is seen that the TPCK adequacy of the social studies teachers do not differ according to gender in the Content Knowledge, Pedagogical Knowledge, Technological Content Knowledge and Pedagogical Content Knowledge sub-dimensions ($p > .05$). When the mean ranks of the social studies teachers are considered, it is seen that the mean rank of the male teachers is higher than that of the female teachers. For this reason, it is possible to claim that the Technological Pedagogical Content Knowledge competency levels of the male teachers are better than those of the female teachers.

Table 7. The Kruskal Wallis H test results of the social studies teachers in terms of technological pedagogical content knowledge competencies according to service years in profession

	<i>Service Years in Profession</i>	<i>N</i>	<i>Mean Rank</i>	<i>X-Square</i>	<i>Degree of Freedom</i>	<i>p</i>
Technology Knowledge	0-5 year	18	50,19	13,300	5	,021
	6-10 year	8	40,00			
	11-15 year	16	46,53			
	16-20 year	20	31,40			
	21-25 year	7	24,14			
	26 year and above	8	29,75			
Content Knowledge	0-5 year	18	41,58	2,186	5	,823
	6-10 year	8	31,50			
	11-15 year	16	40,91			
	16-20 year	20	35,53			
	21-25 year	7	42,86			
	26 year and above	8	42,19			
Pedagogical Knowledge	0-5 year	18	41,28	2,074	5	,839
	6-10 year	8	43,56			
	11-15 year	16	40,66			
	16-20 year	20	33,35			
	21-25 year	7	37,86			
	26 year and above	8	41,13			
Pedagogical Content Knowledge	0-5 year	18	40,53	3,131	5	,680
	6-10 year	8	37,19			
	11-15 year	16	44,66			
	16-20 year	20	32,50			
	21-25 year	7	38,79			
	26 year and above	8	42,50			
Technological Pedagogical knowledge	0-5 year	18	42,47	3,097	5	,685
	6-10 year	8	40,75			
	11-15 year	16	42,81			
	16-20 year	20	32,88			
	21-25 year	7	42,43			
	26 year and above	8	34,13			
Technological Content Knowledge	0-5 year	18	42,94	10,121	5	,072
	6-10 year	8	38,00			
	11-15 year	16	48,88			
	16-20 year	20	31,60			
	21-25 year	7	45,00			
	26 year and above	8	24,63			
Technological Pedagogical Content Knowledge	0-5 year	18	46,28	7,263	5	,202
	6-10 year	8	36,69			
	11-15 year	16	45,38			
	16-20 year	20	31,38			

21-25 year	8	40,64
26 year and above	4	29,81

According to Table 7, it is seen that there is a significant difference in the Kruskal Wallis H test to determine whether there was a significant difference between the Technological Pedagogical Content Knowledge Competencies of social studies teachers according to their service years, it was determined that there was significant difference in the Technological Knowledge sub-dimension [$\chi^2(5) = 0,21$; $p < 0,05$]. However, no significant differences were detected in the Content Knowledge [$\chi^2(5) = 0,823$ $p > 0,05$], Pedagogical Knowledge [$\chi^2(5) = 0,839$ $p > 0,05$], Pedagogical Content Knowledge [$\chi^2(5) = 0,680$ $p > 0,05$], Technological Pedagogical Content Knowledge [$\chi^2(5) = 0,202$ $p > 0,05$], Technological Pedagogical Knowledge [$\chi^2(5) = 0,685$ $p > 0,05$] sub-dimensions.

Table 8. The results of the Kruskal Wallis H-Test on the technological pedagogical content knowledge competencies according to knowledge and skills of social studies teachers in using technology

	Technology Knowledge and Skill Level	N	Mean Rank	X- Square	Degree of Freedom	p
Technology Knowledge	Insufficient	5	21,30	22,615	3	0,000
	Intermediate	19	22,79			
	Upper intermediate	41	43,49			
	Advanced	12	56,71			
Content Knowledge	Insufficient	5	46,70	7,386	3	0,061
	Intermediate	19	32,45			
	Upper intermediate	41	37,05			
	Advanced	12	52,83			
Pedagogical Knowledge	Insufficient	5	26,00	7,580	3	0,056
	Intermediate	19	32,29			
	Upper intermediate	41	40,05			
	Advanced	12	51,46			
Pedagogik Content Knowledge	Insufficient	5	36,70	8,802	3	0,032
	Intermediate	19	31,32			
	Upper intermediate	41	38,13			
	Advanced	12	55,08			
Technological Pedagogical knowledge	Insufficient	5	29,10	13,109	3	0,004
	Intermediate	19	28,45			
	Upper intermediate	41	39,96			
	Advanced	12	56,54			
Technological	Insufficient	5	26,80		3	

Content Knowledge	Intermediate	19	27,82	11,990	3	0,007
	Upper intermediate	41	41,57			
	Advanced	12	53,00			
Technological Pedagogical Content Knowledge	Insufficient	5	25,80	20,307	3	0,000
	Intermediate	19	26,37			
	Upper intermediate	41	40,00			
	Advanced	12	61,08			

In Table 8, it is seen that no significant differences were determined in the dimensions of Content Knowledge [$\chi^2(5) = 0,061$; $p > 0,05$] and Pedagogical Knowledge [$\chi^2(5) = 0,056$; $p > 0,05$] of the social studies teachers. In other words, the Technological Pedagogical Content Knowledge competencies of the social studies teachers do not differ according to their technological knowledge and skills. Significant differences were detected in the Technological Knowledge [$\chi^2(5) = 0,000$; $p < 0,05$], Pedagogical Content Knowledge [$\chi^2(5) = 0,032$; $p < 0,05$], Technological Pedagogical Knowledge [$\chi^2(5) = 0,004$; $p < 0,05$], Technological Content Knowledge [$\chi^2(5) = 0,007$; $p < 0,05$], Technological Pedagogical Content Knowledge [$\chi^2(5) = 0,007$; $p < 0,05$] sub-dimensions. It is seen that this situation is in favor of the social studies teachers.

Table 9. The Kruskal Wallis H Test results of the social studies teachers in the content knowledge and pedagogical content knowledge competencies according to weekly time spent on computer

	Average Weekly Time Spent On Computer	N	Mean Rank	X-Square	sd	p
Content Knowledge	0-5 hours	31	36,79	8,548	2	,014
	6-10 hours	26	32,44			
	11-20 hours	20	50,95			
Pedagogical Content Knowledge	0-5 hours	31	38,32	4,381	2	,112
	6-10 hours	26	33,52			
	11-20 hours	20	47,18			

According to Table 9, the Kruskal Wallis H test, which is one of the non-parametric statistical methods, was used in the *Content Knowledge* and *Pedagogical Content Knowledge*, which constitute the sub-dimensions of the *Technological Pedagogical Content Knowledge* according to the weekly time spent on computer of the social studies teachers, who participated in the study. In this respect, while the Content Knowledge of the social studies teachers differed at a significant level ($P < 0,05$) according to the average time they spent on computer ($P < 0,05$), there were no significant differences in Pedagogical Content Knowledge ($p > 0,05$). Whether there were significant differences in the other sub-dimensions according to *Weekly time spent on computer* was tested with the ANOVA test, which is one of the parametric statistical methods, and the results are given in Table 10.

Table 10. The Differentiation (Anova) of the technological pedagogical content knowledge competencies of the social sciences teacher according to the average weekly time spent on computer

	Average Weekly Time Spent On Computer	N	* M	sd	S	F	p
Technology Knowledge	0-5 hours	31	14,77				
	6-10 hours	26	14,23	2	2,518	4,611	0,013
	11-20 hours	20	16,35				
Pedagogical Knowledge	0-5 hours	31	16,67				
	6-10 hours	26	16,42	2	2,223	3,648	0,031
	11-20 hours	20	18,05				
Technological Pedagogical Knowledge	0-5 hours	31	15,90				
	6-10 hours	26	15,88	2	2,232	0,632	0,534
	11-20 hours	20	16,55				
Technological Content Knowledge	0-5 hours	31	16,19				
	6-10 hours	26	16,19	2	2,713	6,700	0,002
	11-20 hours	20	18,60				
Technological Pedagogical Content Knowledge	0-5 hours	31	28,87				
	6-10 hours	26	28,76	2	3,512	6,754	0,002
	11-20 hours	20	31,95				

As it is given in Table 10, the Technological Pedagogical Content Competencies of the social studies teachers according to the average weekly time spent on computer, differed at 0.05 significance level. When the average values are considered, the high time spent by the teachers on computer affected the Technological Pedagogical Content Knowledge competencies positively.

Findings on the Qualitative Part of the Study

The answers of the social studies teachers given to the questions in the interview form were analyzed and grouped in terms of similarity and differences.

In relation to TK, which is one of the components of the TPCK, social studies teachers were asked the question *"In your opinion, what does being a technology literate mean?"* In general, social studies teachers stated that technology literacy was following technological developments, being open to innovation, using it effectively in education-teaching, using technological equipment and producing solutions to problems faced when needed.

The Opinions of Social Studies Teachers on Technological Knowledge (TK) and the Findings and Comments on Using It

Table 11. The opinions of social studies teachers on “In your opinion, what does being technology literate mean?”

The Statements of the Teachers	<i>f</i>	%
Following technology	21	27.6
Using technology for proper purpose	21	27.6
Using technological equipment	15	19.7
Adapting to Technological innovations and process	5	6.5
Using technology in education-teaching	5	6.5
Being aware of innovations	4	5.2
Producing solutions for the problems faced	2	2.6
Questioning technological innovations and processes	1	1.3
Knowing technological terms	1	1.3
Using Internet software	1	1.3
Total	76	100

The answers given by the teachers encoded by T21, T33 support these statements.

T21; E: “...People who use technology, and bring solutions for the problems they face may be technology literate...”

T33; E: “...Being technology literate means knowing how and in what way to use it in education...”

Teachers were also asked “At which level do you consider yourself as a technology literate?” The teachers who responded to this question said that they generally considered themselves as technology literate at an adequate level. The answers of the teachers supporting these statements the teachers who were encoded as T3 and T29) are as follows:

T3; E: “...I consider myself as technology literate at a good level as I follow technological software related to my field closely...”

T29; K: “...I think that I am a good technology literate person...”

Table 12. The Number of the teachers who consider themselves as technology literate

Evaluation Degree	Number of Teachers
Inadequate	7
Not bad	22
Adequate	34
Very good	2
Total	65

As given in Table 12, while only two of the social sciences teachers considered themselves as very good technology literates, 34 considered themselves as adequate, and 22 considered themselves as moderate level. Seven teachers; however, considered themselves as inadequate in technology literacy.

The interviews made in the context of the present study show that teachers consider themselves as technology literate, follow the technology in their daily lives, and are aware of the developments.

The Considerations of Social Studies Teachers on Technological Pedagogical Content Knowledge (TPFK) and Findings Related to Using It

The social studies teachers were asked the question “*Did you teach technology-supported lessons in your classes? Can you explain what you did?*” about the TPCK components. Most of the teachers stated that they did technology-supported teaching. They said that they frequently made use of the smart boards as a part of the FATİH project, and that they used various educational sites to teach their classes, and they also said that they used technology to concretize abstract issues, to reinforce learning, and to enhance the lessons in visual and auditory terms. In addition, it was determined that social studies teachers made use of technology in teaching history and geography subjects.

The answers of the teachers who were encoded as *T21 and T33* are given below as examples:

T21; M: “...I use technology-supported teaching in almost every lesson. As you know, there are too many smart board applications and the contents related with this. There are tens of technological support contents about each subject in the social sciences lessons and history of revolutions lessons. I use the EBA System actively as well as the sosyalbiligler.biz.com, morpa kampüs, vitamin to which I am a member of.

In 6th Grade, the unit “Life on Earth”, and in the 5th Grade, the unit “Know our Regions” are the units in which I should use technological visual aids. Students are in interaction with technology in the programs I use. They do the activities and receive feedback at that moment...”

T33; M: “...Yes, I used technology-supported teaching. I used it in the 6th Grade, in the Central Asian Turkish States, Turkish Army from Past to Present, a New Religion is Born subjects of the Turks in Silk Road Unit; in the 7th Grade, in the Ottoman State Administration, Military Structure subjects in the A Journey to the Turkish History Unit; in the 8th Grade, in the 1st İnönü War and the Sakarya War subjects in the Either Independence or Death Unit. I used it in many subjects that I cannot write here...”

The question “*What were the difficulties you faced? How did you cope with them?*” was asked to the teachers. The answers given by the teachers are given in Table 13:

Table 13. The viewpoints of the teachers on the question “What were the difficulties you faced? How could you cope with them?”

The statements of the teachers	<i>f</i>	%
Slow Internet connection and cut-offs	26	41.9
Breakdowns in smart boards	8	12.9
Inadequate technological infrastructure	9	14.5
Not planning the lesson hour	4	6.4
Electricity cut-outs	3	4.8
Missing technical knowledge	10	16.1
Limitations in content presentation	2	3.2
Total	62	100

As seen in Table 13, the most important problem experienced by teachers in technology-assisted teaching is the problems related to the Internet. A total of 41.9% (26 teachers) teachers said that they lost time due to problems like internet connection or slow internet speed. A total of 12.9% (8 teachers) said that these problems were related to breakdowns in smart boards, 14% (9 teachers) said that these problems were related to missing technological infrastructure, 6.4% (4 teachers) said that these problems were related to inefficient planning for lessons, 4.8% (3 teachers) said that these problems were related to power cut-offs, 16.1% (10 teachers) said that these problems were related to missing technical knowledge, and 3.2% (2 teachers) said that these problems were related to various difficulties like restrictions on presenting contents. If the difficulties that are faced by them is related to themselves, they asked for help from another teacher from another institution, and if the problem was related to a technical problem, the resolved it by contacting the administration. Aside from these, 11 teachers said that they did not experience any problems when they provided technology-assisted education. The answers of *T10* and *T73* are given below as examples:

T10; F: "...As the technology of the school was not developed at an adequate level, I had difficulties in terms of timing and place; however, I could easily overcome them with the support of the school administration..."

T73; F: "...Because of the inadequate hours of the lessons, we face difficulties in catching up with the curriculum. Turning on the smart board, entering the system, slow access to the Internet during lessons cause that we lose time..."

Table 14. The viewpoints of the teachers on the question "In your opinion, what should the things be that can be done by teachers and students to enrich social studies lessons with technology?"

The statements of the teachers	<i>f</i>	%
Enriching the contents with technology	19	27.9
Preliminary preparation	11	16.1
Teachers and students should follow technological developments	9	13.2
In-service trainings should be organized	9	13.2
Students should be encouraged to use technology for educational purposes	7	10.2
Efficient and correct use of technology	5	7.35
Developing the skill of teachers to use technology	4	5.8
Teachers' being enthusiastic to use technology	1	1.4
Planning	1	1.4
Preparing technological documents by MoNE	1	1.4
Students should reinforce their learning with technology	1	1.4
Total	68	100

According to Table 14, 27.9% (19 teachers) of the teachers said that the content should be enriched with technology, 16.1% (11 teachers), the technological materials to be used in classrooms should be prepared prior to the lessons, 13.2% (9 teachers) teachers said that students and teachers should follow technological developments, 13.2% (9 teachers) said that in-service trainings should be organized, 10.2% (7 teachers) said that students students should be encouraged to use technology for educational purposes, 7.35% (5 teachers) said that technology should be used effectively and correctly, 1.4% (1 teacher) said that

there should be planning before the lessons, 1.4% (1 teacher) said that the MoNE should prepare technological documents, and 1.4% (1 teacher) said that students should reinforce their learning by using technology.

The statements of the teachers who were encoded as T1 and T72 are given below as examples.

T1; F: "...In-service trainings should be increased and activated. In the scope of the Fatih project, the computer distribution should be made in schools in Turkey; and in this way, presentations should be made about the preliminary preparations of students and teachers..."

T72; F: "...The thing that must be done by the teacher is following the innovations, and know the levels of his/her students, and determine his/her education technique in this respect. The students, on the other hand must always be curious about technology..."

In another question, the teachers were asked, "In your opinion, how should be the competence of a social studies teacher be in technology field?" The distribution of the answers of the teachers is given in Table 15:

Table 15. The answers of the teachers given to the question "In your opinion, how should be the competence of a social studies teacher be in technology field?"

The statements of the teachers	f	%
Should be able to use technological equipment	22	41.5
Should follow technological developments	12	22.6
Should be able to use computer	9	16.9
Should be able to use smart board	5	9.4
Should have technological competence	2	3.7
Should be able to use technology suitable for the subject	2	3.7
Should be technology-literate	1	1.8
Total	53	100

As seen in Table 15, 41.5% of teachers (22 teachers) said that a social studies teacher should be able to use technological devices, 22.6% (12 teachers) said that they should follow technological developments, 16.9% (9 teachers) said that they should be able to use computer, 9.4% (5 teachers) said that they should be able to use smart board, 3.7% (2 teachers) said that they should have technological competence, 3.7% (2 teachers) said that they should be able to use the technology that is suitable for the topic, and 1.8% (1 teacher) said that they should be technology literate.

The statements of the teachers who were encoded as T2 and T33 are given below:

T2; M: "...In your statement, a social studies teacher must be technology literate. An experienced teacher who knows computer well, who can use the smart board, maintains his/her dynamism, who is open to new technological developments..."

T33; M: "...A social studies teacher should know how to use technology in his/her lessons. S/he should know which technology or software to select for the lesson. S/he should take the level of the students into account when making this choice..."

Table 16. The viewpoints of the social studies teachers on the question “What can be done to acquire and improve these competencies?”

The statements of the teachers	f	%
In-service trainings should be organized	48	75.0
Teachers should follow technological innovations and be open to them	7	10.9
Teachers should improve themselves	4	6.2
School administrations should provide support	4	6.2
Preparing various software for lessons	1	1.5
Total	64	100

As seen in Table 16, 75.0% of teachers (48 teachers) said that in-service trainings should be performed, 10.9% (7 teachers) of teachers said that teachers should follow technological innovations and be open to innovations, 6.2% (4 teachers) said that teachers should improve themselves, 6.2% (4 teachers) said that school administrations should provide support, and 1.5% (1 teacher) said that teachers should prepare various software for their lessons.

The answers of the teachers encoded as T19 and T85 supporting this are given below as samples:

T19; M: “...Firstly, it is required that teachers are provided with all kinds of technological support in schools and school administrations should do anything they can to ensure this...”

T75; M: “...The school administration should complete technological materials, and teachers should renew themselves for new technologies...”

The Viewpoints of Social Studies Teachers on Technological Content Knowledge (TCK) and Findings and Interpretations on Its Use

About the TCK, which is one of the components of TPCK, the question “What kind of technological materials do you use in your lessons?” was also asked to social studies teachers. The distribution of the answers of the teachers to this question is given in Table 17 below:

Table 17. The distribution of the answers of the teachers to “What kind of technological materials do you use in your lessons?”

The statements of the teachers	<i>f</i>	%
Smart board	50	37.3
Computer	35	26.1
Projection device	26	19.4
Overhead Projector	6	4.4
Mobile phone	5	3.7
Internet	8	5.9
Maps	4	2.9
Total	134	100

The teachers were also asked “Do you have knowledge on educational software?” The answers of the teachers are given in Table 18.

Table 18. The answers of the teachers to the question “Do you have knowledge on educational software?”

The statements of the teachers	<i>f</i>	%
Yes	44	61.9
No	27	38.0
Total	71	100

As stated in Table 18, 61.9% of the teachers (44 teachers) said that they had knowledge on educational software and they often used Education Informational Network (EBA). A total of 38.0% (27 teachers) said that they did not have any knowledge on educational software.

In addition to this question, the teachers were also asked: “How and at which level did educational software have an effect on the learning of students? Teachers generally stated that educational software affected learning positively, the attention, interest and motivation of students increased in the lesson. They also stated that learning became more fun, the learning environments were enriched and active participation of students was established. The answers of the teachers are distributed as follows in Table 19:

Table 19. The viewpoints of the teachers on the question “How much and in which direction were educational software effective in the learning of students?”

The statements of the teachers	<i>f</i>	%
Ensuring that learning becomes permanent	13	25.4
Increasing the interest and motivations of students	11	21.5
Facilitating learning	8	15.6
Increasing the attention of students	8	15.6
Concretizing the subjects	6	11.7
Active participation in lessons	4	7.8
Increasing audio-visual intelligence	1	1.9
Total	51	100

As seen in Table 19, 25.4% of teachers (13 teachers) stated that learning became permanent, 21.5% (11 teachers) increased the interest and motivation of students, 15.6% (8 teachers), stated that it facilitated learning, and 15.6% (8 teachers) increased the attention of students, 11.7% (6 teachers) stated that it concretized subjects, 7.8% (4 teachers) stated that it ensured active participation in lessons, 1.9% (1 teacher) stated that visual and audio intelligence increased. The answers of the teachers encoded as T17 and T51, who supported these statements, are presented below as an example:

T17; F: "...Technology improves the audio-visual intelligence of students better. As they attract attention, students are more motivated. For this reason, positive effects occur in their learning..."

T51; F: "...Technology helped students to participate in lessons actively. Visual animations and concrete examples made students ensured that students comprehended more quickly..."

Table 20. The viewpoints of the teachers on the question "In your opinion, what is the effect of technology in social studies education?"

The statements of the teachers	<i>f</i>	%
Making the subjects become concrete	18	27.2
Visualization of subjects	14	21.2
Permanent learning	13	19.6
Forming enriched learning environment (audio-visual)	9	13.6
Increasing the interest	4	6.06
Increasing the attention	3	4.54
Facilitating learning	2	3.03
Saving time	2	3.03
Increasing academic achievement	1	1.51
Total	66	100

According to Table 20, 27.2% of the teachers (18) said that the subjects should be made concrete, 21.2% (14 teachers) said visualization of subjects, 19.6% (13 teachers), permanent learning should be provided, 13.6% (9 teachers) said a rich learning environment should be created, 6.06% (4 teachers) said interest in the lesson should be increased, 4.54% (3 teachers) attention in the lesson should be increased, 3.03% (2 teachers) learning should be facilitated, 3.03% (2 teachers) time should be saved, 1.51% (1 teacher) stated that academic achievement should be increased. Sample statements of the teachers encoded as T33 and T75 supporting the statements of the teachers are as follows:

T33; M: "...Using technology in social studies education has positive effects on the interest of students in the lesson, on the continuity of learning, on the concretization and reinforcing the subjects".

T75; M: "...There are current events in the lessons as well as brief history knowledge topics. Technology is mostly effective in current events..."

Table 21. The viewpoints of teachers on the question “What should teachers do to use technology for educational purpose in their lessons?”

The statements of the teachers	<i>f</i>	%
Being able to use technological equipment	21	31.8
Being able to use technology for education	13	19.6
Following technological innovations	10	15.1
Having the technological knowledge and skills	9	13.6
Being able to use technology	8	12.1
Being able to use educational software	5	7.5
Total	66	100

As seen in Table 21, 31.8% of teachers (21 teachers) used technological equipment, 19.6% (13 teachers) could use technology for educational purposes, 15.1% (10 teachers) followed technological innovations, 13.6% (9 teachers) had technological knowledge and skills, 12.1% (8 teachers) used technology, 7.5% (5 teachers) could use educational software.

The Viewpoints of Social Studies Teachers on Technological Pedagogical Information (TPI) and the Findings and Interpretations on Using This

The social studies teachers were asked about TPI, which is one of the TPCK components, “*How do you organize the classroom when you teach technology-supported lessons in social sciences education? Do you use the computer laboratory or what kind of learning environments do you form?*” The teachers generally stated that they taught their classes with smart boards in their classrooms, and did not organize anything extra in the classrooms except for a few teachers.

Table 22. The viewpoints of the teachers on the question “How do you organize the classroom when you teach technology-supported lessons in social studies education? Do you use the computer laboratory or what kind of learning environments do you organize?”

The statements of the teachers	<i>f</i>	%
Teachers who teach in classrooms with smart boards	60	86.9
Teachers using computer laboratory	9	13.1
Total	69	100

The responses of the teachers encoded as *T2* and *T68*, who supported these statements, are as follows:

T2; M: “... No matter whether my classroom is supported with technology or not, I try to create an interactive, participatory classroom environment in my classroom. I prefer an organization in which every student can use the physical space of the classroom. I try to apply the “V” form when I use the smart board. I use the computer laboratory when I need it...”

T68; M: “... It is no longer necessary to take extra precautions as there are interactive boards. I often used the computer laboratory or the classrooms that had computer and projection when there were no interactive smart boards...”

Discussion, Conclusion and Suggestions

In the present study, the Technological Pedagogical Content Knowledge (TPCK) competences of social studies teachers were examined according to the sub-dimensions. In addition, the ability of social studies teachers, who participated in the study, in using technology and teaching methods were also examined. The results of the research are given below:

The social studies teachers, who participated in the present study, do not consider themselves too competent in sub-dimension of technological knowledge compared to the other sub-dimensions of the TPCK. Landry (2010) conducted a study with mathematics teachers and reported that the technological knowledge of teachers was low among all sub-dimensions of the TPCK. It was also determined that teachers were eager to learn new technologies and use them in their lessons. The problems faced by teachers due to lack of infrastructure caused that they could not to improve themselves much in terms of technological knowledge and experience.

Social studies teachers consider themselves as competent in terms of technology literacy. However, it was determined that the teachers did not mention any field of technology or information technologies, instead of this, they used general expressions in the definitions of technology literacy.

When the Technological Knowledge sub-dimension is evaluated within itself, the technological knowledge of teachers varied according to gender, knowledge and skill level in using technology, weekly time spent on computer and years of professional service. It was determined as a result of the study that the technological knowledge scores of male teachers were higher than female teachers according to the gender variable. Gündoğmuş (2013) and Lin, Tsai, Chai and Lee (2013) reported in their study that the technological knowledge levels of male teacher candidates were better than female teacher candidates. Özsevgeç, Batman, Yazar and Yiğit (2014) reported in their study that the technological term awareness of teacher candidates was in favor of male teacher candidates. It is possible to explain the male teachers' being better in technological knowledge with the fact that they are more interested in technological developments. It was determined that the technological knowledge scores of the teachers, who had 0-5 years of professional service and who considered themselves competent in technological knowledge and skills, were better. In a similar study, Akman (2014) reported that social sciences teachers considered themselves competent in computer and technology knowledge, and the teachers who had 0-5 years of professional service benefited from technological opportunities better. Mutluoğlu (2012) conducted a study with chemistry teachers and determined that as the seniority of the teachers increased, their technological knowledge decreased. It is possible to claim that teachers do not have adequate levels in technological knowledge because of the increase in seniority years, and for this reason, they used traditional methods or older technological instruments in their classes. Çakmaz (2010) conducted a study and reported that the technologies used by pre-school teachers changed depending on the increase in their professional service years, and that senior teachers used old technologies and classical methods, and new teachers preferred new technologies.

Although Pedagogical Knowledge (PK) scores of the social studies teachers did not differ according to gender, year of professional service and knowledge and skill in using technology did not differ, these scores differed significantly according to the average weekly time spent on computer. Teachers know which teaching methods and techniques and measurement tools they will employ in line with the development and individual characteristics of students. For this reason, they ensure that students focus on the subject,

and for this reason, and did not have any problems in class management. As social studies teachers benefit from a limited number of technology (smart boards, computers, projection devices) in their classes, when they face a negative situation, they can solve it with their pedagogy knowledge. Chai, Koh, Tsai and Tan (2011) conducted a study and reported that pedagogical knowledge has a direct effect on TPCK. Akbaşlı (2010) conducted another study and reported that the teachers who had theoretical pedagogical knowledge were not competent in practice.

Social studies teachers consider themselves self-sufficient at a high level in the Field Knowledge sub-dimension of TPCK. The fact that the teachers have adequate field knowledge shows that they have a positive effect on the efficiency of the lessons and that teachers feel confident. Therefore, high levels in field knowledge in teachers affected self-efficacy perceptions of them in a positive way. Although it was determined that the field knowledge scores of social studies teachers did not differ according to gender, knowledge and skill level in technology and the years of professional service, these scores differed according to the weekly time spent on computer. Aksin (2014) conducted a study on TPCK competences of social studies teachers and reported that the field knowledge of teachers had the highest value among the sub-dimensions of the TPCK. Similarly, in the study conducted by Doğru (2016), it was reported that the field knowledge of geography teachers was higher compared to all sub-dimensions of the TPCK.

It was concluded in the present study that the Social Studies Teachers, had high levels in Technological Pedagogical Knowledge (TPK), which is one of the sub-dimensions of TPCK. In addition to this, although the TPBs of the social studies teachers did not differ according to gender, professional service years and weekly time spent on computer, they differed in the knowledge and skills of using technology. Demir and Bozkurt (2011) conducted a study with mathematics teachers and reported that teachers needed professional training on technology and pedagogy fields. Hughes (2005) conducted a study and emphasized that it was possible to develop pedagogical knowledge with innovative technologies in terms of professional development of teachers. Jaipal and Figg (2010) reported that the TPK deficiency of teacher candidates had a negative impact on classroom management, and stated that the lessons that would be provided to teacher candidates for effective technology integration were significant.

Social studies teachers, who participated in the present study, can produce solutions for various problems they experience; however, they also experience some technical difficulties like internet disruptions, breakdowns in smart boards, deficiencies in technological infrastructure and power cuts when they use technology. Bauer and Kenton (2005) conducted a study and reported that teachers experienced difficulties in accessing information because of the difficulties faced in internet access. Çakır and Yıldırım (2009) emphasized that the limited access to technology at school where teachers worked was one of the factors that limited using technology.

Wall, Higgins and Smith (2005) conducted a study and emphasized that some technical difficulties while using smart boards in teaching had negative effects on students and teachers. Teachers prepared materials or playing cards in case they might face technical problems. Teachers preferred solving the problems by contacting school administrations or by receiving help from other teachers.

When teachers use technology, they cannot complete the curriculum because of the limited time in lessons. Menzi, Çalışkan and Çetin (2012) conducted a study and reported that the low rates in using technology by teachers was due to lack of adequate time and technological devices, and lack of adequate

training of teachers in technology. Although the social sciences teachers, who participated in the present study, considered themselves adequate in terms of technological pedagogical content knowledge, they also experienced difficulties in terms of time and integrating technological knowledge with pedagogical knowledge. This result is in line with the results reported by Hırça and Şimşek (2013), who also stated that the teachers experienced difficulties in integrating the technological knowledge and pedagogy in the educational processes.

Social studies teachers think that teachers should be enabled to use technological devices and follow innovations to use technology for educational purposes.

Due to the fact that smart boards exist in every classroom, most teachers do not use computer laboratories. However, in schools where smart boards are not established yet, teachers use computer laboratories or projection devices.

In the Technological Content Knowledge sub-dimension of the social studies teachers, who participated in the study, it was determined that considered themselves adequate. While the TPCK of the teachers did not differ according to the gender and professional service years variables, their knowledge and skills in using technology differ according to the average weekly time they spend on computer. In their study, Pamuk, Ülken and Şener Dilek (2012) conducted a study and reported high correlations between TPCK, TCK and PCK of TPCK among other sub-dimensions. Bilgin, Tatar and Ay (2012) stated that the change that occurred in the TPCKs of the classroom teachers was influential in their attitudes towards technology.

Many of the teachers are trying to use the smart boards in their classrooms after they were installed in the scope of the FATİH Project. In addition to these technologies, they also said that they used computers, projection devices and the Internet. However, many of the teachers think that using smart boards is adequate, and for this reason, they do not use other technologies much. Akyüz, Pektaş, Kurnaz, and Kabataş Memiş (2014) reported in their studies that using smart boards affected the TPCK self-confidence of science teacher candidates in a positive way. Some technical breakdowns and the knowledge of technology of teachers limit their use of the existing technologies.

Many of the social studies teachers participating in the present study said that they had knowledge on educational software. However, they said that they used only the EBA as the educational software. Based on this, it is possible to claim that teachers do not have adequate knowledge on educational software, and they know EBA because it is the educational software used most frequently in FATİH project. Tutar (2015) conducted a study and reported that teachers had knowledge on EBA and thought that it was an effective and efficient site; however, they did not use it frequently in their classes. In addition, it was also determined that many teachers were not aware of EBA market applications and that teachers mostly used this software to provide e-book chapters and documents. Teachers also stated that educational software facilitated the learning of students, affected their interest and motivation positively in classes. Petrović, Stanković and Jevtić (2015) reported in their study that students preferred educational software as the best way to learn in school. As a result of the present study, it was shown that using technology in social studies education has an impact on making the subjects become concrete, increased the academic achievements of students by increasing their interest, motivation and attention in the lesson. For this reason, it is possible to claim that teachers believe that using technology in teaching social sciences has a positive effect.

Social studies teachers did not show negative attitudes towards technology. Similarly, in the study conducted by Yurdakul (2011), it was concluded that teacher candidates had positive viewpoints on effective technology integration in teaching by employing their technological and pedagogical knowledge and skills. In addition, teachers also said that using technology in social studies education was an effective method for students to increase their academic success levels, to facilitate their learning, and to enhance learning environment in an audio-visual way. Karatekin, Elvan and D. Öztürk (2015) concluded in their study that was conducted with social studies and classroom teachers that the beliefs of teachers on employing technology in education were positive.

The Pedagogical Content Knowledge (PCK), which is another TPACK dimension, of social studies teachers was determined to be high in the present study depending on the higher pedagogy and content knowledge of teachers. The high levels in field knowledge of teachers affected the Pedagogical Content Knowledge in a positive way. In addition, teachers can also use pedagogy to facilitate the learning of their students. The teachers who rely on their field knowledge can respond to the learning needs of the students in a pedagogical manner. Canbazoğlu, Demirelli and Kavak (2010) reported in their studies that the knowledge of teacher candidates was an information type that was related with Pedagogical Content Knowledge. It was determined that the Pedagogical Content Knowledge of the social studies teachers did not show any differentiation according to the professional service year variable. According to social studies teachers, teachers should enhance the content with technology in social studies classes, follow technological developments, be willing to use technology and develop their skills in this context. It was also emphasized that students should be encouraged to employ technology for educational purposes, and to reinforce their learning through technology.

It was determined that the social studies teachers who participated in the present study were carrying out technology-supported instruction in the units in which history and geography subjects were dominant. The units in which the teachers applied technology-supported teaching according to the class levels were *Sources of Our Country Unit* in the 5th Grade, *Turks in Silk Road* in the 6th Grade, *Journey in Turkish History and Population in our Country* Units in the 7th Grade, *Either Independence or Death* unit the 8th Grade. It is considered that graduation fields of the teachers might have been influential on technology-assisted teaching in subjects where history and geography subjects are dominant.

Social studies teachers believe that students and teachers both should have various technological equipment for the purpose of enhancing their lessons with technology. They also emphasize the requirement for teachers to employ technology for educational purposes and to reinforce the learning of their students. They also believe that the Ministry of National Education should diversify the training software that are available now. Teachers require efficient in-service training to improve their technological competences. They also believe that school administrations should support them in terms of missing technological infrastructure in classes. Sezer (2015) conducted a study and reported that in-service trainings were influential on the TPACKs of teachers. The Karadeniz and Vatanartiran (2015) determined that in-service trainings affected the knowledge of technology and field information of teachers in a positive way.

Stoilescu (2011) found that the in-service trainings of teachers should be employed to update their computer information and technology should be integrated with mathematics education. Z. Kaya and Yılayaz (2013) conducted a study and reported that the in-service trainings of teachers were inadequate and

that it was an incorrect approach to accept that the participation, attitude, knowledge and experience of the teachers who participated to in-service trainings equal. Jamani and Figg (2013) emphasized that instead of providing teachers with trainings that will make them acquire technical skills related to technology, it would be more beneficial to provide them with professional development workshops.

The Technological Pedagogical Content Knowledge (TPCK) qualifications of the social studies teachers who participated in the present study did not differ according to their gender, educational status and years of professional service; however, their qualifications in this respect differed at a significant level according to the skills and knowledge on using technology and weekly time spent on computer. Uçar, Demir and Hiğde (2014) conducted a study and reported that there were significant differences between the TPCK scores of the teachers depending on their frequency of using computers. Sarı, Bilici, Baran and Özbay (2016) reported a positive relation between the attitudes of teachers towards information and communication technologies and TPCK competences.

Önal and Çakır (2015) conducted another study and reported that the gender and educational status variables did not cause a difference at a significant level in the TPCK self-confidence perceptions of the teaching staff. Önal and Çakır (2015) conducted a study to determine the TPCK self-confidence of academicians and reported that the gender and educational status variables did not cause a significant difference. On the other hand, it was determined that there was a significant difference between the years of service and departments of the participants.

According to the results of the study, it was determined that the technological pedagogical content knowledge of the social studies teachers, who participated in the present study, was good. Although the TPCK of the teachers had the lowest value in technological knowledge sub-dimension among all the other sub-dimensions of the TPCK, their pedagogy and field information were determined to be high. Based on this, it may be claimed that the high pedagogy and field knowledge scores of the teachers increased their TPCK scores. Şimşek, Demir, Bağgeci and Kinay (2013) conducted a study and reported that the TPCKs of the academicians were at an advanced level. Aisyah (2013) reported that the learning of students increased at a rate of 65.7% in their study that was conducted to determine the effects the TPCK model on learning potential and on encouraging the 3rd Grade students to think critically.

As a result of the study, it may be claimed that social sciences teachers consider themselves as competent in all the sub-dimensions of the TPCK in general. However, it was determined as a result of the semi-structured interviews conducted with the teachers that although the teachers had positive attitudes towards using technology in teaching processes, they experienced some difficulties in employing the TPCK knowledge effectively in these processes. Social studies teachers are aware of the positive effect of employing technology in classes, and need effective in-service trainings to achieve effective technology integration. Conducting the in-service trainings within certain periods and following the development of each teacher will facilitate the achievement of these in-service training objectives. Although teachers are aware of the importance of the integration of technology to education, it was determined that their individual efforts in this direction are inadequate, and they cannot employ adequate technology in their classes.

Based on the findings of the present study, the following may be recommended:

- The efforts of teachers to find solutions to technical problems they experience will help them to improve their technological content knowledge.
- The educational software employed by teachers should be diversified, and they should learn how to use new educational software.
- Organizing in-service trainings by considering the technological competences and seniority years of teachers will enhance the efficiency of in-service trainings.
- Organizing in-service trainings by considering the differences between the branches of teachers instead of providing all teachers with in-service trainings without considering the difference between the branches will help teachers to enhance their TPCKs.
- Eliminating the deficiencies of the infrastructures of schools will help teachers to obtain knowledge and experience about efficient integration of technology.

GENİŞLETİLMİŞ ÖZET

Sosyal Bilgiler Öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi Yeterlilikleri: Karabük İli Örneği

Problem Durumu ve Araştırmanın Amacı

Gelişen bilişim teknolojileri insanların kendilerine ve başkalarına olan bakış açılarını yeniden şekillendirmiş, buna paralel olarak eğitim alanında değişim ve gelişimin aynı hızla gerçekleşmesini kaçınılmaz hale getirmiştir (Karadeniz, 2014). Bu sebeple yaşama, öğrenme ve çalışma biçimlerinin hızla değiştiği bir ortamda bireyleri hayata hazırlama misyonu üstlenen eğitim sistemlerinin de durağan bir şekilde kalması mümkün değildir (Şenel ve Gençoğlu, 2003). Eğitim ve öğretimin bütün boyutlarıyla dinamik bir yapıya sahip olması, bu süreçte önemli bir rol üstlenen öğretmenlerin görevinin ve bu görevin gerektirdiği yeterliliklerin sürekli sorgulanmasını ve geliştirilmesini gerekli kılmıştır (Öğretmen Yetiştirme Genel Müdürlüğü [ÖYGM], 2006). Bu bağlamda öğrencilerin temel bilgi ve becerilerinin geliştirmeleri önemli bir ilköğretim dersi olan sosyal bilgiler öğretmenlerinin de kendilerini teknolojik anlamda geliştirmeleri gerekmektedir. Ancak öğretmenlerin yalnızca teknoloji bilgisine sahip olması öğretim sürecinde etkili bir teknoloji entegrasyonu yapacakları anlamına gelmemektedir. Bu konuda Heafner (2004), teknolojinin etkili bir sosyal bilgiler öğretimi için yeterli olmadığını; etkili bir teknoloji entegrasyonunun öğrencilerin bilgi ve becerilerinin gelişmesinde ve motivasyonlarının artmasında etkili olacağını altını çizmiştir.

Öğretmenlerin etkili teknoloji entegrasyonunu gerçekleştirebilmeleri için Teknolojik Pedagojik Alan Bilgisine sahip olmaları gerekmektedir. Mishra ve Köhler (2006) tarafından literatüre kazandırılan TPAB; teknoloji, pedagoji ve alan bilgilerinin ötesinde bir bilgiyi ifade etmektedir. Türk Eğitim Derneği (2009), TPAB'yi, "Öğretim programları ve konu alanı, programın nasıl öğretileceği ve alanın temel kavram, araç ve yapıları, öğretilcek içeriğin teknoloji ile bütünleştirilmesi hakkında bilgi sahibi olma" şeklinde tanımlamıştır.

Zaman boyutu içinde insanların etkileşiminin ortaya çıkardığı bilgi, değer ve becerileri yeni yetişen kuşağın hizmetine sunulması ile dünyadaki hızlı değişimin sosyal bilgiler dersine yansımaması düşünülemez (Aykaç, 2011). Bu anlamda sosyal bilgiler öğretiminde etkili teknoloji entegrasyonu, öğrencilerin bilişsel ve duyuşsal amaçların gerçekleştirilmesine katkıda bulunacaktır. Sosyal bilgiler öğretmenleri; çağdaş öğretim, yöntem ve teknikleri ile teknolojiyi bütünleştirerek, gündelik hayatlarında teknoloji ile bu denli iç içe yetişmekte olan öğrencilerin sosyal bilgiler dersinde bu bilgilerini kullanmaları ve öğrencilerin derse daha aktif katılmalarını sağlamalıdır. Bu sebeple sosyal bilgiler öğretmenlerinin, öğrencilerin öğrenmelerini daha verimli hale getirebilmeleri için Teknolojik Pedagojik Alan Bilgisine sahip olmaları oldukça önemlidir.

Alan yazında sosyal bilgiler öğretmenlerinin TPAB'lerine ilişkin çalışmaların (Bal ve Karademir, 2013; Aksin, 2014) azlığı dikkat çekmektedir. Bu açıdan bakıldığında yapılan araştırma ilgili alanyazına katkı sağlayacağı düşünülmektedir. Bu çalışmada Karabük İli'ndeki Sosyal Bilgiler öğretmenlerinin pedagojik bilgileri ile öğrencilerine öğretmiş oldukları konulara teknolojiyi nasıl entegre ettikleri araştırılmıştır. Buna göre çalışmada 2015-2016 eğitim öğretim yılında Karabük İli'ndeki Sosyal Bilgiler

öğretmenlerinin TPAB yeterlilikleri belirlenmesi amaçlanmıştır. Bu amaç doğrultusunda çalışmanın problem cümlesi ve alt problemleri aşağıda verilmiştir.

1. Sosyal bilgiler öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi (TPAB) yeterlilikleri nasıldır?

a) Sosyal bilgiler öğretmenlerinin *Teknolojik Bilgi (TB)*, *Pedagojik Bilgi (PB)*, *Alan Bilgisi (AB)*, *Teknolojik Pedagojik Bilgi (TPB)*, *Teknolojik Alan Bilgisi (TAB)*, *Pedagojik Alan Bilgisi (PAB)*, *Teknolojik Pedagojik Alan Bilgisi (TPAB)* konusundaki yeterlilikleri ne düzeydedir?

b) Sosyal bilgiler öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi (TPAB) yeterlilikleri *cinsiyetlerine, mesleki kıdemlerine, teknoloji kullanma bilgi ve becerilerine, haftalık bilgisayar başında geçirilen süreye* göre farklılaşmakta mıdır?

2.Sosyal bilgiler öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi (TPAB) bileşenleri hakkındaki düşünceleri ve bunları kullanma durumları nasıldır?

a) Sosyal bilgiler öğretmenlerinin *Teknolojik Bilgi (TB)*, *Pedagojik Bilgi (PB)*, *Alan Bilgisi (AB)*, *Teknolojik Pedagojik Bilgi (TPB)*, *Teknolojik Alan Bilgisi (TAB)*, *Pedagojik Alan Bilgisi (PAB)*, *Teknolojik Pedagojik Alan Bilgisi (TPAB)* hakkındaki düşünceleri ve bunu kullanma durumları nasıldır?

Yöntem

Araştırma Modeli

Bu araştırmada sosyal bilgiler öğretmenlerinin TPAB yeterliliklerini belirlemek amacıyla araştırmada karma yöntem çeşitlerinden açıklayıcı desen kullanılmıştır.

Evren ve Örneklem

Araştırmanın evrenini MEB'e bağlı devlet okullarında görev yapan sosyal bilgiler öğretmenleri oluşturmaktadır. Araştırmanın tam çalışılabilir evrenini Karabük İli Merkez ve İlçelerinde görev yapan 77 sosyal bilgiler öğretmeni oluşturmaktadır.

Tartışma ve Sonuç

Araştırmaya katılan sosyal bilgiler öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi (TPAB) yeterlilikleri cinsiyet, eğitim durumu ve mesleki hizmet yılına göre bir farklılık göstermez iken, teknolojiyi kullanma bilgi ve becerileri ve haftalık ortalama bilgisayar başında geçirdikleri süreye farklılaşmaktadır. Uçar, Demir ve Hiğde (2014), araştırmalarında bilgisayar kullanma sıklığına bağlı olarak öğretmenlerin TPAB'lerinde anlamlı farklılaşma olduğunu saptamışlardır.

Araştırma sonucunda sosyal bilgiler öğretmenleri TPAB'nin tüm alt boyutlarında genellikle kendilerini yeterli görmektedirler. Ancak öğretmenler ile gerçekleştirilen yarı yapılandırılmış görüşme sonucu öğretmenlerin öğretim sürecinde teknoloji kullanımına yönelik olumlu tutuma sahip olmalarına karşın TPAB bilgilerinin öğretim sürecinde etkili kullanmada bir takım sıkıntılar yaşadıkları tespit edilmiştir. Sosyal bilgiler öğretmenleri derslerde teknoloji kullanımının olumlu etkisinin farkında olup etkili teknoloji entegrasyonunu gerçekleştirebilmek amacıyla verimli hizmet içi eğitimlere ihtiyaç duymaktadırlar. Ancak eğitimlerin belirli periyotlar halinde ve her öğretmenin gelişimini izleyecek şekilde yapılması eğitimlerin amacına ulaşmasını kolaylaştıracaktır. Öğretmenler her ne kadar teknoloji entegrasyonunun önemini fark

etseler dahi bu yöndeki bireysel girişimlerinin yetersiz olduğu ve derslerinde yeteri derecede teknolojiyi kullanamadıkları tespit edilmiştir.

Sosyal bilgiler öğretmenleri teknolojiyi öğretim amaçlı kullanabilmek için öğretmenlerin teknolojik araçları kullanabilme, yenilikleri takip etmeleri gerektiğini düşünmektedirler. Öğretmenlerin büyük çoğunluğu FATİH projesinin hayata geçirilmesiyle sınıflarında bulunan akıllı tahtaları kullanmaya çalışmaktadırlar. Bu teknolojilere ek olarak bilgisayar, projeksiyon ve internet kullandıklarını ifade etmişlerdir. Ancak öğretmenlerin büyük çoğunluğu akıllı tahta kullanımının yeterli olduğunu düşünmekte bu nedenle de diğer teknolojileri çok fazla kullanmamaktadırlar. Akyüz, Pektaş, Kurnaz ve Kabataş Memiş (2014), akıllı tahta kullanımının fen bilgisi öğretmen adaylarının TPAB öz güvenlerini olumlu yönde etkilediği sonucuna ulaşmıştır. Yaşanan bir takım teknik aksaklıklar ve öğretmenlerin teknoloji bilgileri var olan teknolojileri kullanmalarını sınırlandırmaktadır.

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