

An Investigation into Design Thinking Skills of Social Studies Teachers

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ABSTRACT

The aim of design thinking approach is to provide students with skills that they can use in daily life. In this context, it can be said that design thinking is an approach that can be used in the teaching of social studies course, which aims to provide students with knowledge and skills related to daily life. Equipping students with design thinking skills in social studies course is possible if social studies teachers have design thinking skills. This study aimed to investigate social studies teachers' levels of design thinking skills and collect their views on reflecting their design thinking skills on their daily lives. Explanatory sequential design, one of the mixed method research methods, was used in the study. A total of 256 social studies teachers from different regions of Turkey and with different qualifications participated in the study. There are two groups of participants in the study. Maximum variation sampling method was used for collecting quantitative data, and the criterion sampling method was used for collecting qualitative data. The statistical data of the study were collected with the design thinking scale in teaching, and the qualitative data were collected with a semi-structured interview form developed by the researchers. To analyze the data, t-test for independent samples, one-way ANOVA, and descriptive analysis techniques were used. It was concluded that the levels of design thinking skills of social studies teachers were high. On the other hand, it was determined that the design thinking skill levels of social studies teachers did not differ in terms of gender, age, region of employment, work experience, type of institution, and use of technology level. In addition, it was investigated that most social studies teachers reflect the relationship, process, ethics, and individual-oriented skills related to design thinking skills on their daily lives. Various suggestions were made to the researchers, the Ministry of National Education, and the Higher Education Institution based on the findings of the study.

Keywords: Design thinking skills, Social studies education, Social studies teachers.

INTRODUCTION

Depending on the constantly changing conditions in the world, approaches to education also change. The differentiation caused by the social, economic, and political transformations in the structure of the society necessitates the constant revision of the school programs developed for the purpose of educating the society. This necessity can be considered as the design of teaching programs in a way that allows individuals to be educated in accordance with the multidimensional living conditions of the 21st century. As a matter of fact, the conditions of the 21st century require individuals to have a wide variety of skills. For this reason, educational institutions focus on providing students with practical knowledge and skills that make their lives easier, rather than theoretical knowledge. One of the educational approaches developed in this context is design thinking (DT).

DT was developed in the US in the second half of the 20th century, in the field of architecture (Cabello Llamas, 2015), and later started to be used in the fields of health (Chan, 2018), economy (Lockwood et al., 2010), sports (Armstrong and Johnson, 2019), and education (Vanada, 2014). Various definitions of DT have been offered in the literature. For example, while Carrol (2015) defines DT as an experimental process involving designing solutions for problems, Melles et al. (2015) describe DT as generating ideas and developing

inventions within the scope of generated ideas. Von Thienen et al. (2015), on the other hand, define DT as a process in which different types of information are used to identify the problems encountered and develop creative solutions for them. Based on the definitions in the literature, DT is an interdisciplinary approach to promote skills such as problem solving, designing, creativity, innovation, and experimentation.

The aim of the DT process is to enable individuals to come up with new thoughts and designs by providing them with creative thinking skills (Aflatoony, 2015). In other words, DT encourages individuals to be inventors and make discoveries (Mahil, 2016). In this context, DT can be considered as an approach that directs analytical and intuitive thinking to be

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used together (Johansson Sköldbberg et al., 2013). Arguing that DT provides individuals with experience and improves their comprehension skills through experiential learning, Henriksen (2017) visualized the structure of DT, which includes analytical and intuitive thinking processes, as in Figure 1:

Figure 1 shows that Henriksen (2017) defines DT as the intersection of analytical and intuitive thinking processes. As a matter of fact, DT is a comprehensive process of using rational logic and insight together (Canestraro, 2017). As a result, DT has become an approach used in the field of education to provide students with various skills (Scheer et al., 2012). Different models have been developed for the use of DT approach in the field of education. For example, the DT Model developed by the US design company IDEO for educators consists of five stages. The model that IDEO proposes for educators is shown in Figure 2.

Figure 2 shows that the IDEO's DT Model consists of five phases. The discovery phase is made up of understanding the challenge, prepare research, and gather inspiration phases. The interpretation phase includes tell stories, search for meaning, and frame opportunities. The ideation phase covers generate ideas and refine ideas. The experimentation phase includes make prototypes and get feedback, and finally, the evolution phase covers track learnings and move forward. Discovery, which is the first phase of the IDEO's DT Model, is the one where the problem is defined and preparations for the problem are made. Interpretation is the phase where the problem is interpreted, and its structure is determined. The third phase, ideation, is the one in which opinions about the problem and its solutions are designed. While the experimentation phase includes creating a prototype for solving a problem and implementing the prototype and getting feedback on

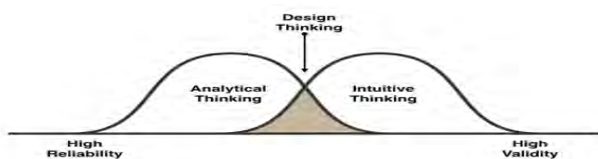


Fig. 1: Design Thinking (Henriksen, 2017, p.3)

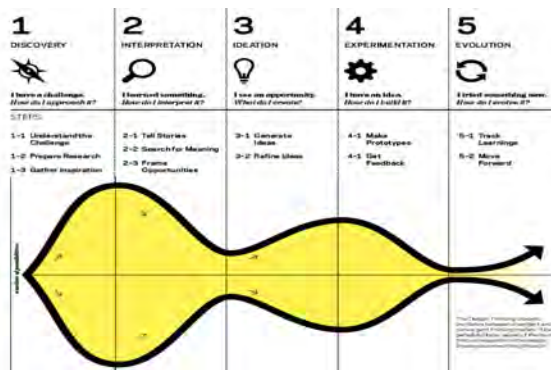


Fig. 2: IDEO's DT Model (IDEO, 2012, p. 15)

the prototype, the evolution phase includes monitoring the training processes and determining the extent of progress (IDEO, 2012).

Another model developed for the use of the DT approach in education is the Hasso Plattner Institute (HPI) Model. Although the HPI Model has similarities with the IDEO Model, there are some differences with the IDEO Model. The HPI Model is shown in Figure 3:

As seen in Figure 3, the HPI Model foresees a process that includes six phases: understand, observe, point of view, ideate, prototype and test. There is a continuous cycle in this model, so much so that there may be reversals between the phases. The understand phase involves collecting data regarding the problem by doing research, the observe phase is to develop a perspective on the problem and the people involved in the problem by making observations, the point of view phase is the one in which the data collected in the previous phases are evaluated and the problem is defined and the point of view towards the problem is developed. The Ideate phase includes brainstorming on the problem defined in the point of view phase and developing solutions. The prototype phase aims to develop a prototype for the solution process of various problems. In the test phase, the DT process is evaluated in its entirety, and if necessary, corrections are made by repeating the phase or phases (Thoring & Mueller, 2011).

Another DT model used in the field of education was developed by Stanford d. school. This model consists of five phases, which are like the IDEO and HPI models. The DT model of Stanford d. school was shown in Figure 4:

As seen in Figure 4, Stanford d. school DT Model consists of five phases: empathize, define, ideate, prototype and test. The empathize phase includes empathizing with people and

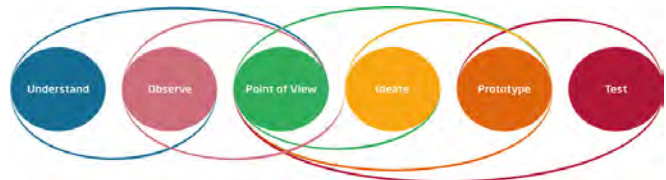


Fig. 3: HPI DT Model (https://hpi-academy.de/en/design-thinking/what-is-design-thinking.html, 2021)

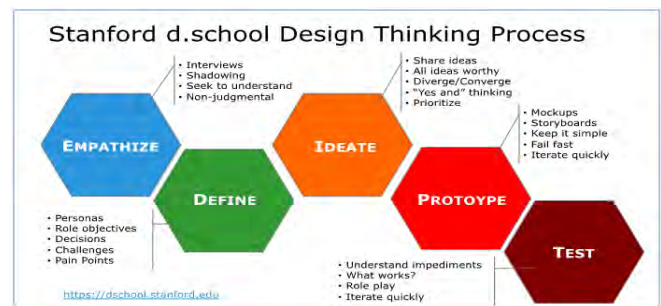


Figure 4. Stanford d. school DT Model (Cited from Schmarzo, 2017, Khalid et al., 2019)

understanding their problems by interacting and observing. During the ideate phase, a perspective towards the problem is developed and solutions are created for the problem. The prototype phase is about the implementation of the prototype for solving the problem. The final stage of test includes getting feedback on the prototype solution and improving the prototype to reach better solutions (Aflatoony, 2015).

When DT models in education are examined, it is understood that DT is a daily life-oriented approach. As a matter of fact, DT aims to provide individuals with skills that they can use to solve the problems they encounter in daily life. Thus, it can be inferred that the DT is an approach that can be used in the teaching of social studies course, which aims to provide students with knowledge and skills related to daily life. So much so that the social studies course, like the DT approach, deals with daily life and aims to educate students in this direction. So much so that social studies course aims to enable students to become effective individuals in daily life by gaining a wide variety of knowledge, skills, and values (Barr et al., 1977; Öztürk & Deveci, 2016). From this point of view, it can be stated that social studies teachers should be able to use design thinking and train students accordingly.

There are many studies in the literature conducted within the scope of the DT approach (Lockwood, 2010; Scheer et al., 2012; Retna, 2016; Zampollo and Peacock, 2016; Van de Grift and Kroeze, 2016; Valentim et al., 2017; Eines and Vatne, 2018; Painter, 2018; Schiele and Chen, 2018; Yang, 2018; Sipe, 2019). It has been observed that the studies in question have been carried out in a wide variety of fields such as nursing, economics, mathematics education, nutrition, engineering, technology, and science education. Studies have shown that the DT approach provides students with various skills, helps them develop different perspectives on problems, and reinforces their analytical and rational behaviors. Although there are many studies in the literature on the use of the DT approach in different fields, no study has been found in the context of social studies education or social studies teachers. However, the skills in the DT are congruent with the ones that the social studies course aims to equip learners regarding daily life. Considering that DT skills are also related to facilitating daily life, it is understood that it is important to equipping students with DT skills in social studies lessons. Equipping learners with the DT skills is only possible if social studies teachers have these skills. The present study was conducted with the purpose that it would contribute to the literature in terms of filling this gap. It is assumed that this study will fill the relevant gap in the literature and be a source for future studies.

Aim

This study aimed to examine the DT skill levels of social studies teachers. Within the scope of this aim, answers to the following questions were sought:

1. What are the DT skill levels of social studies teachers?
2. Do the DT skill levels of teachers differ in terms of
 - gender
 - age
 - work city
 - work experience
 - type of institution
 - use of technology
3. What are the social studies teachers' views on reflecting their DT skills on their daily lives?

METHODOLOGY

A sequential explanatory design, one of the types of mixed methods research, was used in the study. The sequential explanatory design is used in studies where quantitative data are collected first, then followed by qualitative data (Creswell & Plano Clark, 2017). The reason for using the sequential exploratory mixed design in this study is that the research was firstly analyzed by collecting statistical data through the scale, and then qualitative data were collected with a semi-structured interview form and used to examine the statistical findings in depth. A multi-stage process was followed in the study from the determination of the data collection tools to the reporting of the research results. The stages followed in the research within the scope of the sequential explanatory mixed design are shown in Figure 5:

Figure 5 shows that seven steps were followed to conduct the study. First, the scale required for the collection of quantitative data was determined. Then, a participant group was formed, and quantitative data were collected and analyzed. Next, the participant group, which is the source of the qualitative data, was determined and the qualitative data of the research were collected and analyzed. The results of the

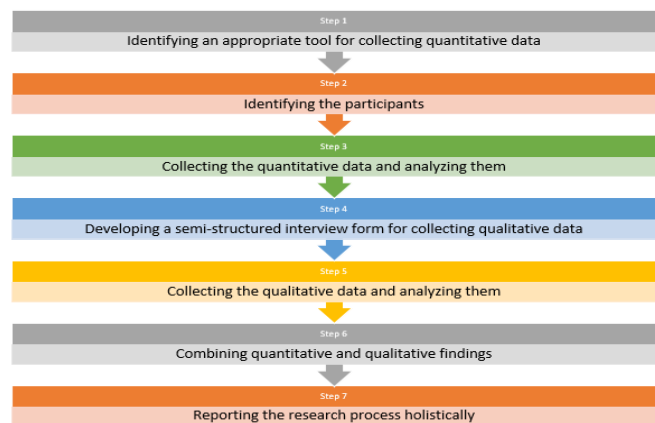


Fig. 5: Steps followed in the research process

research were reported by combining the quantitative and qualitative data obtained from the analyzed data. The present study was conducted with the permission of Ağrı İbrahim Çeçen University Scientific Research Ethics Committee within the scope of the decision numbered E-95531838-050.99-31725.

Participants

The participant group of the study was formed in two stages. In the first stage, the sample group from which the quantitative data was collected was determined. At this stage, the maximum diversity sampling method was used. Maximum diversity sampling is used to involve individuals in the research with different characteristics and qualifications (Büyüköztürk et al., 2020). In accordance with this method, participants working in seven different geographical regions of Turkey with different demographic characteristics were included in the study. Demographic characteristics of the participant group, from which the statistical data of the study were collected, are shown in Table 1:

When Table 7 is examined, it is understood that the participants are in different age and gender categories. On

Table 1: Demographic Characteristics of the Participants

Variable	Characteristic	f	%
Gender	Female	81	31,64
	Male	175	68,36
	Total	256	100
Age	20-25	43	16,8
	26-30	72	28,13
	31-35	57	22,27
	36-40	42	16,4
	40+	42	16,4
	Total	256	100
	Region of employment	Marmara	95
Central Anatolia		42	16,5
Aegean		35	13,5
Mediterranean		21	8,2
Black Sea		16	6,24
Southeastern Anatolia		25	9,76
Eastern Anatolia		22	8,6
Total	256	100	
Work Experience	1-5 years	129	50,40
	6-10 years	43	16,8
	11-15 years	42	16,4
	15 years and above	42	16,4
	Total	256	100
Type of Institution	Public school	171	66,8
	Private school	85	33,2
	Total	256	100

the other hand, it is understood that the participants work in different geographical regions of Turkey. In addition, it is seen that there are different participants in the participant group in terms of professional seniority and type of institution. In this context, it can be said that the research sample reflects the characteristics of the universe.

Criterion sampling, one of the purposive sampling methods, was used to determine the participant group from which the qualitative data of the study were collected. Criterion sampling is the creation of the participant group from people with the qualifications determined in relation to the research problem (Büyüköztürk et al., 2020). The reason for using the criterion sampling method at this stage is to collect in-depth information by interviewing the four participants with the highest DTST scale scores and the four participants with the lowest scores. The participants, from whom the qualitative data of the study were collected, were given a code name within the scope of ethical rules. Participants with the highest DTST scale score were given a code HDTST1, HDTST2, HDTST3 etc. (H represents “high”), and the participants with the lowest DTST scale score were coded as LDTST1, LDTST2, LDST3 etc. (L represents “low”).

Data Collection

The quantitative data were collected by employing Design Thinking Scale in Teaching (DTST), which was developed by Sürmelioglu and Erdem (2021). The scale consists of five sub-dimensions and 25 items. The scale has a five-point Likert-type scoring system. The sub-dimensions of the scale are relationship, process, ethics and individual. The Cronbach's Alpha coefficient of the DTST scale was calculated as 0.93 by Sürmelioglu and Erdem (2016). Reliability study was conducted to check the suitability of the DTST scale for this study. It was found to be 0.905 in this study. A Cronbach's Alpha coefficient between 0.81-1,00 indicates high reliability (Tavakol & Dennick, 2011). Based on this result, the DTST scale was decided to be employed in this study. The scale was sent to 714 social studies teachers working in different regions of Turkey via Google Forms. In the demographic information section of the scale, items related to gender, age, region of employment, work experience, type of institution and level of use of technology were included. The statement “Your opinions will be sought in the next stage of the research. The interview is on a voluntary basis. If you are a volunteer for the interview, please indicate your e-mail address in the form so that the researchers can reach you” was added to the form for the next phase of the research. The statement was put to determine the participant group from which the qualitative data of the research will be collected. Of these 714 teachers, 256 of them filled out the scale completely and sent it back. The confidence interval was taken as 95% when analyzing the data collected through the DTST scale. When scoring the scale,

1.00–1.79 score range was considered as very low, 1.80–2.59 score range was considered low, 2.60–3.39 score range was considered moderate, 3.40-4.19 score range was considered high, and 4.20-5.00 score range was considered as very high.

Qualitative data of the study were collected via semi-structured interview form developed by the researchers. The interview form was used to gain in-depth exploration of the data obtained by the scale. During the development of the interview form, the opinions of four experts who are competent in qualitative research were consulted. The interview form was revised twice within the scope of the expert opinions. There are four questions in the final version of the form. These questions were formed based on the four sub-dimensions of the DTST scale. The questions were used to reveal the views of teachers on reflecting their DT skills on their daily lives. Before collecting the qualitative data, the piloting of the interview form was implemented. Two teachers working in Istanbul and Diyarbakir, who were not the participants of the study, was interviewed, and then it was decided that the interview form developed by the researchers was suitable for this research. Then, the qualitative data of the research were collected. Interviews for the purpose of collecting qualitative data were administered online. The data collected from the teachers were arranged and prepared for analysis.

Data Analysis

Before starting the analysis of quantitative data, skewness and kurtosis values were calculated. The values are shown in Table 2:

As can be seen in Table 2, the skewness value of the data collected via DTST scale was -.431, and the kurtosis value was -.234. It was determined that the data showed a normal

Table 2: Skewness and Kurtosis Values of the Data Collected via DTST scale

Skewness		Kurtosis	
Skewness	Standard deviation	Kurtosis	Standard deviation
-.43	.15	-.23	.30

Table 3: Results of the Homogeneity Test of the Data Collected via DTST scale

Variables	Levene Statistics			
	Sd1	Sd2	p	
Gender	.03	1	254	.85
Age	1.48	4	251	.21
Region of employment	.76	8	247	.63
Work experience	1.95	3	252	.12
Type of institution	.49	1	254	.48
Use of technology	1.63	2	253	.19

distribution because the values obtained were between -1.5 and 1.5 (Tabachnik & Fidel, 2019).

In addition, Levene test was performed to check whether the data were homogeneously distributed. The values are shown in Table 3:

Table 3 shows that the collected data via DTST scale were homogeneously distributed: gender (p > 0.05), age (p > 0.05), region of employment (p > 0.05), work experience (p > 0.05), type of institution (p > 0.05) and use of technology (p > 0.05).

It was determined that the quantitative data of the study were normally and homogeneously distributed within the scope of skewness and kurtosis values and Levene test results. Therefore, parametric tests of t-test and one-way ANOVA were performed to analyze the data obtained by the DTST scale.

Descriptive analysis technique was used to analyze the qualitative data of the study. Descriptive analysis is aimed at analyzing data according to predetermined themes (Creswell & Poth, 2018). The reason for using the descriptive analysis technique in this research is that the analysis was made according to predetermined themes as well.

FINDINGS

DT skill levels of social studies teachers were investigated within the scope of variables such as gender, age, region of employment, work experience, type of institution, and use of technology. In addition, the views of teachers with the highest and lowest DT skill levels on reflecting their DT skills on their daily lives were also examined. The statistical findings were presented in the form of the general average of the scores obtained from the scale and the DT skill levels of the teachers according to gender, age, region of employment, work experience, type of institution, and use of technology. The qualitative findings of the study were given under the themes of social studies teachers’ relationship skills, process skills, ethical skills, and individual-oriented skills.

Findings Related to the Data Obtained from the DTST Scale

To calculate averages of the DT skill levels of teachers participating in the study, descriptive statistics were performed. The values are shown in Table 4:

As can be seen in Table 4, the average of the scores that the teachers have got from the DTST scale was 4.08, and the standard deviation is .52. Based on these results, it can be said that the DT skill levels of social studies teachers are high.

Table 4: Descriptive Statistics of Social Studies Teachers’ Scores from DTST Scale

n	Mean	Standard Deviation
256	4.08	.52

To investigate the DT skill levels of teachers by gender, t-test was performed for independent samples. The results obtained are shown in Table 5:

Table 5 shows that the DT skill levels of social studies teachers do not show a significant difference according to gender ($t(254) = -1.36; p > .05$). It is also seen in the table that Cohen's d values were calculated to examine the effect sizes of the participants' DT skill levels within the scope of the gender variable. Looking at Table 5, it is seen that the effect size ($d < .20$) is low.

The DT skill levels of the participants were also examined according to age. The findings obtained in this context are shown in Table 6:

When Table 6 is examined, it is understood that the DT skill levels of the social studies teachers participating in the

research do not differ significantly according to the age variable ($F(4; 251) = .71; p > .05$). It is also seen in the table that eta square values were calculated to examine the effect sizes of the DT skill levels of social studies teachers within the scope of the age variable. Looking at Table 6, it is seen that the effect size ($\eta^2 < .06$) is low.

The DTST skill levels of social studies teachers were also examined according to the region where they worked. The results obtained are shown in Table 7:

When Table 7 is examined, it is understood that the DT skill levels of the social studies teachers participating in the research do not differ significantly according to the region where they work ($F(6; 249) = 1.87; p > .05$). It is also seen in the table that eta square values have been calculated to examine the effect sizes of the DT skill levels of social studies teachers

Table 5: t-test Results of Social Studies Teachers' Scores from DTST Scale by Gender Variable

Category	<i>n</i>	\bar{X}	<i>ss</i>	<i>sd</i>	<i>t</i>	<i>p</i>	Cohen's d
Female	81	4.05	.51	254	-1.36	.17	0.18
Male	175	4.15	.52				
Total	256						

Table 6: One-Way Anova Test Results According to Age Variable of Social Studies Teachers' DT Scores

Category	<i>n</i>	\bar{X}	<i>ss</i>	Source of variance	Sum of Squares	<i>sd</i>	Mean Squares	<i>F</i>	<i>p</i>	Difference	η^2
20-25	43	4.19	.46	Intergroup	.78	4-251	.19	.71	.58	-	0.01
26-30	72	4.07	.52	Total	70.28	255					
31-35	57	4.08	.55								
36-40	42	4.05	.44								
40+	42	4.01	.60								
Total	256	4.08	.52								

Table 7: One-way Anova Test Results of Social Studies Teachers' Scores from DTST Scale According to the Variable of the Region of Employment

Category	<i>n</i>	\bar{X}	<i>ss</i>	Source of variance	Sum of Squares	<i>sd</i>	Mean Squares	<i>F</i>	<i>p</i>	Difference	η^2
Marmara	95	4.04	.49	Intergroup	3.03	6-249	.50	1.87	.08	-	.04
Central Anatolia	42	4.01	.54	Total	70.28	255					
Aegean	35	3.94	.53								
Adana	21	4.15	.48								
Trabzon	16	4.30	.43								
Southeastern Anatolia	25	4.1	.55								
Eastern Anatolia	22	4,29	.29								
Total	256	4.08	.52								

within the scope of the variable of the region where they work. Looking at Table 7, it is seen that the effect size ($\eta^2 < .06$) is low.

DT skill levels of social studies teachers were examined according to work experience. The findings obtained in this context are shown in Table 8:

When Table 8 is examined, it is understood that the DT skill levels of the participants do not differ significantly according to the work experience variable ($F(3; 252) = .56; p > .05$). It is also seen in the table that eta square values have been calculated to examine the effect sizes of the DT skill levels of social studies teachers within the scope of the variable of the region where they work. Looking at Table 8, it is seen that the effect size ($\eta^2 < .06$) is low.

The DT skill levels of the participants were examined according to the type of institution they work. The findings are shown in Table 9:

When Table 9 is examined, it is seen that the DT skill levels of social studies teachers do not show a significant difference according to the type of institution ($t(254) = -.674; p > .05$). It is also seen in the table that Cohen's d values were calculated to examine the effect sizes of the participants' DT skill levels within the scope of the variable of the type of institution. Looking at Table 5, it is seen that the effect size ($d < .20$) is low.

The DT skill levels of the participants were also examined according to their use of technology. The findings obtained in this context are shown in Table 10:

When Table 10 is examined, it is understood that the DT skill levels of the participants do not differ significantly according to the work experience variable ($F(2; 253) = .85; p > .05$). It is also seen in the table that eta square values have been calculated to examine the effect sizes of the DT skill levels of social studies teachers within the scope of the variable of the region where they work. Looking at the table, it is seen that the effect size ($\eta^2 < .06$) is low.

It was determined that the DT skill levels of the social studies teachers included in the study were generally high. On the other hand, it was also revealed in the study that the DT skill levels of teachers did not differ significantly according to the variables of gender, age, region of employment, work experience, type of institution and use of technology.

Findings Regarding Social Studies Teachers' Views on Reflecting DT Skills on Their Daily Lives

Interviews were administered to the participants who received the highest and lowest scores from DTST scale to explore their scores in depth. The findings of these interviews are shown in Figure 6:

As seen in Figure 6, the qualitative findings reached in the study were combined under four themes: social studies teachers' relationship skills, social studies teachers' process skills, social studies teachers' ethical skills, and social studies teachers' individual-oriented skills.

Table 8: ne-way Anova Test Results According to the Work Experience Variable of Social Studies Teachers' DTST Scores

Category	n	\bar{X}	ss	Source of variance	Sum of Squares	sd	Mean squares	F	p	Difference	η^2
1-5 years	129	4.12	.51	Intergroup	0.47	3-252					
6-10 years	43	4.06	.56	Total	70.28	255					
11-15 years	42	4.05	.44				.15	.56	.64	-	.01
15 years and above	42	4.01	.60								
Total	256	4.08	.52								

Table 9: Independent samples t-test Results of Social Studies Teachers' Scores from DTST Scale According to the Variable of Type of Institution

Category	N	\bar{X}	ss	sd	t	p	Cohen's d
Public School	171	4.06	.53				
Private School	85	4.11	.51	254	-.67	.50	0.09
Total	256						

Table 10: One-way Anova Test Results of Social Studies Teachers' Scores from DTST Scale According to Use of Technology Variable

Category	n	\bar{X}	ss	Source of variance	Sum of squares	sd	Mean squares	F	p	Difference	η^2
Rarely	42	4.01	.60	Intergroup	.47	2-253	.23	.85	.43	-	.01
Sometimes	85	4.06	.51	Total	70.28	255					
Often	129	4.12	.51								
Total	256	4.08	.52								



Fig. 6: Findings Regarding Social Studies Teachers' Views on Reflecting DT Skills on Their Daily Lives

It has been found that some of the interviewed social studies teachers have the opinion that they use their relationship skills effectively in daily life. For example, the participant with the code name HDTST1 expressed his opinion in this context, "When I do something, I always seek the opinions of others. Because I know that two heads are better than one. Everyone should consult each other." Another participant, HDTST4, said, "Things get easier together. If a work (design) is to be done, it is necessary to cooperate. Collaboration and different perspectives bring strength and convenience."

On the other hand, some participants expressed that they prefer not to use their relationship skills. One of these participants is LDTST3, which is among the teachers with the lowest score on the DTST scale. LDTST3 expressed his opinion in this context, "I don't like interacting with other people. This is not my thing. I like to do everything by myself. Also, I think that when I do things by myself, they turn out to be better and more successful." LDTST2 said similar things: "To be honest, I do not listen to opinions of the people around me when I do something. Because they confuse me. I have many examples in my life. I get confused when I consult someone. That's why I'm in favor of doing what I know."

Qualitative findings that did not support the data collected with the DTST scale were also reached in the study. For example, HDTST2, one of the highest scorers in the DTST scale, expressed her opinions regarding using relationship skills in daily life: "I try not to get help from anyone as much as possible. People should do their own work. I prefer not to get help from anyone unless I am helpless."

It is possible to say that the findings obtained from the interviews with the teachers and the findings obtained from the DTST scale are generally compatible. On the other hand, it was determined that the qualitative findings obtained from the interview with HDTST2 conflicted with the answers given by the participant to the items regarding the relationship sub-dimension of the DTST scale.

It was determined that some teachers believed that they effectively reflected their process skills on their daily lives. In this context, HDTST4 made the following striking statements:

"Being practical is always necessary. You need to think fast. Because we all experience problems in one way or another during the day. It is necessary to design different solutions to solve these problems. I think I am good at this, and that's what the people around me say to me. They say that you can find solutions quickly. For example, in my school, we do all our work in the teachers' room, things like preparing activities, preparing exams, designing materials, etc. For this reason, problems can often be experienced in the teachers' room. I come up with solutions to solve problems immediately. My colleagues also benefit from the solutions I have found."

Looking at the expressions of HDTST4, it is understood that he can effectively manage the design processes and use his process skills. In addition, the fact that HDTST4 gives examples of the use of process skills shows that the participant is aware of the skills he has. Another participant who thinks that she has process skills and reflects them on her daily life is HDTST1. HDTST1 said: "We are talking about design now. While I am designing something, I ask myself this question: 'How is the environment affected by this?' Because designing something is a comprehensive issue. It is necessary to think about how it affects others as well." She expressed her perspective on "being aware of the effects of design on the environment", which is one of her process skills.

On the other hand, it was found that a few participants in the study did not use their process skills in their daily lives. LDTST1 stated: "Personally, I do not like to grapple with problems. When there is a problem, I immediately refer the matter to someone else as the shortest way. I'm not dealing with solving it. I want someone else to solve it." When we look at the words of LDTST1, it is understood that he does not have the ability to "design a way of solution", which is one of the process skills.

It is understood that the findings obtained from the DTST scale, and the interviews support each other. In this context, it can be said that the statistical findings related to process skills and qualitative findings overlap.

It was found that some of the interviewed teachers use ethical skills in their daily lives. One of these teachers, HDTST3 stated: "Designing something on a certain topic requires teamwork, and everyone involved in this process should be given credit. Someone should not stand up and say, 'I did everything'. This is my point of view" and revealed that ethical principals are important for him in the design process.

Using similar expressions, HDTST2 revealed her point of view with the following striking words: "It is important to act in an ethical way. It is very important to be ethical both as a human being and in doing successful works (designs). For example, something will be designed. Can it be done alone? I think no. Therefore, designs can be done with many people. If there are many people involved, it means that many people have put an effort in it. Everyone does their part. Everyone

respects each other's hard work. Respect for effort is the essence of being ethical. This is the case with everything in life. I always give priority to this in my life, both in school and in daily life". This statement shows that the participant actively uses "being ethical", which is one of the DT skills, in her daily life. It is also seen that she cares about being ethical.

On the other hand, the findings also revealed that some teachers did not reflect ethical skills on their daily lives. LDTST4 used the most striking expressions. The statements of LDTST4 are as follows:

"If a person is engaged in an action or an activity, there will definitely be some consequences. There can be bad results or good results. We cannot think about everything. You cannot say for example, what will happen at the end? What happens to this or that person? What happens to that institution? There are some realities in life. If something is being done, surely someone will be affected. I wish no one could be affected badly, but it is possible. Thinking about every detail will make the person tired, and in this way, you will not have enough energy to perform your main duties. That's why you should do whatever you want without thinking too much."

It is understood from the statements of LDTST4 that he clearly does not care about ethical skills. From the expressions, it is also noticed that LDTST4 does not use ethical skills in designs in his daily life.

When the statements of the interviewed teachers are examined, it is seen that the findings provided by the DTST scale and by the interviews are similar. In this context, it can be said that the qualitative findings on ethical skills support the statistical findings.

It was found that some teachers use individual-oriented DT skills in their daily lives. HDTST3's *"If I am going to be involved in an activity (design), I make sure that it is original. I always think solution-oriented."* statements show that HDTST3 benefits from his own individual design skills in his life. HDTST1 expressed that she her individual-oriented design skills in her life: *"I think every resource should be used while designing. I am doing that. I use a lot of visuals when designing activities for students. I also use auditory and affective things. This is my personality. I find it more appropriate to do so."*

LDTST1 and LDTST3, among the interviewed participants, stated that they made the designs in the simplest way instead of using individual DT skills. LDTST1 expressed his opinion in this context, *"I am in favor of mediocrity. If something has been done before and it has been found to be useful, I think it is best to use it without making a new design. Also, it is unnecessary for me to make such a big show while doing something."*

LDTST3 on the other hand, says, *"Novelty is good, but it is not always necessary. People should innovate when they have to. It is unnecessary to innovate simply by saying that I will design something new without the need to innovate."* When we look at the words of LDTST1 and LDTST3, it is understood that

both of them do not think innovatively, in other words, they do not use individual-oriented DT skills.

It is understood that the findings obtained from the scale and the interview form support each other. In this respect, it can be said that the statistical data on individual-oriented DT skills are similar to the qualitative data.

DISCUSSION AND CONCLUSION

In this study, which aimed to examine the DT skill levels of social studies teachers, both quantitative and qualitative data were collected and analyzed, and the findings of the research were revealed. The findings were interpreted and discussed within the scope of similar studies in the literature.

The findings of the study showed that the DT skill levels of social studies teachers were high. Studies on DT skills in the literature were examined and discussed in the light of the findings of the present study. Retna (2016) examined teachers' DT skills and found that teachers had knowledge about design thinking. Girgin (2019) determined that teachers' design thinking skills improved at the end of his experimental study, in which he examined the cognitive structures of teachers for design thinking and the situation of eliminating misconceptions. Girgin (2020) concluded that teachers have difficulties in design thinking processes and therefore their design thinking skills are insufficient.

In the present study, it was concluded that the DT skill levels of social studies teachers did not differ according to gender. Özekin (2006) conducted a study with primary and secondary school students and found that, like the present study, students' DT skill levels did not differ within the scope of the gender variable.

In the present study, it was concluded that the DT skill levels of social studies teachers did not differ according to age. Özekin (2006) conducted a study with primary and secondary school students and found that, like the present study, students' DT skill levels did not differ within the scope of the age variable.

It was determined in the present study that the DT skill levels of social studies teachers did not differ according to the region of employment. As a matter of fact, DT skill levels of teachers participating in the research from seven regions of Turkey were close to each other. Since there is no study in the literature investigating DT skills by region, this result has not been discussed.

It was seen in the present study that the DT skill levels of social studies teachers did not differ according to work experience. So much so that the relationship between work experience and DT skill levels examined in four experience categories was found to be meaningless. Similarly, Lin et al., (2020) did not find a relationship between DT skills and work experience as part of their study.

In the present study, it was determined that the DT skill levels of social studies teachers do not differ according to the type of institution they work. It was observed that there was no difference between DT skill levels of teachers working in public and private schools. Since there is no study in the literature investigating DT skills according to the type of institution, this result has not been discussed.

This study examined that DT skills of social studies teachers in terms of use of technology. It was concluded that the DT skill levels of the teachers did not differ according to the use of technology. Contrary to the finding of the present study, Retna (2016) determined that the DT skills of teachers who actively used technology were more advanced. Henriksen et al. (2017) found that participants with high technology use levels had higher DT skills. Lin et al. (2020) conducted a study and reported that teachers with high knowledge of technology employ DT skills more effectively and teach them to their students.

The present study concluded that most social studies teachers thought that they reflected the relationship skills within the scope of DT on their daily lives. Using DT supported applications in art education, Vanada (2014) concluded that students with DT skills are competent in communication and cooperation. Atacan (2020) investigated the effects of DT activities on students' motivation, teamwork, and perspectives towards the course, and determined that as the students' DT skills improve, their collaborative skills improve as well. Carol et al. (2010) found that students with DT skills were successful in establishing relationships.

It was determined in the present study that most of social studies teachers believed that they reflect the process skills on their daily lives. Freimane (2015) examined the relationship between students' ability to design and DT skills and determined that students with high DT skills had high problem-solving skills, which is one of their process skills. McKilligan et al. (2017) determined that students with high DT skills had high motivation levels in the design process.

It was concluded in the present study that most social studies teachers have the point of view that they reflect the ethical skills within the scope of DT on their daily lives. This result has not been discussed, as there is no study in the literature investigating ethical skills within the scope of the DT skills.

It has been determined that most of the social studies teachers in the research believed that they reflect the individual-oriented skills within the scope of DT on their daily lives. Nguyen (2016) determined that individuals with high DT skills use their individual skills effectively. In his study on business education, Sadeikaite (2017) found that there are significant relationships between DT skills and reflecting individual skills on daily life.

SUGGESTIONS

Various suggestions have been developed depending on the results obtained in the research. These suggestions were presented under two headings: suggestions to researchers and suggestions for practice.

SUGGESTIONS TO RESEARCHERS

- Studies can be conducted with larger participant groups investigating the DT skills of social studies teachers.
- Action research can be conducted to provide social studies teachers with DT skills.
- Suggestions to Researchers
- Studies with large participant groups examining the DT skills of social studies teachers in terms of multidimensional variables can be conducted.
- Action research can be conducted to provide social studies teachers with DT skills.
- Case studies can be conducted to examine whether social studies teachers reflect their DT skills on their daily lives.

SUGGESTIONS TO PRACTICE

- In-service training programs can be offered to social studies teachers by the Ministry of National Education for the development of DT skills.
- The Higher Education Institution can add a course to the curriculum of social studies teaching departments for the development of DT skills.
- Social studies course resources can be prepared with more content about DT skills.

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