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Implementation of Technology-Supported Self-Regulated Strategy Development Model in the Education of Gifted and Talented Students

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Abstract

The aim of this study is to determine the effect of writing education carried out according to the self-regulation strategy development model on the self-regulation writing skills, self-efficacy perceptions, and creative thinking skills of gifted and talented students. In this study, a pre-test and post-test design with a control group was utilized, which is among the experimental designs. The study group consisted of 42 students aged 10-11 years who were diagnosed as gifted and talented and were studying at the same science and art center in Istanbul. In this research, the Self-Regulated Writing Scale, Self-Efficacy Writing Scale, and Torrance Tests of Creative Thinking Figural Form A were applied. Information about the scales is presented. Within the scope of the study, a 6-stage self-regulated strategy development model was enhanced with Web 2.0 digital tools for gifted and talented students. The research showed that writing instruction focused on the creation of self-regulation strategies reinforced with Web 2.0 resources had a beneficial impact on self-regulation writing skills, perceptions of self-efficacy, and the creative thinking skills of gifted and talented students.

Key words: Technology, Self-Regulated Writing, Writing Self-Efficacy, Gifted and Talented Students

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INTRODUCTION

The Strategy and Implementation Plan released by the Supreme Council of Science and Technology of Turkey in 2013 addressed the concept of "gifted and talented," which is suggested as a replacement for the concept of "giftedness" and describes individuals who succeed at a higher degree than their peers in terms of intelligence, creativity, art, or special academic fields (MEB, 2013). When the literature on the characteristics of people referred to as "gifted and talented" is investigated, it can be found that their traits include fast learning, effective use of numbers, creative capacity, spatial abilities, problem-solving skills, strong memory, advanced ethical judgment, and sensitivity (Ataman, 1998; Hernandez-Torrano, Prieto, Ferrandiz, Bermejo, & Sainz, 2013; Sak, 2010).

While students who are defined as gifted and talented have higher levels of skills relative to their peers based on their developmental characteristics and their life experiences, they may also experience unexpected shortcomings in certain fields of learning (Fetzer, 2000; Dole, 2000). Davis (2006) claimed that gifted and talented individuals encountering unexpected shortcomings in certain fields can be understood as a result of these people having developmental features that are not at the same level in different intelligence areas, innately oversensitive approaches to certain subjects, issues faced with peers, aggressive behavior towards other children at school and at home, and heightened affectivity. Silverman (2002), on the other hand, stated that gifted and talented children may experience various problems because they may not progress at the same level in all developmental areas, which is defined as asynchronous development in the literature.

As the relevant literature is reviewed in light of the above information, one of the challenges encountered by gifted and talented students is seen to be writing. Friend (2006) claimed that gifted and talented children experience difficulty with writing due to their complicated reasoning mechanisms, their lack of a capability to make decisions in the writing process, their lack of attention to the utilization of spelling principles and punctuation marks, and their lack of ability to express details when transcribing story elements. Baum, Cooper, and Neu (2001) claimed that gifted and talented students have difficulties in building their thoughts, creating relations among the topics they have written about, expressing details, and managing time.

Macintyre (2008) suggested that gifted and talented children are good at the imagination process while composing stories but have problems in writing their imaginary scenarios on paper due to their fast thoughts. Gargiulo (2006) noted that, in terms of language development, while gifted and talented children begin to form full sentences earlier than their peers, manage to learn to read by themselves before they start school, and think quickly, actions such as writing cannot be adapted to the pace of their mental processes and so they become bored with the task of writing.

When the research undertaken to enhance the writing performance of gifted and talented students and improve their attitudes toward writing are examined, several conclusions are noted. For example, it is possible to create connections between thoughts by introducing new methods in their education, it is feasible to incorporate computer technology into the learning process, and various collaborative approaches have been implemented to date, with studies revealing that creative and critical thinking capacities are possible for these students and writing instruction delivered via multimedia designs that will support increased motivation for writing should be implemented using fun and enjoyable activities (Albertson & Billingsley, 2001; Chaffee, McMohan, & Stout, 2004; Davis & Rim, 2004; Peterson & Karlan, 2011).

In the education of gifted and talented students, proper settings should be developed that will empower students to question various circumstances and utilize their high-level thinking abilities, encourage their efforts, and offer opportunities for them to leverage their skills in different disciplines. However, to make this possible, education should be provided in such a manner that teachers can organize learning experiences by considering the characteristics and needs of each student in their classrooms (Mann, Mann, Strutz, Duncan, & Yoon, 2011). When the literature on this topic is investigated concerning the suggestions stated above, it is seen that self-regulated writing instruction is

advised to enhance the sense of obligation of gifted and talented students in their education, to allow their writing processes to become manageable, to encourage their metacognitive development, and to encourage them to communicate with each other and positively influence their motivation (Glaser & Brunstein, 2007; Saddler & Asaro, 2007; Tracy, Reid, & Graham, 2009; Zumbrunn & Bruning, 2012).

Self-Regulated Strategy Development (SRSD) Model

Self-regulated writing instruction strengthens the sense of responsibility of students, helps to manage their behaviors and the writing process, and increases their independent performance practices. This also greatly impacts the student's motivation in the learning process. Moreover, self-regulated writing instruction not only enhances the metacognition abilities of students but also helps them engage with each other (Glaser & Brunstein, 2007; Saddler & Asaro, 2007; Tracy, Reid, & Graham, 2009; Uygun, Aktürkoğlu, & Dedeoğlu, 2014; Zumbrunn & Bruning, 2012). In order to align writing activities through self-regulated writing instruction and to implement relevant strategies, planning, self-observing, and self-assessment skills can be taught to gifted and talented students.

Graham and Harris (2000) explained that writing skills are practices that include planning, producing, and evaluating strategies as well as being goal-oriented, complex, and versatile; thus, high levels of self-regulation are required for the development of writing skills in students. Furthermore, they advised the use of the self-regulated strategy development (SRSD) model in writing instruction. Utilizing SRSD for writing practices promotes the development of planning and self-regulation skills so that students can better understand the writing process and use the techniques included in the model. In previous studies on writing strategy education, it was reported that writing instruction based on SRSD had positive results on students' writing skills and helped in the cultivation of positive attitudes about writing (De La Paz & Graham, 2002; Glaser & Brunstein, 2007; Saddler & Asaro, 2007; Tracy, Reid, & Graham, 2009; Uygun, Aktürkoğlu, & Dedeoğlu, 2014; Zumbrunn & Bruning, 2012).

The SRSD model (Graham & Harris, 2000) consists of the following stages: (1) Develop background knowledge, (2) Discuss it, (3) Model it, (4) Memorize it, (5) Support it, and (6) Establish an independent practice.

Developing background knowledge: In this stage, the background knowledge and skills required by students for self-regulation strategies are defined. This is the stage in which students' pre-writing, writing, and post-writing backgrounds are assessed for the writing process and any shortcomings are remedied. Awareness-raising education on story characteristics and story elements is also provided.

Discussing it: This is the stage in which self-regulation strategies for writing are implemented, the steps of the techniques to be used are introduced, and details on where and how these strategies are used are provided to the students.

Modeling it: This is the stage in which teachers act as models to show students how to implement self-regulation strategies. In this stage, the teacher sets the aim of writing, makes full use of story elements, and takes students' thoughts into account while generating ideas. The teacher also explains what pre-writing, writing, and post-writing requirements need to be fulfilled and demonstrates model behaviors to motivate students to write and deal with negative feelings throughout the writing process.

Memorizing it: This is the stage that enables students to easily and rapidly learn the steps of self-regulation strategies and helps them organize their time and focus on their assignments. This stage is usually applied at the beginning of writing instruction studies and may not be applied if it is deemed unnecessary.

Supporting it: In this stage, in which teachers and students collaborate, students who have established their objectives usually perform their writing tasks and teachers offer guidance to students regarding the topics for which they seek help. The teacher also enables the self-reflection processes of students in their assignments while providing feedback on the performances of the students and facilitating the students offering feedback on the work of their peers in the classroom.

Independent practice/performance: This stage is the one in which students do not receive support from anyone else. A self-evaluation exercise is undertaken to show the effects of the strategy applied for the students. This is also the stage in which teachers observe their students' attitudes toward the writing process and their anxiety levels.

In this research, the stages of the SRSD model are combined with Web 2.0 tools in the writing instruction of gifted and talented students according to the guidelines of the related literature. Among the most critical elements of the SRSD model is the fact that stages of this model can be modified and adapted to meet the needs of students and some stages can be omitted if desired (Lane, Graham, Harris, & Weisenbach, 2006). This study was designed to help minimize negative attitudes toward writing among gifted and talented children, to make the writing process enjoyable, to combine it with new technological improvements, and to raise their motivation while creating a writing program designed to facilitate the acquisition of skills such as formulating task plans through writing instruction, acting within the scope of those plans, managing actions, and displaying creative thinking. The goal here is to show the effects of the proposed writing program on writing skills based on self-regulation, perceptions of self-efficacy, and creative thinking skills among gifted and talented students. In this framework, the research questions of the present study are as follows:

Problem:

What are the effects of writing education carried out based on the SRSD model on the self-regulated writing skills of gifted and talented students, their perceptions of self-efficacy in writing, and their creative thinking skills?

Subproblems:

1. Is there a significant difference between the Self-Regulated Writing Scale scores of the students in the experimental group for whom the SRSD model was applied and the students in the control group for whom the Support Education Program was applied?

2. Is there a significant difference between the Writing Skills Self-Efficacy Scale scores of the students in the experimental group for whom the SRSD model was applied and the students in the control group for whom the Support Education Program was applied?

3. Is there a significant difference between the Torrance Creative Thinking Test scores of the students in the experimental group for whom the SRSD model was applied and the students in the control group for whom the Support Education Program was applied?

METHOD

Research Model

In this study, a quasi-experimental model was used. Since it was not possible to select the students for the experimental group of this study independently due to limitations such as time, place, and educational process, a quasi-experimental design was appropriate (Büyüköztürk et al., 2018). An experimental design with a pre-test, post-test, and control group was used to examine the effect of writing education provided according to the SRSD model on the self-regulated writing skills of gifted and talented students, their perceptions of self-efficacy in writing, and their creative thinking skills. The dependent variables in this study were the writing skills of the students based on self-regulation,

their perceptions of self-efficacy in writing, and their creative thinking skills, while the independent variable was the writing education program conducted according to the SRSD model.

Study Group

The study group of this research included 42 students aged 10-11 years who were diagnosed as gifted and were attending the same science and art center (*Bilim ve Sanat Merkezi*: BİLSEM) in the city of Istanbul. Participants were selected by simple random sampling method. With this method, every item selected in the sampling has the same chance statistically and each item is selected completely randomly (Büyüköztürk et al., 2018).

While there were 13 female and 9 male students in the experimental group, there were 12 female and 8 male students in the control group. The students of the study group attended both their own main schools and BİLSEM. While 9 students in the experimental group attended public schools, 13 students attended private schools. Seven of the students in the control group attended public schools and 13 attended private schools. All participating students were diagnosed as gifted.

As a result of an independent-samples t-test performed based on the data from the Self-Regulated Writing Scale pre-test performed before the application, it was observed that there was no statistically significant difference between the experimental ($\bar{X}$experiment = 74.64) and control ($\bar{X}$control = 73.95) groups (t (0.48) = p > 0.54). As a result of an independent-samples t-test conducted based on data from the Writing Skills Self-Efficacy Scale pre-test performed before the application, it was observed that there was no statistically significant difference between the experimental ($\bar{X}$experiment = 58.74) and control ($\bar{X}$control = 59.36) groups (t (0.26) = p > 0.61). As a result of an independent-samples t-test conducted based on data from the Torrance Creative Thinking Test pre-test performed before the application, it was seen that there was no statistically significant difference between the fluency, originality, elaboration, and detail (abstractness of titles, resistance to closure, creative power control) scores of the experimental and control groups.

Data Collection Tools

The Self-Regulated Writing Scale developed by Müldür (2017), the Writing Skills Self-Efficacy Scale developed by Ünlü et al. (2016), and the Torrance Tests of Creative Thinking Figural Form A developed by Torrance (1966) and adapted to Turkish by Aslan (2001) were used in this work.

Self-Regulated Writing Scale

The Self-Regulated Writing Scale created by Müldür (2017) consists of 21 items and the Cronbach alpha coefficient was determined as 0.85, reflecting the reliability of the scale. This 5-point Likert-type scale is scored as "I never do: 1," "I rarely do: 2," "I sometimes do: 3," "I often do: 4," and "I always do: 5." The scale consists of the four dimensions of making effort, observing and managing the process, asking for help, and generating ideas. The 21-item scale includes 6 items in the dimension of making effort, 6 items for observing and managing the process, 5 items for asking for help, and 4 items for generating ideas.

Writing Skills Self-Efficacy Scale

The Writing Skills Self-Efficacy Scale developed by Onder and Muldur (2016) was used to determine the effects of the activities conducted within the scope of the study on students' perceptions of self-efficacy in writing. This 5-point Likert-type scale is graded as "None: 1," "Few: 2," "Partially: 3," "Mostly: 4," and "Completely: 5." The Cronbach alpha coefficient was found to be 0.85 in determining the internal consistency of the scale. The scale consists of 3 dimensions: cognitive self-efficacy, emotional self-efficacy, and social self-efficacy.

Torrance Tests of Creative Thinking

In this study, the Torrance Tests of Creative Thinking Figural Form A, developed by Torrance (1966) and adapted to Turkish by Aslan (2001), was applied to determine the creativity skills of the students in the experimental and control groups. Figural Form A includes three activities: creating a picture, completing a picture, and parallel lines. The Torrance test calculates subdimensions of creativity with fluency, originality, elaboration, and detail (abstraction of titles, resistance to closure, creative power control) scores. While calculating the score, these four dimensions are calculated both separately and as a total score. Three experts were involved in the scoring process. Interrater reliability was tested with Kendall's W test.

Setting

BİLSEM centers were established by the General Directorate of Special Education and Guidance Services of the Ministry of National Education for the purpose of the education of specially talented children in the fields of science and art. In these centers, which are independent educational institutions, work is carried out to ensure that gifted students of primary, middle, and secondary school ages receive education in accordance with their abilities (MEB, 2016). Three main skill areas are used in determining student admission to these institutions: general ability, painting, and music. Students can be shown as gifted in at most two of these areas (MEB, 2015). Students who attend BİLSEM centers receive their education in BİLSEM together with their main schools for formal education (Keskin et al., 2013). In the science and art centers, the education process differs from the curriculum in general education and special goals are set. In these centers, there are 5 main programs: the adaptation program, support training program, individual talents awareness program, special talents development program, and project production and preparation.

Implementation

1. In this study, a writing program was developed in accordance with the 6 steps of the SRSD model (Graham & Harris, 2000). The program was implemented within the framework of the Science and Art Center Support Education Program for 12 weeks in the 2018-2019 academic year.

2. The program prepared was examined by 2 curriculum development specialists and 1 measurement and evaluation specialist working in the Department of Education Programs and Instruction of Yıldız Technical University, 2 classroom teachers working in the science and art center, and 1 Turkish teacher, and necessary adjustments were made in line with their opinions.

3. The data collection tools of the study, including the Self-Regulated Writing Scale, the Writing Skills Self-Efficacy Scale, and the Torrance Tests of Creative Thinking Figural Form A, were applied as pre-tests before the application and as post-tests after the application.

4. Activities prepared in accordance with the stages of the SRSD model were applied for the students in the experimental group. The stages and activities of the program applied for the experimental group are presented in Table 1 below.

5. The activities of the BİLSEM writing module were carried out for the students in the control group. Subject-oriented writing activities, story completion, writing feelings and thoughts, and creative writing activities are included among these BİLSEM writing activities.

6. The data obtained from the experimental and control groups were analyzed.

The activities pertaining to the stages of the SRSD model, which also constitute the program model, are listed in Table 1.

Table 1. Writing instruction activities pertaining to the stages of the SRSD model

Stages	Activities
Develop background knowledge	During this stage, in which efforts are made regarding the background knowledge of students: • A presentation was provided on narrative stories and their elements, prepared with the Emaze Program, a Web 2.0 tool. • Activities were conducted to identify the story elements that were read digitally to incorporate the knowledge obtained from the presentation. • Narrative story writing activities given in line with the creative writing method were conducted for protagonists, places, times, and problems. • Web 2.0 tools to be used in this research were introduced, including the Storybird, storyjumb, StoryJumper, Pawtoon, and Padlet programs. • To promote the usage of Web 2.0 tools in the home setting, training sessions for the students' parents were offered concerning the use of Web 2.0 tools.
Discuss it	Within the scope of this research, the SPACE strategy was taught, which is among the story writing strategies. S = Setting elements: Place, time, characters. P = Purpose: What are the protagonist and the other characters trying to do? A = Actions: What does the character do to reach his/her target? C = Consequence: What do these actions result in? E = Emotional reactions: What are the feelings and responses of the protagonist and other characters to the actions? • A presentation laying out the fact that this strategy will contribute to the recall of the elements of the narrative and the development of self-regulation skills was given.
Model it	• In this stage, in which the teacher writes a story by applying the stages of the strategy, the teacher performed the following exercises out loud while the students watched: • A target concerning writing was determined. • The story elements were determined respectively. • The story was written using a Web 2.0 tool. Thus, the teacher taught the students the basics of what they should do to motivate themselves, manage their negative feelings, and guide their thoughts and actions through the pre-writing, writing, and post-writing processes.
Memorize it	The teacher showed the students the stages of the strategy using a range of game methods. In this stage, the teacher used the "Learning Apps" application as a Web 2.0 tool and the stages of the strategies to be used by students were learned using the gamification technique.
Support it	The students, who had set targets for writing, wrote their stories in line with the strategy for self-regulation. As soon as the writing process was finished, the students read each other's stories and provided feedback. Students converted their stories to the digital environment using Web 2.0 software. They resumed writing with the help of the teacher and other classmates until the independent practice stage began. They were asked to present their work to their classmates. The stories presented were assessed by the teacher as well as the classmates. Feedback was provided. Students who obtained feedback were encouraged to reflect on their own opinions by applying a self-assessment method.
Independent practice/ performance	In this stage, as the students resumed their writing practices without the help of others, a general assessment was carried out by discussing the use of strategies with the students. A digital board was formed using Padlet, a Web 2.0 platform, for the students to express their feedback regarding the activities and the writing process. The teacher and students expressed their opinions via this application.

Data Analysis

In this study, in order to decide on the parametric or nonparametric tests to be used to determine whether the writing education carried out according to the SRSD model was effective or not, the pre-test and post-test scores of the experimental and control groups were calculated before any experimental analysis, and it was determined whether the score distributions fulfilled the assumptions of normality and homogeneity. For this purpose, the skewness and kurtosis values of the total scores of the pre-test, post-test, and permanence test obtained for each group were examined to determine whether the assumption of normality was achieved. It is accepted that the distribution of scores is normal if these coefficients are between -2 and +2 (Hair, Black, Babin, Anderson, & Tatham, 2010). The Levene test was conducted to test the assumption of homogeneity.

As a result of this testing, it was accepted that the significance scores were higher than 0.05; in other words, in the case of no significant difference between the variances of the scores, the variances met the assumption of homogeneity. Therefore, the independent-samples t-test was used to test the significance of the difference between the mean pre-test and post-test scores of the two groups.

Validity and Reliability

In this study, two equal groups were selected to ensure that the scores obtained by the students in the experimental and control groups were valid and comparable and that there was no bias in the selection of the study group. It was ensured that the numbers of participants in the two groups were close to each other. Considering the maturation effect, the application was limited to 12 weeks. During the application, there was no loss of subjects that would hinder the weekly practices.

The Torrance Creativity Thinking Test was scored according to the relevant criteria by the researcher and 2 different experts before and after the application for the students in the experimental and control groups. The Kendall W test was used to determine the level of agreement between these 3 different raters. According to these results, the reliability between the raters was high (Kendall W coefficient of harmony: 1st evaluation: 0.921, 2nd evaluation: 0.913).

FINDINGS

As the first finding of this study, independent samples of the t-test results obtained from the Self-Regulated Writing Scale were calculated for the students' pre-test scores in the experimental and control groups. The data obtained are provided in Table 2.

Table 2. Findings related to Self-Regulated Writing Scale pre-test scores

Group	N	X	SD	T	p
Experimental	22	74.64	11.54	0.48	0.54
Control	20	73.95	12.48		

As shown in Table 2, based on the results of the t-tests performed for independent samples within the scope of this study, there was no significant difference between the pre-test scores of the students in the experimental group (X = 74.61, SD = 11.54) and the control group (X = 73.95, SD = 12.48) obtained from the Self-Regulated Writing Scale. The t-test results of independent samples for the post-test scores obtained from the Self-Regulated Writing Scale for students in the experimental and control groups were also calculated. The data obtained are provided in Table 3.

Table 3. Findings related to Self-Regulated Writing Scale post-test scores

Group	N	X	SD	T	p
Experimental	22	87.64	8.47	0.64	0.00
Control	20	74.08	12.23		

As shown in Table 3, based on the results of the t-tests performed for independent samples within the scope of this study, a significant difference was observed between the pre-test scores of the students of the experimental group (X = 87.64, SD = 8.47) and those of the control group (X = 74.08, SD = 12.23) obtained from the Self-Regulated Writing Scale (t: 0.64, $p < 0.05$).

Independent-samples t-test results were determined for the post-test scores of the students in the experimental and control groups for the Self-Regulated Writing Scale. Obtained data are presented in Table 4.

Table 4. Findings related to Self-Regulated Writing Scale post-test scores

Group	N	X	SD	t	p
Experimental	22	87.64	8.47	0.64	0.00
Control	20	74.08	12.23		

As seen in Table 4, within the scope of this research, a significant difference was found between the post-test scores of the students in the experimental group (X = 87.64, SD = 8.47) and the control group (X = 74.08, SD = 12.23) according to the results of the t-tests performed for independent samples based on the Self-Regulated Writing Scale (t: 0.64, $p < 0.05$).

As the second finding of this study, independent-samples t-test results were determined for the pre-test scores of the students in the experimental and control groups for the Writing Skills Self-Efficacy Scale. The obtained data are presented in Table 5.

Table 5. Findings related to Writing Skills Self-Efficacy Scale pre-test scores

Group	N	X	SD	t	p
Experimental	22	58.74	9.24	0.26	0.61
Control	20	59.36	8.84		

As seen in Table 5, within the scope of this research, no significant difference was found between the pre-test scores of the students in the experimental group (X = 58.74, SD = 9.24) and the control group (X = 59.36, SD = 8.84) according to the results of the t-tests for independent samples based on the Writing Skills Self-Efficacy Scale.

Independent-samples t-test results were also determined for the post-test scores of the students in the experimental and control groups for the Writing Skills Self-Efficacy Scale. The obtained data are presented in Table 6.

Table 6. Findings related to Writing Skills Self-Efficacy Scale post-test scores

Group	N	X	SD	t	p
Experimental	22	65.74	6.94	0.38	0.00
Control	20	60.48	10.58		

As seen in Table 6, within the scope of this research, a significant difference was found between the post-test scores of the students in the experimental group (X = 65.74, SD = 6.94) and the control group (X = 60.48, SD = 10.58) according to the results of the t-tests for independent samples based on the Writing Skills Self-Efficacy Scale (t: 0.38, $p < 0.05$).

The Torrance creativity test was applied as a pre-test and post-test in order to determine the creativity levels of the students participating in the research. The t-test was applied to determine the difference between the scores obtained by the students for the 6 dimensions of the Torrance creativity test. The scores obtained by the students in the experimental group are presented in Table 7 and the scores obtained by the control group are presented in Table 8.

Table 7. The t-test results for scores obtained by the experimental group from the Torrance creativity test

Dimensions		N	X	SD	t	p
Fluency	Pre-test	22	12.74	2.36	-9.47	0.00
	Post-test	22	19.56	2.54		
Originality	Pre-test	22	13.74	3.16	-3.82	0.39
	Post-test	22	14.16	3.58		
Elaboration	Pre-test	22	15.57	2.23	-5.93	0.00
	Post-test	22	20.94	1.47		
Abstractness of titles	Pre-test	22	13.47	2.52	-14.83	0.01

	Post-test	22	18.93	1.49		
Resistance to premature closure	Pre-test	22	12.64	2.57	-16.72	0.01
	Post-test	22	18.26	1.36		
Creative strengths	Pre-test	22	8.77	1.49	-19.74	0.00
	Post-test	22	14.13	2.32		

As shown in Table 7, there were significant differences between the pre-test and post-test scores of the students in the experimental group in terms of their levels of fluency, originality, elaboration, abstractness of titles, resistance to premature closure, and creative strengths. In other words, it was concluded that the application had positive effects on the creativity levels of these students.

Table 8. The t-test results for scores obtained by the control group from the Torrance creativity test

Dimensions		**N**	**X**	**SD**	**t**	**P**
Fluency	Pre-test	20	13.57	2.87	-3.17	0.42
	Post-test	20	14.36	4.33		
Originality	Pre-test	20	11.53	3.49	-2.74	0.29
	Post-test	20	11.89	3.57		
Elaboration	Pre-test	20	12.61	2.84	-3.92	0.46
	Post-test	20	13.28	3.36		
Abstractness of titles	Pre-test	20	09.77	2.47	-3.28	0.34
	Post-test	20	10.36	2.21		
Resistance to premature closure	Pre-test	20	09.72	2.26	-3.37	0.28
	Post-test	20	10.84	1.98		
Creative strengths	Pre-test	20	08.74	1.86	-3.66	0.17
	Post-test	20	9.93	2.24		

As shown in Table 8, there were no significant differences between the pre-test and post-test scores of the control group students who participated in this study in terms of their levels of fluency, originality, elaboration, abstractness of titles, resistance to premature closure, and creative strengths.

DISCUSSION AND CONCLUSION

Within the scope of this study, the 6-stage SRSD model was enhanced with Web 2.0 digital tools for gifted and talented students. Research has shown that writing instruction focused on the creation of self-regulation strategies reinforced with Web 2.0 resources has a beneficial impact on self-regulation writing skills, perceptions of self-efficacy, and attitudes toward writing among gifted and talented students. Reviewing the relevant literature (Chaffee, McMahon, & Stout, 2004; Fischer, 2002; Graham & Harris, 2000; Graham, Harris, & Mason, 2005; Uygun, Aktürkoğlu, & Dedeoğlu, 2014; Saddler & Asaro, 2006), it is seen that the use of self-regulation strategies in writing instruction has positive outcomes, supporting the findings of the present research.

It is assumed that offering students the opportunity to identify their objectives and strategies and to apply them positively impacts not only their self-regulation skills but also their writing skills. The results of the research conducted by Cleary and Zimmerman (2004), in which the beneficial outcomes of practices in which students applied different strategies independently, such as goal setting, planning, self-monitoring, asking for help, and organizing the environment, support the results of this study. The findings of the research performed by Zimmerman (2002) further indicate that students' identification of a clear goal in the self-regulation process and the identification and usage of strategies directed at that goal have positive implications for the management of the performance process. Furthermore, Pintrich (2000) found that students who learn based on self-regulation are able to deliberately build knowledge in their minds by establishing their own goals and methods of learning. These works support the findings of the present study.

In the self-regulated writing activity conducted within the framework of this study, the efforts of students to take responsibility and fulfill their tasks successfully through their own experiences are

thought to have had a positive influence on their self-regulation skills. Considering the related literature, it has been claimed that when students' experiences are included in the process and when they see that they can write by using self-regulated writing strategies, their belief in their writing increases and they are more motivated in future writing activities (Bandura, 1986; Pajares, 2003; Zimmerman, 2000). It is further thought that the students' freedom to choose their topics and which Web 2.0 tools they would use positively affected the results of the present study. However, there are differing views on this issue when the specific literature is reviewed. While Uygun (2012) claimed that, during writing instruction, being able to choose the topic helps students have more power over their writing and thus encourages them to write longer and more clearly, Mason et al. (2006) argued that students waste time while selecting topics in the writing process and this leads them to begin their tasks late. In the research conducted by Müldür (2017), the opinions of students regarding this issue were also considered, and some students reported that choosing the writing topic had supportive effects, while some students stated that they wasted time.

In light of the data collected in this study, it was concluded that applications developed within the framework of the SRDS model enriched with Web 2.0 digital tools had a positive effect on the development of students' creative thinking skills. Several studies have demonstrated the beneficial impacts of designing learning environments in line with learning attributes, resulting in improved thinking skills among students. In the study conducted by Aktamış and Ergin (2006), it was found that students with creative potential require an environment that stimulates both the product and process, and that all children are born with the capacity for creativity, but their school experiences must enable them to explore creative thinking, to look at events and circumstances from different perspectives, and to come up with new solutions to the problems they encounter in their daily lives. The creativity of students should be cultivated to raise them as individuals who can overcome issues related to themselves and their surroundings and who can reflect on and analyze events from different viewpoints. To this end, as seen in the present study, seeking answers based on the problems faced by students in writing or providing exercises to improve their imagination will be more useful in cultivating the creativity of students. Teachers may develop creative thinking skills in a classroom setting where they behave democratically, are tolerant of different viewpoints, act as guides, and encourage free discussions focused on questioning, in harmony with the environment, while utilizing different thinking strategies, in-class engagement, and learning through doing and experiencing. According to Özerbaş (2011), a teacher who wants to develop the creativity of his or her students should prepare a comfortable learning environment where students can freely express their feelings and thoughts. He further claimed that a curriculum equipped with a progressive approach to teaching that places students' needs and developmental traits at the center will prioritize the student's research and problem-solving, and putting students' decisions at the forefront will have a positive effect on student creativity. Başer and Ersoy (2009) suggested that teachers should provide exercises that encourage students in the classroom and should organize learning and teaching experiences that enable students to make unique discoveries and explore new solutions to life-related problems.

Within the framework of this study, it was concluded that the positive impact of writing instruction focused on the implementation of a self-regulation strategy augmented with Web 2.0 tools on the self-regulation and creative thinking skills of gifted and talented students originated from the fact that students in the experimental group were exposed to numerous strategies and methods that allowed them to discover their inherent potential and benefit from computer technology. The results of the research undertaken by Chaffee, McMahon, and Stout (2004) support the findings of the present work; they stated that writing instruction for gifted and talented students should direct them through thinking processes and positively influence their capacity to reveal their knowledge at the end of the process through activities assisted by various teaching methods and technologies. The viewpoint of Plucker and Callahan (2008) that computer technology can be used in writing instruction for gifted and talented students and that teachers using computer tools in writing studies will be more advantageous for gifted and talented students who have difficulty in writing also supports the findings of this research. Macintyre (2008) argued that it is not difficult for gifted and talented students to picture stories in their imagination, but they have trouble articulating their thoughts on paper due to their quick thinking. Computer technologies promote faster writing in keeping with faster thinking,

and the availability of functions such as text deletion, correction, rewriting, and adjustment enables the creation and transmission of new ideas.

Within the scope of this research, it was found that providing opportunities for gifted and talented students to use Web 2.0 tools, share their ideas, build links between thoughts, visualize, and use group writing strategies that encourage cooperative learning has a positive impact on the students' attitudes toward writing and their writing performances. This finding is confirmed by the related literature (Albertson & Billingsley 2001; Friend, 2006; Plucker & Callahan, 2008), demonstrating that, during writing instruction, the use of strategies enabling the building of links between thoughts and based on cooperative learning methods is necessary for gifted and talented students. McIntosh (2006) claimed that the education of gifted and talented students should aim at guaranteeing their motivation, which will positively affect their performance in turn. Siegle (2015) argued that gifted and talented individuals can boost their interest, positive attitudes, and motivation thanks to easy comprehension of multimedia design features. Nichols (2002) stated that teachers' organization of activities including computer technologies had positive effects on the writing activities of gifted and talented students.

The incorporation of technology into the SRSD model is the most significant aspect distinguishing this study from other writing instruction methods based on the development of self-regulation strategies. Reviewing the relevant literature, it is seen that the use of technology in the teaching of gifted and talented students enhances the quality of education, can satisfy the needs of gifted and talented students for distinction and enhancement, and allows these students to develop their mental and creative skills (Chen et al., 2013; Pyryt, 2009; Shavinina, 2009; Siegle, 2015; Ülger & Çepni, 2017). It is also observed, however, that the technologies referred to in the related literature have both positive impacts and various limitations. In the research conducted by Fox (2014), it was found that teachers do not have adequate knowledge about how to use technology in writing instruction, while in the study performed by Yousaf and Ahmed (2013), the excessive use of technological instruments in writing instruction led students to make errors in spelling and use non-standard vocabulary in educational settings. In the research conducted by Robin (2006), it was concluded that when students first experienced narrative exercises via digital tools, they were unable to properly monitor their time and this impacted their self-efficacy and attitudes.

SUGGESTIONS

In light of the findings that emerged from this research, it is proposed to incorporate writing exercises in which self-regulation strategies are used in the education of gifted and talented students to establish positive attitudes toward writing at every level of education and in all courses. It is assumed that gifted and talented students, whose attitudes toward writing will evolve positively, will also experience positive effects on their overall academic performances and in their attitudes toward their courses.

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