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## THE EFFECT OF JOURNAL WRITING ACTIVITIES ON VARIOUS VARIABLES WITHIN THE SCOPE OF SPECIAL TEACHING METHODS COURSE

O EFEITO DAS ATIVIDADES DE ESCRITA DE DIÁRIOS SOBRE DIVERSAS VARIÁVEIS NO ÂMBITO DO CURSO DE MÉTODOS ESPECIAIS DE ENSINO

EL EFECTO DE LAS ACTIVIDADES DE ESCRITURA DE DIARIO SOBRE DIVERSAS VARIABLES DENTRO DEL ÁMBITO DEL CURSO DE MÉTODOS DE ENSEÑANZA ESPECIALES

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**ABSTRACT:** This study aimed to examine the effect of journal writing activities, one of the writing-to-learn activities, on pre-service science teachers' perceptions of efficacy regarding the selection of teaching techniques, their science-oriented inquisitive learning skills, and their reflective thinking tendencies. In the study, a single-group pretest-posttest design, one of the weak experimental designs of the quantitative approach, was used. The study participants consisted of 29 pre-service teachers studying in the Department of Science Education at Kafkas University. The study data were collected using the 'Perceived Competence in the Selection of Teaching Techniques Scale', 'Science-Oriented Inquisitive Learning Skills Perception Scale', and 'Reflective Thinking Tendency Scale'. Statistically significant differences were found between the pre-test and post-test scores of the students for each of the scales in favor of the post-test scores.

**KEYWORDS:** Journal Writing. Pre-Service Teacher. Special Teaching Methods. Science Journals.

**RESUMO:** Este estudo teve como objetivo analisar o efeito das atividades de escrita em diário, uma das práticas de “escrever para aprender”, nas percepções de futuros professores de Ciências sobre a eficácia na seleção de técnicas de ensino, suas habilidades de aprendizagem investigativa voltadas para a Ciência e suas tendências ao pensamento reflexivo. Foi utilizado um delineamento pré-teste/pós-teste com grupo único, considerado um dos delineamentos experimentais menos robustos da abordagem quantitativa. Participaram do estudo 29 futuros professores do Departamento de Educação Científica da Universidade Kafkas. Os dados foram coletados por meio da Escala de Competência Percebida na Seleção de Técnicas de Ensino, da Escala de Percepção de Habilidades de Aprendizagem Investigativa Orientada para a Ciência e da Escala de Tendência ao Pensamento Reflexivo. As análises revelaram diferenças estatisticamente significativas entre as pontuações dos alunos no pré-teste e no pós-teste em todas as escalas, com resultados mais elevados no pós-teste.

**PALAVRAS-CHAVE:** Escrita de diário. Futuros professores. Métodos especiais de ensino. Periódicos científicos.

**RESUMEN:** Este estudio tuvo como objetivo examinar el efecto de las actividades de escritura en diario, una de las actividades de escritura para aprender, en la percepción de los futuros docentes de ciencias sobre la eficacia en la selección de técnicas de enseñanza, sus habilidades de aprendizaje inquisitivo orientado a las ciencias y su tendencia al pensamiento reflexivo. En el estudio, se empleó un diseño pretest-postest de un solo grupo, uno de los diseños experimentales más débiles del enfoque cuantitativo. Participaron 29 futuros docentes del Departamento de Didáctica de las Ciencias de la Universidad de Kafkas. Los datos del estudio se recopilieron mediante la Escala de Competencia Percibida en la Selección de Técnicas de Enseñanza, la Escala de Percepción de Habilidades de Aprendizaje Inquisitivo Orientado a las Ciencias y la Escala de Tendencia al Pensamiento Reflexivo. Se encontraron diferencias estadísticamente significativas entre las puntuaciones pretest y postest de los estudiantes para cada una de las escalas, a favor de las puntuaciones postest.

**PALABRAS CLAVE:** Escritura de diario. Docentes en prácticas. Métodos de enseñanza especiales. Revistas científicas.

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## INTRODUCTION

The use of writing as a learning tool in science classrooms is gaining importance day by day (Gunel et al., 2009). Writing to learn, which is not only an assessment tool but also a learning tool, can be considered a powerful tool to help students learn science (Lewin & Wagner, 2006). Writing-to-learn activities are among the significant and effective activities that are thought to improve high-level mental process skills in science lessons (Bozat & Yıldız, 2015). The cognitive activities that result from the use of the components of the writing activity allow students to establish new network connections in their understanding of concepts (Hand & Prain, 2002; Ozfidan & Marks, 2025). In addition, the use of writing to learn in the learning environment allows students to express their ideas, compare, reflect on their existing knowledge, and structure the new concepts they have learned in their minds (Mason & Boscolo, 2000; Ozturk & Gunel, 2015). Considering these situations, writing-to-learn activities contribute to the acquisition of knowledge at the conceptual level and the construction of processual skills in science education (Ozturk & Gunel, 2015).

Due to the positive effects it has on students' learning, it is considered important to implement teaching based on writing activities in science classrooms. It is also observed that there is little time allocated to writing-related activities in the classroom in Turkey, especially in science classes. The main reasons for this are that teachers perceive writing only as a means of note-taking and consider it a time-consuming activity (Dasdemir et al., 2015). However, ideas about writing activities have changed radically in recent years. This is because writing activities are considered effective learning tools that include significant learning processes, strategies, and products (Emig, 1977). Recently, this changing perspective on writing-to-learn activities has led to different ideas on how to make better use of writing activities (Atilla et al., 2010). Among these ideas, the view that students' sharing of their knowledge with other friends in the class and writing to learn activities are effective in the classroom environment has gained importance (Gunel et al., 2009). Students can do this most effectively through journals. While keeping a journal, students both collect data about their learning styles and have the opportunity to repeat the lesson they have taught. In addition, when students review their journals, they feel motivated by observing the progress they have made (Bolukbas, 2004). Journals are known as "notebooks that students write in light of the information they have learned". With the help of journals, students can review the topics covered in the lessons, increase their interest in the lessons and their self-worth, and improve their writing skills (Arslan & Ilgin, 2011). Student journals are tools that increase students' achievements, attitudes, interests, self-values, and courage, improve their participation in learning processes, and share their thoughts comfortably (Aydın, 2014). Journals improve students' linguistic skills, allow them to see the activities they do in lessons, and contribute to their mental development (Savaskan,

2014). Borasi and Rose (1989) stated that journal writing increases subject learning, improves students' problem-solving skills, and creates an empathetic effect on students. Journal writing activities help students convey what they have learned while revealing what is understood and what is not. Thus, students can show increased success in their future learning (Ediger, 2006). When the studies conducted in Turkey to reveal the positive effects of journal writing are examined, it is seen that journal writing activities are mostly carried out in the field of mathematics education (Atasoy, 2005; Atasoy & Atasoy, 2006; Ugurel et al., 2009; Tekin-Aytas & Ugurel, 2016) and there are not enough studies on journal writing activities for science learning area (Diken & Yuruk, 2012; Akcay et al., 2014; Savaskan, 2014). Journal writing activities allow students to develop conceptual understanding, and express and develop their ideas (Ozturk & Gunel, 2015). There is a need to create an infrastructure for students to be able to connect their new knowledge with their existing knowledge and to mobilize writing to learn activities in in-class practices. Therefore, it is essential to ensure that pre-service teachers, who will be the teachers of the future, gain experience in journal writing activities and develop their affective characteristics through these practices.

In line with this information, the problem statement of the study was formed as follows: "What is the effect of journal writing activities implemented within the scope of the Special Teaching Methods I course on pre-service teachers' perceptions of competence regarding the selection of teaching techniques, their inquiry learning skills towards science, and their reflective thinking tendencies?"

## **METHODOLOGY**

### *Purpose of the Study*

This study aimed to determine the effect of journal writing activities, one of the writing-to-learn activities used for science subjects taught within the scope of the "Special Teaching Methods I" course, on pre-service science teachers' perceptions of competence regarding the choice of teaching techniques, their inquiry learning skills towards science, and their reflective thinking tendencies. The study was approved by the ethics committee of the Kafkas University Social and Human Sciences Scientific Research and Publication Ethics Committee with the 2nd decision numbered 25, dated 07.12.2021.

### *Research Design*

The study utilized a single-group pretest/posttest experimental design, one of the experimental designs of the quantitative research approach. In this design, the effect of the

experimental procedure is tested by studying a single group. In the study, teaching with journal writing activities was determined as the independent variable, and perception of competence regarding the choice of teaching technique, inquiry learning skills towards science, and reflective thinking tendency were determined as the dependent variables. In addition, the opinions of the students about the teaching process were also taken.

### *Study Group*

The study group consists of 29 pre-service teachers (14 females, 15 males) studying at Kafkas University, Dede Korkut Faculty of Education, Department of Science Education. The faculty member teaching the course to the pre-service teachers in which the study was conducted is also one of the researchers of this study. This is a significant factor in the selection of this sample.

### *Data Collection Tools*

Both quantitative and qualitative data collection tools were used in the study. The 'Perceived Competence in the Selection of Teaching Techniques Scale', 'Science-Oriented Inquisitive Learning Skills Perception Scale', and 'Reflective Thinking Tendency Scale' were used as quantitative data collection tools. As a qualitative data collection tool, a journaling guideline consisting of structured questions was used.

### *Perceived Competence in the Selection of Teaching Techniques Scale*

This scale was developed by Firat-Durdukoca et al. (2017). Exploratory and confirmatory factor analysis studies were conducted for the validity of the scale, and internal consistency was analyzed for reliability. Exploratory factor analysis revealed that the scale consisted of a total of 22 items in two factors, and 22 items explained 49.36% of the total variance. Cronbach's Alpha reliability coefficient for the overall scale was found to be .90.

### *Science-Oriented Inquisitive Learning Skills Perception Scale*

This scale was developed by Taskoyan (2008) to determine students' inquiry learning skills towards science. The scale consists of 22 items. The reliability coefficient of the overall scale was calculated as 0.84 by Taşkoyan (2008).

## **Reflective Thinking Tendency Scale**

This scale was developed by Semerci (2007). The scale consists of a total of 35 items, 20 negatives and 15 positives, in seven factors. The Cronbach's Alpha coefficient of the scale was 0.908.

## **Journaling Guideline**

The journaling guideline used in the study was prepared by Diken and Yuruk (2012). The journaling guideline includes structured questions for pre-service teachers to evaluate both their presentations and their peers' presentations. The questions in the journaling guideline were examined by two field experts who had previously worked on this subject, and their validity was tested.

## **Data Analysis**

In the study, the scores obtained from the "Perceived Competence in the Selection of Teaching Techniques Scale", "Science-Oriented Inquisitive Learning Skills Perception Scale", and "Reflective Thinking Tendency Scale" were analyzed before and after implementation. In the analysis of the data and the evaluation of the findings, a 95% confidence interval and  $p=0.05$  significance level were taken into consideration. Arithmetic mean, standard deviation, and dependent sample t-test were used to compare the scores of pre-service teachers obtained from the aforementioned scales. While interpreting the arithmetic means of these scores, it was accepted that the values between 1.00-1.80 were 'very low', the values between 1.81-2.60 were 'low', the values between 2.61-3.40 were 'moderate', the values between 3.41-4.20 were 'high', and the values between 4.21-5.00 were 'very high' (Kutu & Sozibilir, 2011). In addition, to determine the gains belonging to the scores obtained from the scales administered to the pre-service teachers before and after the implementation of the study, percentages were calculated for the difference values between the mean scores, and the overall gain scores were determined after the implementation.

## **RESULTS**

This section presents the findings regarding the sub-problems of the study. The findings related to the sub-problem 'What is the effect of journal writing activities within the scope of the "Special Teaching Methods I" course on pre-service teachers' perceptions of competence regarding the selection of teaching techniques?' are given in Table 1.

**Table 1.** Dependent Groups t-Test Results of the Perceived Competence in the Selection of Teaching Techniques Scale

Test	$\bar{x}$	S	SD	t	p	% difference (gain)
Pre-test	3,41	0,27	28	-10,312	0,000	27,86
Post-test	4,36	0,43				

Source: prepared by the authors.

As can be seen in Table 1, a statistically significant difference ( $t(29)=-10.312$ ;  $p<.05$ ) was found between the pre-test and post-test scores of the pre-service teachers obtained from the “Perceived Competence in the Selection of Teaching Techniques Scale”. In addition, there was an increase of 27.86% between the pre-test and post-test scores of the “Perceived Competence in the Selection of Teaching Techniques Scale”.

According to the qualitative findings obtained from the study, it was determined that the journals kept by the pre-service teachers for the Special Teaching Methods I course had positive effects. In their journals, pre-service teachers reported that they chose appropriate teaching methods that distracted them from memorization, provided an effective introduction to the subjects, related what they learned in the lesson with daily life, were appropriate to the nature of the subjects, allowed them and their peers to develop positive attitudes towards the lesson, and made their peers active while explaining the subjects.

The findings related to the sub-problem ‘What is the effect of journal writing activities within the scope of the “Special Teaching Methods I” course on pre-service teachers’ inquiry learning skills towards science?’ are given in Table 2.

**Table 2.** Dependent Groups T-Test Results of Science-Oriented Inquisitive Learning Skills Perception Scale

Test	$\bar{x}$	S	SD	t	p	% difference (gain)
Pre-test	3,56	0,20	28	-7,784	0,000	16,57
Post-test	4,15	0,35				

Source: prepared by the authors.

As can be seen in Table 2, a statistically significant difference ( $t(29)=-7.784$ ;  $p<.05$ ) was found between the pre-test and post-test scores of the pre-service teachers obtained from the “Science-Oriented Inquisitive Learning Skills Perception Scale”. In addition, it was determined that there was a 16.57% increase between the pre-test and post-test scores of the “Science-Oriented Inquisitive Learning Skills Perception Scale”.

The qualitative findings obtained from this study support the quantitative findings of the study. According to the qualitative findings obtained from the study, it was determined that the



pre-service teachers reported in their journals that they needed to conduct experiments in some of the teaching methods they used, that the experiments they conducted enabled them to find answers to the questions they were curious about, that they did literature review during the preparation process for the lesson, and that the pre-service teachers who listened to the lesson during the presentation were able to find answers to the questions they had in their minds thanks to the experiments and activities carried out by their peers who lectured the lesson.

The findings related to the sub-problem “What is the effect of journal writing activities within the scope of the ‘Special Teaching Methods I’” course on reflective thinking tendencies of pre-service teachers?’ are given in Table 3.

**Table 3.** Dependent Groups T-Test Results of Reflective Thinking Tendencies Scale

Test	$\bar{x}$	S	SD	t	p	% diferença (ganho)
Pre-test	2,63	0,20	28	-16,764	0,000	63,88
Post-test	4,31	0,60				

Source: prepared by the authors.

As can be seen in Table 3, a statistically significant difference ( $t(29)=-16.764$ ;  $p<.05$ ) was found between the pre-test and post-test scores of the pre-service teachers obtained from the ‘Reflective Thinking Tendency Scale’. It was determined that there was a significant increase of 63.88% between the pre-test and post-test scores of the “Reflective Thinking Tendency Scale”.

It is considered that the high scores determined in the quantitative part of the study were mostly because the pre-service teachers taught the lesson according to the teaching methods appropriate to the subject, presented the lesson with appropriate teaching materials, thought that they introduced and explained the subject effectively, benefited constructively from the critiques of their friends, took into account the teaching outcomes related to the subject, did not be satisfied with the activities in the textbooks but created new ones by doing research, encouraged discussion in the classroom, and valued the opinions of their friends at the point of self-evaluation. In short, the quantitative findings of the study support the qualitative findings.

## DISCUSSION

This study is significant in terms of revealing the effect of journal writing activities on pre-service teachers’ perceived competence in the selection of teaching techniques, science-oriented inquisitive learning skills perceptions, and reflective thinking tendencies. There are studies on journal writing activities in the literature. Akkuzulu and Cetin (2011) found that



students were eager to learn thanks to journaling activities, that students enjoyed the activities, that the units in all courses would be more instructive with this activity, that they would do more research, and that they had the opportunity to think more about the subjects they studied. Cavus and Ozden (2012) found that students who were keeping a journal in the field of science learning believed that they should continue to keep a journal because they understood the subjects better, they repeated the subjects, they thought that their achievement had increased, and that they could advise their friends in different schools to increase their success levels. Yilmaz and Gultekin (2013) determined that the science course supported by journals had a positive effect on students' attitudes towards science and scientific process skills. Eryilmaz Mustu et al. (2018) found that lessons supported by journaling activities are significant in identifying the deficiencies that students feel in themselves, determining their attitudes towards the course, determining their emotional states, and developing students' questioning, creative thinking, and communication skills. Gurbuz (2022) found that students' achievement increased thanks to science journals and that their interactions with each other, according to the instructions in the journals, had positive effects on their reflective thinking skills. Sasmaz-Oren et al. (2023) stated that students should write journals to improve their learning experiences, conceptual understanding, field knowledge, decision-making, and critical thinking skills, and associate the course with daily life.

## FINAL CONSIDERATIONS

Regarding the first sub-problem in the study, a statistically significant difference was found in favor of the post-test between the scores obtained from the "Perceived Competence in the Selection of Teaching Techniques Scale" before and after the implementation. In addition, when the mean scores were examined, it was determined that this increase changed from a high level to a very high level. This result shows that journal writing activities have a significant effect on pre-service teachers' perceptions of competence regarding the selection of teaching methods and techniques. This effect is also evident from the gain (% difference) values. Accordingly, when the achievement values of the scores of the pre-service teachers were examined, it was determined that there was a 27.86% increase in the post-test scores compared to the pre-test scores. These findings are similar to the findings of some studies in the literature (Diken & Yuruk, 2012; Unlu & Soylyu, 2017). When the quantitative and qualitative results of the study were evaluated together, it was determined that the pre-service teachers reported that they considered themselves competent in terms of increasing in-class interaction in the teaching-learning process, enabling positive attitudes towards the course,

associating the subjects with daily life, and choosing methods and techniques that will make students active in the teaching-learning process thanks to journal writing activities.

It was determined that there was a statistically significant difference between the pre-test and post-test scores of the “Science-Oriented Inquisitive Learning Skills Perception Scale” administered to pre-service teachers. This result shows that journal writing activities help pre-service teachers use the knowledge and skills they have gained in the subject to solve the problems they encounter in daily life.

Finally, the effect of journal writing activities on pre-service teachers’ reflective thinking tendencies was examined. Accordingly, the t-test results for the pre-test and post-test of the ‘Reflective Thinking Tendency Scale’ revealed that these interventions created a significant difference in favor of the post-test. This positive effect of this method was also reflected in interviews with pre-service teachers. Accordingly, thanks to the journal writing activities, pre-service teachers realized that it is important to value the opinions of others, to be open-minded, to have appropriate discussions in the classroom, to prioritize teaching responsibility and scientificity, to do research, to be foresighted and sincere, and to take into account the expectations of others. In short, it can be stated that journal writing activities are effective in developing pre-service teachers’ reflective thinking tendencies.

This study was carried out within the scope of the Special Teaching Methods I course, and the effectiveness of journal writing activities in different courses can be examined. To increase the level of students’ achievements in the curriculum, more journal writing activities can be included in the lessons. This study was carried out with pre-service science teachers. Similar studies can be carried out by teacher candidates from different branches or university students at different levels.

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