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The Use of Standardized Feedback for Teaching Material Preparation: The Opinions of Preservice Science Teachers*

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ABSTRACT

Purpose: The present study aims to investigate the opinions of preservice science teachers about using standardized feedback in preparing education materials, including their opinions about oral, written and e-feedback and the effectiveness of individual and group work. The preservice teachers were also informed about the applicability of standardized feedback in other undergraduate courses.

Research Methods: Case study design, a qualitative research method, was used in this study. This study was conducted in the "Learning Technologies and Material Design" course with the participation of 43 junior preservice teachers enrolled in the science education department of a public university.

Findings: According to the results of the research, preservice science teachers are positive about the use of the standardized feedback process while preparing class materials. Among these views, it boosted the quality of learning, corrected erroneous information and raised their grades. The most important disadvantage was that the candidates did not want to redo the class material. Since the feedback givers and receivers were in mutual interaction, they stated that the most effective feedback was oral feedback. The second most effective was written feedback because it contained information, while the least effective was e-feedback. The candidates thought that standardized feedback was effective and promoted permanent learning in the studies conducted both individually and in groups.

Implications for Research and Practice: Standardized feedback can also be used in undergraduate education, projects, teaching materials and laboratory classes.

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Introduction

The increase of quality in education; in other words, the continuity of the improvement in education is an important issue related to the "assessment" phase. Assessment is commonly applied as the product evaluation at the end of teaching and as formative assessment used in the process phase of teaching, which has increased in recent years. Based on the formative assessment, students' learning needs are determined within the process, and a form of teaching appropriate to these needs is performed. With formative assessment, students were found to improve their knowledge and skills, such as problem-solving (Shute, 2007). Feedback, a type of formative assessment, is addressed as a strong mechanism that increases individuals' learning and motivation (Erisen, 1997; Retna & Cavana, 2009). Feedback is a process that informs students about their strengths and weaknesses regarding the performances they exhibit and, therefore, contributes to the efficiency of their future studies (Brown, 2004; Weaver, 2006). Informing students or providing feedback on their strengths and weaknesses without comparing them with their peers is a significant source of motivation, enabling them to assess their own performances and to use this information for their future studies (Vollmeyer & Rheinberg, 2005; Wiliam, 1999).

Many studies pointed out the effectiveness of feedback in the learning process with various implementations (Bergil & Atli, 2012; Espasa & Meneses, 2010; Hu & Choo, 2016; Kleinknecht & Gröschner, 2016; Roessger, Daley, & Hafez, 2018; Woods & Welch, 2018). In a study conducted by Higgins, Hartley and Skelton (2002), students attempted to learn feedback, which might help them to understand the topic in-depth, by moving based on intrinsic motivation despite their awareness of the importance of scoring. In a different study on praise and feedback in primary school grades, Burnett and Mandel (2010) set forth that aimless general praises are mostly used in the classroom; yet feedback on the skill or effort regarding the successful fulfillment of a task assigned is more beneficial for students. A study conducted in higher education indicated that students, when they are not provided with sufficient feedback on their own learning, are unable to proceed because they cannot make out their level regarding learning objectives and knowledge and skills attainments of the task assigned. Besides, different feedback types have various effects on students' learning and motivation (Cabakcor, Aksan, Ozturk, & Cimer, 2011). Butler (1987, 1988) in different studies on various feedback types, put forward that feedback given in the form of grades has no positive influence on the student achievement and that written and verbal feedback, which yields information for students on their performance, enhances the achievement. Therefore, written or verbal feedback given in the educational process produces a positive effect on students' knowledge and skills. In the standardized feedback process in this study, the preservice teachers' materials were investigated and graded (by providing written, oral, or e-feedback) and all of the preservice teachers made necessary corrections and returned their materials once again for the assessment.

Feedback, which is used at the different stages of education and whose positive effect has been indicated by many studies, is also necessary for teacher

trainingconcerning professional development. Since the theoretical knowledge entails the practice for many subject areas in the teacher education process, preservice teachers attain a very significant objectiveconcerning their pedagogical development by receiving e-feedback in addition to face-to-face and written feedback. With the development of technology, the tools used in the teaching process changed. Electronic teaching tools used in the electronic environment (such as Microsoft PowerPoint, Microsoft Word) are effectively used in the teaching process. Therefore, corrections in e-materials, as the corrections in written materials, become a necessity. The accuracy level and quality of the application carried out, as well as the variability of teaching materials, should be paid attention to the educational process. Thus, preservice teachers can enhance the quality of their future teaching using the feedback process, an example of which they were shown in their undergraduate education and the effectiveness of which they tested in their own studies. At this point, the results of this study are thought to contribute to the literature by increasing the quality standards in teacher education. In addition, few studies of teacher education using the feedback process were encountered in the literature. To our knowledge, there is no study using this process in the design of teaching material was encountered. It is assumed, from this perspective, that this study contributes to the related literature.

This study aimed to determine preservice science teachers' opinions on using the standardized feedback process in the design of teaching materials. In the study, the preservice teachers' opinions on oral, written, and e-feedback were obtained, and their opinions on the effectiveness of individual and group studies were determined. In addition, the preservice teachers indicated their opinions on the applicability of the standardized feedback process in their other undergraduate courses. In line with the aim of the study, answers to the following questions were sought:

What are the preservice science teachers' opinions on:

1. 1. Is the use of the feedback process mandatory (standardized) in the design of teaching materials?
2. What Advantages and disadvantages of the use of the feedback process in the design of teaching materials?
3. The effectiveness of receiving feedback individually or in a group in the design of teaching materials?
4. The ordering of the effectiveness of oral, written, and e-feedback in the design of teaching materials?
5. The use of the feedback process in the design of teaching materials in other undergraduate courses?

Method

Research Design

This study was designed as a case study, a qualitative research design. To perform an in-depth and detailed analysis of the feedback process, a case study design was

adopted. Case studies investigate a phenomenon/event within its up-to-date and real context, reveal their descriptions and explanations in a detailed way, intend to make an in-depth investigation of a system with boundaries determined, and reveal the equivalence of abstract thought in real-life (Merriam, 2009; Robson, 2002; Yin, 2009). In case studies, researchers are rather comprehensive regarding the issues addressed as the case and cases can also include an event, activity, or process rather than merely being an object or existence possessing a certain identity (for example, a group, individual, classroom, or institution). This study was conducted with a single group. The opinions of this group about using the standardized feedback process in the design of teaching materials were taken at the end of the application process. The case investigated in this study is the use of the feedback process in the design of teaching material.

Research Sample

The study group of this study was selected using criterion sampling, a purposeful sampling technique is used to make an in-depth investigation to obtain rich data (Patton, 1997). The preservice teachers took four lab courses and one practice course in their undergraduate education. They were selected as the participants since they took the course of Learning Technologies and Material Design for the first time. Interviews were conducted with eight of the participating preservice teachers. The study group included 43 junior preservice science teachers (38 females, 5 males), whose age distribution is 18-year-old *(2)*, 20-year-old *(19)*, 21-year-old *(11)*, 22-year-old *(9)*, and 23-year-old *(2)*, from a public university during the 2017–2018 academic year. The participating preservice teachers graduated from Anatolian High School *(28),* Vocational and Technical Anatolian High School *(6),* Multi-Program Anatolian High School *(5),* Anatolian Teacher Training High School *(1),* and Anatolian Religious High School *(2).*

Research Instruments and Procedures

This study was conducted in the 2017-2018 academic year in the Learning Technologies and Material Design course, which is taught in the third grade of the Science Education Program. The implementation of this research was performed in ten weeks in total. During the implementation period, the preservice teachers, individually or in groups, designed two-dimensional (paper-and-pencil) and three-dimensional materials on a science topic they preferred each week. At each stage of the standardized feedback process, e-feedback, in addition to oral and written feedback, was provided in e-materials.

At the beginning of each material, the preservice teachers were informed about the implementation following the theoretical explanation and the rubrics developed by the researchers for each assessment tool were distributed. The preservice teachers were given one week to design their materials and each material, after designed, was included in the standardized feedback process. In the standardized feedback process in this study, the preservice teachers' materials were investigated and graded (by providing written, oral, or e-feedback) and all of the preservice teachers made necessary corrections and returned their materials once again for the assessment.

According to this process, the preservice teachers' materials were distributed back to them after the first investigation. Based on the feedback specified in the material, the preservice teachers made the necessary corrections in one week and returned them once again. The score assigned after the final assessment of the material was the evaluation score of the material. In this study, the researcher made the theoretical explanation of the materials in the feedback process and provided oral, written, and e-feedback in the implementation process. The implementation stage of this study is shown in Table 1.

Table 1

Implementation Process and its Stages

Week	Implementation
1st	Theoretical information on the structured grid and the Structured Grid Rubric was given.
2nd	Structured grids were designed and feedback was provided within two days.
	Theoretical information on the diagnostic tree and the Diagnostic Tree Rubric was given.
3rd	Final scores were assigned to the structured grids.
	Diagnostic trees were designed and feedback was provided within two days.
	Theoretical information on the semantic analysis table and the Semantic Analysis Table Rubric was given.
4th	Final scores were assigned to the diagnostic trees.
	Semantic analysis tables were designed and feedback was provided within two days.
	Theoretical information on the concept map and the Concept Map Rubric was given.
5th	Final scores were assigned to the semantic analysis tables.
	Concepts maps were designed and feedback was provided within two days.
	Theoretical information on the worksheet and the Worksheet Rubric was given.
6th	Final scores were given to the concept maps.
	Worksheets were designed and feedback was provided within two days.
	Theoretical information on the Microsoft PowerPoint presentation and the Microsoft PowerPoint Presentation Rubric was given.
7th	Final scores were assigned to the worksheets.
	The presentations were designed in Microsoft PowerPoint software and feedback was given within two days.
	Theoretical information on the poster in the Microsoft PowerPoint software and the Microsoft PowerPoint Poster Rubric was given.

Table 1 Continue

Week	Implementation
8th	Final scores were assigned to the presentations designed in Microsoft PowerPoint software.
	Posters were designed in Microsoft PowerPoint software and feedback was provided within two days.
	Theoretical information on the science collections was given to the preservice teachers and they designed, as a three-dimensional material, collections formed by the classification of samples related to the daily life and science objectives.
9th	Final scores were assigned to the posters designed in Microsoft PowerPoint software.
	Science collections were designed and feedback was provided within two days.
10th	Final scores were assigned to the science collections.
	The opinion form developed by the researchers was applied to the preservice teachers.

The preservice teachers individually prepared the structured grid, diagnostic tree, semantic analysis table and concept map materials. The worksheet, presentation in Microsoft PowerPoint, poster in Microsoft PowerPoint and science collection materials were prepared in groups of three. As an example of the rubrics, which were distributed to each preservice teacher to maintain the order of the process and increase the effectiveness, the criteria regarding the concept map rubric are given in Table 2.

Table 2

Example Categories of the Concept Map Rubric

Criteria	Level of Achievement		
	4 points	7 points	10 points
Originality	The ideas or products produced are not original.	The ideas or products produced are partially original.	The ideas or products produced are unique.
Content	Content of the homework is not sufficiently related to daily life; the information is not up-to-date and accurate.	Content of the homework is partially related to daily life; the information is partially up-to-date and accurate.	Content of the homework is related to daily life, the information is up-to-date and accurate.

The initial and final scores assigned by the researchers to the materials designed by five preservice teachers, who were randomly selected in the standardized feedback

process are shown in Table 3. Scores specified in the table were exemplary and not considered as the study data.

Table 3

Five Preservice Teachers' Initial and Final Scores on their Materials

P.T.	Structured Grid		Diagnostic Tree		Semantic Analysis Table		Concept Map	
	Initial Score	Final Score	Initial Score	Final Score	Initial Score	Final Score	Initial Score	Final Score
1	65	80	71	79	70	86	65	90
2	61	86	84	95	86	95	75	96
3	55	80	58	77	94	95	61	89
4	61	93	76	91	74	94	70	98
5	53	80	64	88	79	93	67	91

P.T: Preservice teacher

Data Collection

1. Open-ended Opinion Form

The data in this study were obtained by an open-ended opinion form applied to all of the preservice teachers and interviews were conducted with eight of the participating preservice teachers. Two field education experts and one assessment and evaluation expert were consulted on the content validity of the open-ended opinion form and the interview forms prepared. The open-ended opinion form (consisting of five questions) was developed by the researchers to obtain the preservice teachers' opinions on the feedback process in line with the research questions. The content validity of the form was ensured based on the experts' opinions and the form was applied to all of the preservice teachers at the end of the implementation process in 40 minutes.

Questions from the open-ended opinion form;

- What do you think about the advantages and disadvantages of making the feedback process obligatory in the assessment of the materials?
- What are the advantages and disadvantages of using the feedback process in the design of teaching materials?
- What are your views on the effectiveness of individual or group feedback given in the design process of instructional materials?
- What are your views on the ranking of the effectiveness of verbal, written, and electronic feedback in the design of instructional materials?
- What are your views on the use of the feedback process used in teaching material design in other undergraduate courses?

2. Semi-structured Interviews

Another data collection method was the semi-structured interviews (consisting of four questions) conducted with eight preservice teachers from the participants. The semi-structured interviews questions developed in line with the research questions were posed to the preservice teachers in face-to-face interviews, and the related data were collected. Interviews with teacher candidates lasted one hour each. All interviews were held with the participants at the school where this research was conducted at the end of the face-to-face application process. The interviews were recorded within the notes of the researcher, with the permission of the participants. The semi-structured interview consisted of questions requiring the preservice teachers to detail their responses to make an in-depth analysis of the research questions. The questions asked in the face-to-face interview were asked in parallel with the open-ended opinion form.

An exemplary question from the interview:

- In your opinion, what are the other undergraduate courses in which the assessment process with feedback should be used? Please justify your response.

Data Analysis

Content analysis, a qualitative data analysis technique, was used to analyze the preservice teachers' responses to the open-ended opinion form. The data obtained by the interviews, on the other hand, were analyzed using descriptive analysis. Categories based on the questions included in the open-ended opinion form were first identified in this study. The categories were as follows: 1) General expressions on making the feedback process compulsory, 2) advantages and disadvantages of the feedback process, 3) individual or group studies in the feedback process, 4) oral, written and e-feedback in the feedback process, 5) the use of the feedback process in other courses. Each participant had multiple opinions regarding each category. These opinions were analyzed using content analysis, and "keywords (concepts)" were determined. Related frequency values were assigned according to the participants' frequency of repeating these opinions. Keywords (concepts) is the name for meaningful sections presented between the data (e.g., a word, sentence and paragraph) and the basic analysis unit of content analysis (Yildirim & Simsek, 2008). Expressions were kept long and ranked from the highest to the lowest frequency value in the tables, to indicate in what contexts the results were termed as "keywords (concepts)." Codes obtained from the preservice teachers were presented in tables in order for interpretation. Two different raters evaluated the data analyzed through content analysis and the Miles-Huberman inter-rater reliability (Miles & Huberman, 1994) was found 89.25. This calculated value shows that a sufficient and strong agreement was achieved (Miles & Huberman, 1994; Yildirim & Simsek, 2008). Therefore, the coding reliability of the research data examined by the two researchers increased, and a joint decision was made by discussing the data they disagreed on. The data obtained from the interviews conducted with eight preservice teachers were analyzed using descriptive analysis. In this study, the results were obtained, presenting excerpts from the interviews.

Results

In this part, the results obtained were analyzed in tables according to the categories determined and excerpts regarding the preservice teachers' opinions were included. They were presented in the tables obtained from the open-ended opinion form, and the semi-structured interviews with the candidates are given by directly quoting. General expressions on making the feedback process obligatory in the design of teaching materials are given in Table 4.

Table 4

Codes and Frequencies regarding General Expressions on Making the Feedback Process Obligatory in the Design of Teaching Materials.

Category	Code	Frequency
Positive	A good application	16
	Advantageous to increase grades	11
	An opportunity to correct deficiencies	9
	Repairing mistakes	6
	Correcting mistakes	5
	Importantconcerning professional development	5
	Providing permanence	4
	An efficient process	2
	Gaining a sense of responsibility	2
	An opportunity for self-assessment	2
	Being obligatory is an advantage	1
	An opportunity to revise the homework	1
Ineffective	Being obligatory has no effect on the process	1
Negative	It is not appropriate that it is obligatory	5
	Boring	1
	Cost loss	1

As Table 4 shows, the preservice teachers were of the opinion that making the feedback process obligatory is a positive application. Given the reasons for this, it increases grades, provides an opportunity to correct the mistakes, and is curical concerning professional development, according to the preservice teachers. A preservice teacher's (PT-7) opinion on this issue was: "*In fact, it is better, we make it since it is obligatory and it contributes to your learning. Therefore, it improves our professional development.*" The opinion of the preservice teacher (PT-3) was: "*Being obligatory also became an advantage because I cannot see my deficient points without feedback; therefore, I would not be able to correct them*." Contrarily, some preservice teachers expressed negative opinions on making the process obligatory. The opinion of a preservice teacher (PT-1) was: "*I do not think that it is appropriate to make the process obligatory, it was a boring process*." In addition, a preservice teacher (PT-8) was of the opinion that whether the process is obligatory or not does not make a difference and expressed that "*Whether the process is obligatory or not did not differ on my side, I would still do it if it were not obligatory. Furthermore, I learned better in cases where I received feedback. I had the chance to see that homework, which seemed perfect to me, was not indeed.*" The preservice teachers indicated that they made more complete and mistake-free homework with the

feedback provided within the process and that they would still do the corrections if the process was not obligatory. It can be said that the feedback process,concerning meaningful learning, is effective and necessary for the preservice teachers, whether it is obligatory or not. Opinions on the advantages and disadvantages of the feedback process in the design of teaching materials are presented in Table 5.

Table 5

Codes and Frequencies regarding the Advantages and Disadvantages of the Feedback Process in the Design of Teaching Materials

Category	Code	Frequency
Advantages	Recognizing and correcting mistakes	27
	Recognizing mistakes	13
	Learning topics in a more permanent way	9
	Increasing grades	8
	Eliminating deficiencies	7
	Providing mastery learning	1
	An efficient process	1
	Preparation for the profession of teaching	1
	Making the material more attractive	1
	Updating homework	1
Disadvantage	Time-consuming process	23
	Tiring process	9
	Redesigning the material	5
	No disadvantage	3
	Costly process	2
	Insufficient time	2
	Decrease in motivation	1

As Table 5 shows, the feedback process was a process where the mistakes and deficiencies were recognized and opportunities to correct them were provided, according to the preservice teachers. They added that the process provided permanent learning and also increased their grades; therefore, they experienced an efficient process. Being time-consuming and tiring process were listed as the disadvantages of the process, while some preservice teachers indicated no disadvantages. A preservice teacher's (PT-1) opinion on the advantages and disadvantages of the process was: "*We could increase our grades, as an advantage of the feedback process, we recognized our mistakes in homework distributed and corrected them. The disadvantage of the use of the feedback process was that doing homework once again was time-consuming*." Another preservice teacher (PT-2) expressed his or her opinion as follows: "*Advantage: We were able to make our materials better and it provided us to learn from our mistakes. Disadvantages: Time-consuming, quite challenging, and boring*" Despite being time-consuming and challenging, the process, in various aspects, was found advantageous by the preservice teachers and considered as an effective application. Opinions on the effectiveness of

feedback received individually or in groups in the design of teaching material are given in Table 6.

Table 6

Codes and Frequencies on the Effectiveness of Feedback Received Individually or in Groups in the Design of Teaching Materials

Code	Frequency
Individual	21
Group	15
Sometimes individual sometimes group	7

As Table 6 indicates, the preservice teachers expressed that individual feedback was more effective in the design of teaching materials. The reason behind this, according to a preservice teacher (PT-2), was: "*It became more efficient when we studied individually because you find researches, methods and information yourself since you deal with every aspect of the topic individually; therefore, it provided more permanent learning. Besides, it improved the sense of responsibility more.*" A different preservice teacher (PT-8) expressed the reason for this as follows: "*It was more efficient when we studied individually because there can be some disagreements during the exchange of ideas within the group. However, I had the opportunity to push the limits with my own effort when it was done individually. In this way, the learning was more permanent and meaningful.*" The preservice teachers who preferred the group study justified this preference as follows: "*We have an exchange of ideas in group studies. We gain different perspectives, recognize each other's mistakes and correct them*" (PT-4) and "*I think that the permanent learning was most efficiently realized when we study in groups because group studies are advantageous in providing a more active interaction and establishing dialogues between people.*" One of the preservice teachers, who sometimes preferred individual sometimes group studies (PT-7), expressed his or her opinion as follows: "*This depends on the topic. Some topics are learned better through group studies, while some are understood better through individual studies. When there is an unclear point, you can learn it by asking it to your groupmates, having an exchange of ideas, or discussing with them*." The preservice teachers formulated the reasoning behind their preference of individual or group study as Group studies for the application-based processes where the feedback is used and for the topics that require having an exchange of ideas and individual studies for the cases where they need to express themselves individually. Opinions on the ranking of the effectiveness of oral, written and e-feedback in the design of teaching materials are given in Table 7.

Table 7

Codes and Frequencies regarding the Ranking of the Effectiveness of Oral, Written, and E-Feedback in The Design of Teaching Materials

Category	Code	Frequency
Oral	1st rank	32
	3rd rank	7
	2nd rank	3

Table 7 Continue

Category	Code	Frequency
Written	2nd rank	23
	1st rank	9
	3rd rank	2
Electronic	3rd rank	20
	2nd rank	8
	1st rank	2

According to Table 7, the preservice teachers preferred to receive oral feedback in the first place. PT-1 indicated his or her opinions on oral feedback as follows: "*Oral feedback was more effective because you make an individual contact with the teacher. It enables to receive instant feedback on a point or part unclear.*" The opinion of PT-8 on this issue was: "*Oral feedback, because we had a chance once again to ask the parts we did not understand. We received a prompt answer for the points unclear to our minds.*" The preservice teachers preferred the written feedback in the second place. The opinions on the reasons for the preference of written feedback were: "*It was better in the written form because written feedback is permanent.*" (PT-6) and "*It becomes better when it is in the written form because we can forget when it is oral or may not have always a chance to access the internet when it is in the form of e-feedback. Thus, the written form is more effective and beneficial.*" (PT-5). The preservice teachers preferred e-feedback least within the process, which was justified by one of the preservice teachers (PT-3) as: "*E-feedback was a bit unusual to me. Although it is an instant feedback, I could not access the internet sometimes.*" Oral feedback was more preferred by the preservice teachers more because face-to-face and instant explanations were made in the design process of materials. Also, written feedback was effectiveconcerning permanence. E-feedback, although they were written, was preferred by the preservice teachers in the last place because of latencies due to its dissimilarity. Opinions on the use of the feedback process in the design of teaching materials in other undergraduate courses are given in Table 8.

Table 8

Codes and Frequencies on the Use of the Feedback Process in the Design of Teaching Materials in other Undergraduate Courses

Code	Frequency
Educational Courses	14
Material course	10
Applied courses	10
Lab courses	6
All courses	4
Teaching Principles and Methods	4
Project-based courses	2
Program development course	1
Assessment and evaluation course	1

As Table 8 shows, the feedback process should be used most in educational courses, according to the preservice teachers. One of the preservice teachers was of the opinion that "*The feedback process should be used most in educational courses because the*

most important condition for the profession of teaching is to be an effective teacher." A different preservice teacher (PT-1) indicated that "*Feedback should be in education courses because sometimes we do homework, a grade is given to that homework, and we do not know why we receive this grade and do not know our deficiencies. When we receive feedback, we are able to see our deficiencies and mistakes we consider correct.*" The preservice teachers also indicated that this process could be used in applied and lab courses. A preservice teacher (PT-3) stated his or her opinions as follows: "*Feedback should be included in applied and educational courses because the easiest and most permanent learning is by doing and experiencing. The application of the theoretical knowledge we gain in applied courses particularly affects the learning in a positive way.*" A different preservice teacher (PT-5) indicated that "*It is good to use this method in lab courses because it can minimize our mistakes in the experimental process and helps us to gain experience.*" Another preservice teacher (PT-7) ascertained that this process should be used in all courses and justified this as "*I think it should be used in all courses and even in exams because we take the exam and give our exam paperback, we do not know our mistakes, and are not asked why we made these mistakes. Receiving feedback helps us to learn everything with its correct form.*" The standardized feedback process provides effective learning in applied courses and educational courses, in particular. With this in mind, the preservice teachers recommended the use of this process in many courses.

Discussion, Conclusion and Recommendations

The preservice science teachers generally presented positive opinions on the use of the standardized feedback process in the design of materials. Among these opinions are increasing the quality of learning, correcting incomplete and incorrect knowledge and therefore increasing academic scores, providing permanence, and making progress in the professional sense. According to various studies, feedback is a useful applicationconcerning increasing preservice teachers' participation in the course and offering opportunities to correct their incomplete and incorrect mistakes and, therefore, contributes to the learning process (Cabakcor, Aksan, Ozturk & Cimer, 2011; Cakir, 2010). In a different study, teachers put forward that students feel valued if they consider their students' interpretations and that scoring carried out in the process is important (Higgins, Hartley & Skelton, 2002). A vast majority of preservice teachers expressed positive opinions on the use of the feedback process in the design of teaching materials, according to a study by Koray (2016). Thus, feedback provides permanent and mastery learning in the learning process and is an assistive and supplementary application for preservice teachers.

According to the opinions presented by the preservice teachers in this study, recognizing the mistakes and correcting them, that is to say, being directive and increasing academic scores were among the most important advantages of the standardized feedback process. The most important disadvantage was, on the other hand, to engage in the course material once again. Kogce and Baki (2014) found in their study that teachers formulate feedback as a way and method of providing learning, informing students about their learning, directing them, and the communication

established with the student. In addition, giving feedback to students positively affects students' academic achievement and attitudes regarding the field subject (Baghzou, 2011; Cooper, 2001; Eraz & Oksuz, 2015). The feedback process enables students to recognize their mistakes and correct them and, therefore, serves as a directive process for students.

The preservice teachers put oral feedback in the first place in the list of most effective feedback form because the feedback provider and receiver were in a mutual interaction in the standardized feedback process in this study. The preservice teachers placed written feedback in the second rank since it involves permanent knowledge, and e-feedback in the third rank. Contrary to this result, Kırbaç, Balı, and Macit (2017) found in their study that teachers mostly prefer to receive written feedback. Erdemli, Sumer, and Bilgic (2007) conducted a study on the feedback in the superior-officer relationship in a public institution and determined that written and oral feedback, compared to written feedback merely, is more beneficial. However, the effect of oral or written feedback presented without education and application in the classroom has limited effects (Gilbertson, Witt, Singletary & VanDerHeyden, 2007). Compared to the process of giving written feedback, the process encountered in giving oral feedback is a more challenging process due to the discomforting aspect of criticism and some cultural limitations (Eksi, 2012). During the use of oral feedback, students should be given feedback in an easy and clear verbal expression and corrected without interruption (Olmezer-Ozturk & Ozturk, 2016). The wording of the feedback provider to the student is crucial, particularly in oral feedback, for students to receive feedback again. Thus, prior to selecting any type of feedback (oral, written and e-feedback) in the feedback process, considering students' preference of the feedback type makes the process more efficient and active.

The preservice teachers preferred individual study more compared to group study. They were of the opinion that they can express themselves better in individual studies, which increased effective and permanent learning. Another result of this study was the preservice teachers' opinion that the feedback applications can be used in undergraduate educational, project and material, and lab courses. Studies conducted in the related literature used the feedback process in various fields, such as teaching with technological tools, game-based learning, science education, psychology and mathematics (Finn, Thomas & Rawson, 2018; Fyfe & Brown, 2018; Law & Chen, 2016; Núñez-Peña, Bono & Suárez-Pellicioni, 2015; Patchan & Puranik, 2016; Ruiz-Primo & Li, 2013). The results of this study and the aforementioned studies in the literature revealed that feedback can be used in the process of teaching different objectives and courses in various fields. These recommendations can be made in line with the results of this study.

The standardized feedback process should be used considering students' level and awareness in all educational levels from primary school to university education.concerning increasing the permanence of the learning and other various advantages, it is regarded as an important factor increasing the quality of the education. Of the feedback types, oral feedback can be effectively used in both applied and theoretical courses. Written feedback, on the other hand, should be preferred since

it is permanent and can be given to every student. Attention should be paid to the use of constructive expressions in both oral and written feedback. In written and e-feedback, detailed explanations should be included and clear expressions should be used.

Effective use of the feedback process helps preservice teachers to prepare for the profession in a qualified and effective way. The use of the process in other courses, especially in applied courses, can provide effective learning. Similar studies can be conducted with more preservice teachers or teachers in in-service training. Other formative assessment applications, in addition to feedback, can be tested on different sample groups. These applications can be made individually or in groups. The participants in this study were preservice science teachers. Similar studies can be conducted with different sample groups.

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Öğretim Materyali Hazırlamada Standartlaştırılmış Geribildirim Sürecinin Kullanılması: Fen Bilgisi Öğretmen Adaylarının Görüşleri

Atıf:

Kahraman, E., & Koray, O. (2020). The use of standardized feedback for teaching material preparation: The opinions of preservice science teachers. *Eurasian Journal of Educational Research 90*, 83-102, 10.14689/ejer.2020.90.5

Özet

Problem Durumu: Eğitimde kalitenin artması, başka bir ifadeyle, eğitimdeki iyileşmenin süreklilik kazanması, "değerlendirme" basamağıyla ilişkili olan önemli bir konudur. Değerlendirme, yaygın olarak öğretimin sonunda yapılan ürün değerlendirme ve son yıllarda artan bir eğilimle öğretimin süreç basamağında kullanılan biçimlendirici değerlendirme olarak uygulanmaktadır. Öğrencilerin öğrenme ihtiyaçlarının süreç içerisinde belirlenerek, bu ihtiyaçlara uygun öğretimin yapılması esasına dayalı olan biçimlendirici değerlendirme ile öğrencilerin bilgi, beceri ve problem çözme gibi yeteneklerinin daha fazla geliştirilebileceği ortaya koyulmuştur (Shute, 2007). Biçimlendirici değerlendirme türlerinden olan geribildirim, bireylerde öğrenme ve motivasyonu arttıran güçlü bir mekanizma olarak ele alınmaktadır (Erişen, 1997; Retna & Cavana, 2009). Geribildirim, öğrencilerin ortaya koydukları performanslar hakkında güçlü ve zayıf oldukları yönleri onlara bildiren böylece ileride yapacakları çalışmaların daha verimli olması için katkıda bulunan bir süreçtir (Brown, 2004; Weaver, 2006).

Eğitimin farklı kademelerinde kullanılan ve olumlu etkisi pek çok araştırmayla ortaya konan geribildirim, öğretmen yetiştirmede mesleki gelişim açısından da gereklidir. Öğretmen yetiştirme sürecinde bir çok konu alanı için teori ile birlikte pratik yapma zorunluluğu olduğundan, öğretmen adayları kendi yaptıkları çalışmalarda yüz yüze ve yazılı geribildirimin yanında elektronik geribildirimler alarak mesleki formasyon açısından çok önemli bir kazanım elde etmiş olurlar. Öğretim sürecinde kullanılan araçlar, teknolojinin gelişmesiyle birlikte değişmektedir. Elektronik ortamlarda kullanılan elektronik öğretim araçları (PowerPoint, Word gibi) öğretim sürecinde etkin olarak kullanılmaktadır. Dolayısıyla yazılı materyallere yapılan düzeltmeler kadar elektronik materyallerde de düzeltmeler yapılması gerekli olmuştur. Eğitim sürecinde öğretim materyallerinin çeşitliliği kadar, yapılan uygulamanın doğruluk derecesi ve kalitesi dikkat edilmesi gereken bir husustur. Bu nedenle öğretmen adayları lisans dönemlerinde bir örneğini gördükleri ve etkililiğini kendi çalışmalarında test ettikleri geribildirim sürecini, mesleki yaşantılarında da kullanarak, verdikleri eğitimin kalitesini arttırabilirler. Bu noktada araştırma sonuçlarının öğretmen yetiştirmede kalite standartlarının arttırılması konu alanına katkı sağlayacağı düşünülmektedir. Ayrıca uluslararası literatür incelendiğinde geribildirim sürecinin kullanıldığı öğretmen eğitimi çalışmalarının yetersiz olduğu belirlenmiş ve çalışmanın alan literatürüne katkı sağlayacağı varsayılmaktadır.

Araştırmanın Amacı: Bu çalışmanın amacı, fen bilgisi öğretmen adaylarının öğretim materyali hazırlamada standartlaştırılmış geribildirim sürecinin kullanılması ile ilgili görüşlerini belirlemektir. Bu süreç içerisinde adayların, sözlü, yazılı ve elektronik

geribildirimler hakkındaki görüşlerini ortaya koymak ve bireysel ve grup çalışmalarının etkililiği ile ilgili düşüncelerini belirlemek hedeflenmiştir. Ayrıca öğretmen adaylarından standartlaştırılmış geribildirim sürecinin, lisans öğrenimindeki diğer derslerde uygulanabilirliği hakkında bilgi alınmıştır.

Araştırmanın Yöntemi: Bu çalışmada nitel araştırma desenlerinden durum çalışması deseni kullanılmıştır. Geribildirim sürecinin derinlemesine ve ayrıntılı olarak incelenmesi için durum çalışması yapılmıştır. Bu araştırmada incelenen durum; materyal hazırlamada geribildirim sürecinin kullanılmasıdır. Araştırmada çalışma grubu amaçlı örnekleme yöntemlerinden ölçüt örnekleme olarak belirlenmiştir. Çalışma bir devlet üniversitesinde, fen bilgisi öğretmenliği bölümüne kayıtlı 43 üçüncü sınıf öğretmen adaylarının katılımı ile gerçekleştirilmiştir. Araştırmanın uygulaması 2017-2018 eğitim-öğretim yılının güz döneminde, adayların lisans eğitimde bir dönem boyunca aldıkları 'Öğretim Teknolojileri ve Materyal Tasarımı' dersinde yapılmıştır.

Uygulama sürecinde öğretmen adaylarından her hafta kendi seçtikleri bir fen konusu ile ilgili bireysel olarak alternatif değerlendirme araçlarından çalışma kâğıdı, yapılandırılmış grid, tanılayıcı dallanmış ağaç ve kavram haritası hazırlamaları istenmiştir. Her bir değerlendirme aracı ile ilgili rubrikler süreç içerisinde öğretmen adaylarına verilmiş ve her bir materyal hazırlandıktan sonra standartlaştırılmış olarak yazılı bir şekilde geribildirim sürecine alınmıştır. Daha sonra, öğretmen adayları iki veya üç kişilik gruplar oluşturarak PowerPoint programında sunu ve poster hazırlamaları ve koleksiyon oluşturmaları istenmiştir. Bu süreçte de öğretmen adaylarına rubrikler verilmiş, sözlü ve elektronik olarak geribildirim almaları sağlanmıştır. Öğretmen adaylarına yaptıkları çalışmalar hakkında, materyal hazırlama ilkelerine ve materyalin özelliklerine uygun şekilde, geribildirimler verilmiştir. Öğretmen adaylarından her hafta gelen materyaller puanlandırılmış ve geribildirimler doğrultusunda tekrar düzenlenmesi ve geliştirilmesi için süre tanınmıştır. Geribildirimler sonunda materyaller tekrar değerlendirilmiş ve puanlandırılmıştır.

Bu çalışmada veriler, bütün öğretmen adaylarına uygulanan açık uçlu görüş bildirim formu ve çalışmaya katılan sekiz öğretmen adayı ile yapılan görüşmelerden elde edilmiştir. Açık uçlu görüş bildirim formunun kapsam geçerliliği ve hazırlanan mülakat soruları için, iki alan eğitim uzmanı ve bir ölçme değerlendirme uzmanının fikirleri alınmıştır. Çalışmada veri toplama aracı olarak kullanılan açık uçlu görüş bildirim formu, araştırma soruları paralelinde, öğretmen adaylarının geribildirim sürecine ilişkin görüşlerini alabilmek için araştırmacılar tarafından hazırlanmıştır. Formun kapsam geçerliliği uzman kanısı alınarak sağlanmış olup, uygulama süreci sonrasında öğretmen adaylarının tümüne 40 dakikalık sürede uygulanmıştır. Formdan elde edilen veriler, iki farklı puanlayıcı tarafından değerlendirilmiş olup Miles-Huberman (Miles & Huberman, 1994) güvenirlik değeri 89.25 olarak hesaplanmıştır. Bu çalışmada öğretmen adaylarının açık uçlu görüş bildirim formuna verdikleri yazılı açıklamalar nitel veri analiz tekniklerinden içerik analizi ile incelenmiştir. Öğretmen adaylarıyla yapılan mülakatlar birer saat sürmüştür. Mülakatlardan elde edilen veriler ise betimsel analiz ile elde edilmiştir.

Araştırmanın Bulguları: Araştırmanın bulguları araştırma sorularına göre kategorilere ayrılarak analiz edilmiştir. Araştırmanın kategorileri; geribildirim sürecinin zorunlu tutulmasına ilişkin genel ifadeler, geribildirim sürecinin avantajları ve dezavantajları, geribildirim sürecinde bireysel veya grup çalışması yapılması, sözlü, yazılı ve elektronik geribildirimlerin karşılaştırılması, geribildirim sürecinin diğer derslerde kullanılmasıdır. Çalışmanının bulgularına göre; öğretmen adayları geribildirim sürecinin zorunlu tutulmasının olumlu bir süreç olduğunu ifade etmişlerdir. Öğretmen adayları tarafından geribildirim sürecinin, hataların ve eksikliklerin farkına varıldığı ve düzeltme fırsatının verildiği bir süreç olduğu değerlendirilirken, zaman alan ve yorucu bir süreç olması sürecin dezavantajları arasında belirtilmiştir. Öğretmen adayları, materyal hazırlama sürecinde bireysel olarak alınan geribildirimlerin grup ile alınan geribildirimlerden daha etkili olduğunu belirtmişlerdir. Öğretmen adayları etkililik açısından sözlü geribildirimi ilk sırada, yazılı geribildirimi ikinci sırada ve elektronik geribildirimi son sırada tercih etttiklerini ifade etmişlerdir. Ayrıca geribildirim sürecinin lisans eğitiminde en fazla eğitim derslerinde kullanılması gerektiğini belirtmişlerdir.

Araştırmanın Sonuçları ve Öneriler: Fen bilgisi öğretmen adayları, öğretim materyallerini hazırlarken standartlaştırılmış geribildirim sürecinin kullanılması konusunda genellikle olumlu görüş bildirmişlerdir. Bu görüşler arasında; öğrenmenin kalitesini arttırması, eksik ve hatalı bilgilerin düzeltilmesi dolayısıyla akademik puanın artması, kalıcılığı sağlaması ve mesleki açıdan gelişimin sağlanması sayılabilir. Bu araştırmada öğretmen adaylarının görüşlerine göre standartlaştırılmış geribildirim sürecinin en önemli avantajları arasında; yapılan hataların farkına varılarak düzeltilmesi yani yol gösterici olması ve akademik puanın yükselmesi görülürken, en önemli dezavantajı adayın ders materyaliyle tekrar uğraşmak istememesi olmuştur. Öğretmen adayları standartlaştırılmış geribildirim sürecinde geribildirim veren ve alan kişiler karşılıklı olarak etkileşim içinde olduğu için en etkili geribildirimin sözlü olarak yapılan geribildirim olduğunu belirtmişlerdir. Öğretmen adayları tarafından kalıcı bilgi içermesinden dolayı yazılı geribildirimi ikinci sırada, elektronik geribildirimi ise, üçüncü sırada etkili bulmuşlardır.

Araştırma sonuçlarına göre; standartlaştırılmış geribildirim sürecinin ilkokul düzeyinden üniversite eğitimine kadar tüm kademelerde öğrencinin seviyesi dikkate alınarak kullanılması önerilir. Öğrenmenin kalıcılığını sağlama ve diğer pek çok avantajları yönünden örgün eğitimde kullanılması kaliteyi arttıracak önemli bir faktör olarak değerlendirilmektedir. Geribildirim türlerinden sözlü geribildirim hem uygulamalı derslerde hem de teorik derslerde etkin olarak kullanılabilir. Geribildirim sürecinin etkin bir şekilde kullanılması öğretmen adaylarının mesleğe kaliteli ve etkili bir şekilde hazırlanmasına yardımcı olabilir. Sürecin özellikle uygulamalı dersler olmak üzere diğer derslerde kullanılması etkili öğrenmeyi sağlayabilir. Daha fazla sayıda ve farklı branşlarda öğretmen adayıyla benzer yapıda çalışmalar gerçekleştirilebilir. Hizmet içinde görevli öğretmenler ve öğrenciler ile de nicel ve nitel yapıda çalışmalar gerçekleştirilebilir.

Anahtar Kavramlar: Geribildirim, Öğretmen Adayı, Öğretim Materyali.