Journal of Qualitative Research in Education
Eğitimde Nitel Araştırmalar Dergisi

Opinions of Science Teachers Working in BİLSEMs on the Adequacy of In-Service Training*

Umay Hira Bozkurt[1], Güliz Kaymakcı[2]

To cite this article:

Bozkurt, H. U., & Kaymakcı, G. (2024). Opinions of science teachers working in BİLSEMs on the adequacy of in-service training. Journal of Qualitative Research in Education, 19-37. Doi: 10.14689/enad.39.1882

Abstract: The current study aims to determine the opinions of science teachers working in BİLSEMs on the adequacy of the in-service new skills provided by the Ministry of National Education of Turkiye. The study employed the case study design, one of the quantitative research models. The study participants are 11 science teachers working in BİLSEMs in different provinces in different regions of Turkiye in the 2022-2023 school year. In the determination of the participants, the purposive sampling method was used. As the data collection tool, a semi-structured interview form developed by the researchers in line with the expert opinions was used. Descriptive and content analysis techniques were developed to analyze the data obtained from the interviews. As a result of the research, it was determined that the participants expressed their opinions that in-service training through distance education was insufficient, that the content should be enriched, and that essential information for specially gifted children and different methods for science lessons should be included in the in-service training course. In this regard, various in-service training programs designed by the opinions of teachers can be developed.

Keywords: In-service training, science education, gifted students, Science and Art Centres

About the Article

Received: Oct. 21, 2023

Revised: July 20, 2024

Accepted: July 13, 2024

Article Type:

Research

*This study was presented as an oral presentation at the 10th International Eurasian Educational Research Congress (EJER) held on 8-11 2023.

[1] Corresponding Author: Postgraduate Student, Turkiye, umaybozkurt55@gmail.com

[2] Tokat Gaziosmanpaşa University, Turkiye, gulizkaymakci@gmail.com

Introduction

Gifted individuals contribute to discovering new knowledge and assist in transferring information to future generations (Sternberg, Ambrose & Karami, 2021). It is, therefore, necessary to provide an exceptional education service to gifted individuals in line with their interests and abilities, considering the individual differences, learning levels, or speeds that arise during educational activities (Heacox & Cash, 2020). In Turkiye, BİLSEM (Science and Art Centre under the Republic of Turkiye, Ministry of National Education), established and operated by specialized subject teachers, is responsible for maximizing the existing capacity of gifted individuals. BİLSEM aims to determine fields where gifted individuals can conduct in-depth studies, considering their talents and interests. It plans activities where these gifted individuals can explore their unique skills in these identified areas and then implements these planned activities through individual and group training sessions (BİLSEM Yönergesi, 2019). Individuals can participate in BİLSEM education within the framework of the established program during their non-formal education while continuing their primary, middle school, or high school education (Çoban, 2020). The science field, one of the areas where gifted individuals receive education, is crucial for enabling them to play a vital role in the progress of society as productive individuals, utilizing their capacities and creativity (Yalçınkaya, 2023).

You will attach great importance to science, which is the tool of man's effort to understand and interpret what is happening around him with a deep sense of curiosity, for the world in which you will live (Erdoğan, 2023). In the worldwide education system, where the steps towards knowledge are easy, and the prohibitions on knowledge are increasingly increasing, for effective science education to be given starting from pre-school education, the system must be sensitive to scientific and technological advances and the methods to be used in transferring these advances to individuals must be in a structure (Önal and Sarıbaş, 2019). A science education system with this innovative structure requires well-equipped, original and creative science teachers with sufficient knowledge. When individuals perceive science-related theories and activities as significant for themselves and their environment, they become more enthusiastic about actively participating in the tasks and activities they want to carry out within the context of the lessons (Aguilera & Perales-Palacios, 2020). The characteristics and qualifications of teachers who will provide education to gifted individuals having higher educational aspirations (including Master's and Ph.D. degrees) compared to their peers (Eker & Sarı, 2020). Teachers responsible for the education of gifted individuals are expected to be competent to identify their educational needs and prepare and implement suitable education plans accordingly. They should monitor the impact of their planned and implemented educational programs on gifted individuals and take precautions against potential problems that may arise during the process (Sak et al., 2020).

In Turkiye, teachers providing education to gifted individuals need to demonstrate a continuous effort in possessing qualities such as being up-to-date, open to innovation, and capable of implementing education programs tailored to the needs of students (Akhan & Altaş, 2021) since teachers possessing these qualities positively impact the

permanence of education (Karataş, 2020). This understanding necessitates that teachers should be in a continuous state of development throughout their professional careers (Dilekçi, 2022). In the past, teachers could sustain their professional lives, believing that knowledge was fixed and static, relying on the information they acquired during their undergraduate education. However, in today's rapidly changing world, where understanding is evolving rapidly, it becomes essential for teachers to keep up with the latest developments in their field (Dilekçi, 2021). Therefore, to continue developing their knowledge, skills, and competencies, teachers need to participate in in-service training even after receiving pre-service education and starting their careers (Yüceland, 2022). With in-service training, teachers' knowledge, opinions and experiences deepen throughout their careers and that will help them develop professionally (Kocabaş, 1993). However, when the existing research is examined, it is seen that the in-service training received by teachers who provide education to gifted individuals in BİLSEMs is ineffective both for teachers themselves and indirectly for the students they educate (Ağca, 2019).

Upon reviewing the literature, it becomes evident that some studies have concluded that in-service training needs to be improved. Kızılkaya (2021) aimed to determine the critical issues and practices in the education of gifted students in BİLSEMs within the framework of existing problems and to determine solutions to them and stated that the teachers and administrators working in BİLSEMs find the in-service training they receive insufficient. The teachers were found to need in-service training on technology and communication skills. Avcı and Güven (2021) conducted a study to determine the in-service training needs of teachers about online education. They found that teachers perceive their professional development as necessary and have expectations for in-service training, especially in supporting students' development in their areas of interest, using digital tools, assessment and evaluation techniques, and generating original content. Tupas and Noderama (2020) examined the in-service training programs for teachers in the Philippines. They found that the participants attended in-service trainings every year but perceived the effectiveness and efficiency of these trainings as insufficient. The participants believed that the number and quality of in-service training should be increased. Edinger (2020) examined the professional development program for online teachers in the education of gifted individuals and found that teachers perceived this program as highly beneficial for the education and pedagogy of gifted students, and they felt encouraged to improve through this program continuously. However, they also reported that the program's online format was ineffective.

The importance of teachers, the most critical education component, becomes highly evident. For teachers to adapt their educational programs according to individual differences, maintain the continuity of a dynamic educational process, stay up-to-date with recent developments, and enrich education with various new activities, the in-service training they receive should be continuous, high-quality, and sufficient. When the relevant literature is reviewed, a few studies examine the effectiveness of in-service training programs implemented by the Ministry of National Education (MoNE) under the Republic of Turkiye for science teachers working with gifted students and their impact on gifted students. This study fills the existing literature gap on the professional development

of teachers guiding gifted students in BİLSEMs by providing crucial insights into the process of updating in-service training programs. Furthermore, this study contributes to identifying deficiencies in the in-service training provided to science teachers in BİLSEMs. The current study aims to identify the expectations of science teachers who interact directly with gifted students regarding the in-service training they receive and the impact of in-service training programs on the development of gifted students in science. Thus, the study can contribute to restructuring the existing in-service training programs. Considering the differences between gifted students in the field of science, the fact that there is no specific in-service training course for science teachers who undertake the task of teaching science subjects within the scope of the enriched education program with these children and that there is no study that makes a difference in the literature in this field makes this study unique.

This study aims to determine the adequacy of the in-service training provided in BİLSEMs, as science teachers perceive. In this context, the main research question is as follows: In this context, the main problem statement of the research is: What is the contribution of the in-service training received by science teachers working in BİLSEMs to the professional development of teachers and the education of gifted children?

In line with the primary purpose of the study, answers to the following sub-problems were sought:

1. What are the opinions of science teachers working in BİLSEMs on the applications in the in-service training they receive?

2. What are the opinions of science teachers working in BİLSEMs on the content of the in-service training they receive?

3. What are the opinions of science teachers working in BİLSEMs regarding the training they should receive in their branch to cater to the needs of gifted students?

4. What are the effects of the in-service training they receive on developing gifted students in science?

Method

Research Design

Because of its purpose, this study was conducted with a case study with a qualitative analysis. Qualitative research allows for the in-depth examination and interpretation of individuals' thoughts and perceptions about their worlds and lives (Merriam & Grenier, 2019). This design's main idea is to understand the research group's individual meaning structures and intentions by looking at the relevant phenomenon from the perspectives of individuals (Mayring, 2011).

Study Group

The study group consists of 11 science teachers working in BİLSEMs in different provinces in different geographical regions of Turkiye (Black Sea, Eastern Anatolia, and Central Anatolia) in the spring term of the 2022-2023 school year. Since the answers from the participants to the interview questions were close to each other and uniform, 11 participants were deemed sufficient for this study. During the data collection process, the inclusion of more participants in the study was stopped as similar answers to the interview questions began to appear. The criterion sampling method, one of the purposive sampling methods, was used for the study group to consist of science teachers working in BİLSEMs and already receiving in-service training. While creating the sample group, it was aimed to ensure sample diversity by selecting BİLSEMs located in different geographical regions. In accordance with the purpose of the study, science teachers who worked in BİLSEMs and had previously received in-service training were preferred as samples. Purposive sampling is used in qualitative research to ensure that individuals with specific characteristics are included in the study (Berg & Lune, 2019). Criterion sampling is a method in which individuals with certain features are selected as observation units, and people with these characteristics are included in the sample (Büyüköztürk et al., 2014). The personal characteristics of the participants involved in the study on a volunteer basis are given in Table 1.

Table 1. *Demographic Characteristics of the Participants*

Variable	Characteristic	N
Gender	Female	7
	Male	4
Education Level	Undergraduate	2
	Graduate	9
Professional Experience	Less than five years	1
	6-10 years	3
	11-15 years	3
	16-20 years	0
	21 years and more	4

Data Collection Tool

An interview form consisting of open-ended questions developed by the researchers to determine the opinions of science teachers working in BİLSEMs on the adequacy of in-service training they receive was used as the data collection tool. The initial form of the data collection tool was created by obtaining expert opinions from four faculty members specialized in teacher training. Getting expert opinions is a process involving examining the research by individuals who are experts in qualitative research methods and also knowledgeable about the subject of the study, aiming to enhance the study's credibility (Creswell, 2003). The data collection tool was then administered to two science teachers working in BİLSEMs for a pilot study, and the final version of the data collection tool was done. When preparing the data collection tool, conducting pilot interviews to test the

items and determine which ones to use in the study is important for ensuring the validity and reliability of the study (Polat, 2022).

The first section of the data collection tool aims to gather demographic information, including the teacher's professional experience, educational background, and participation in projects or competitions with their students. The second section includes open-ended questions to allow the teachers to evaluate the implementation and content of the in-service training they have received, identify the training they should receive in their branch, and assess the impact of the in-service training on gifted students.

Data Collection

The data of the study were collected using the semi-structured interview technique. Participants were contacted to schedule interviews, and appointments were made. Before the interviews, the participants were informed that participation would be voluntary, that their personal information would be kept confidential, that their interviews would be audio-recorded during the interviews, and that the data obtained would only be used for scientific purposes. The interviews lasted approximately eight to ten minutes, and the data obtained from the interviews were recorded using an audio recording device and transferred to a digital platform for storage. The participants' demographic information was kept confidential by giving them code names such as P1, P2, … . A separate form was prepared for each participant for the analysis process. After the interviews were completed, the responses given by the participants were transcribed, and the analysis phase was initiated.

Data Analysis

The audio recordings obtained from the participants were transcribed. The answers to the interview questions were analyzed by creating themes and codes. Descriptive analysis and content analysis techniques were used to analyze the obtained data. Descriptive analysis is a type of qualitative data analysis in which the data obtained with different data collection techniques are summarized and interpreted according to predetermined themes, and the researcher uses direct quotations to reflect the thoughts of the individuals interviewed (Yıldırım & Şimşek, 2003). Content analysis is one of the most used methods among the different types of qualitative data analysis. In content analysis, text elements are classified using inductive and deductive methods (Özbay, 2021).

Validity and Reliability

In order to increase the credibility of the results obtained in qualitative studies, it is necessary to test the reliability and validity. During the data collection process, allowing participants to express themselves freely and to answer questions without any intervention and preparing a detailed report on how the data analysis process is conducted positively affects the validity (Creswell & Poth, 2016).

The data obtained from the interviews were analyzed using the content analysis technique, resulting in eight themes and 18 codes. Then, two experts were asked to match the obtained themes and principles to test the reliability. After this match, the agreement and disagreement numbers were used to calculate the reliability of the study using Miles and Huberman's (1994) formula "Reliability = (agreement/agreement + disagreement) x 100)," and thus, the reliability was found to be 94%. In qualitative research, an agreement of 90% or higher between expert evaluations and the researcher indicates that reliability has been achieved (Saban, 2009). Both experts consulted concluded that both the themes and codes are consistent with each other. This result shows that the study is reliable in terms of the consistency of the findings.

Ethics

In the current study's stages, great care was taken not to violate ethical principles and moral rules were adhered to. The ethics committee approval for the study was obtained due to the eighth session with decision number 01-54 dated May 16, 2023,from the Gaziosmanpaşa University Social and Human Sciences Research Ethics Committee.

Findings

This section presents the results of the data analysis obtained from the interviews with 11 science teachers working in BİLSEMs. According to the results of the content analysis conducted on the interview data, the data were collected under eight themes: "Face-to-Face Training," "Distance Training," "Subjects Covered in the Training," "Its Advantages," "Subject Content," "Personal Development," "For the Teacher" and "For the Student."

Table 2. *All the Themes and Codes*

Themes	Codes	Frequency
Face-to-Face Education	Applied training	2
	Lack of quantity	3
	Experience sharing	2
Distance Training	Useful training	2
	Inadequate training	6
Subjects Covered in the Training	Rich content	5
	Being inadequate	3
Its Advantages	Having contact with experts	2
	Cost	2
Subject Content	Technological information	3
	Characteristics of gifted students	3
	Enriched activities	2
Personal Development	Sense of adequacy	3
	Professional need	10
For the Teacher	Increasing self-confidence in science	2

	Variety of activities	2
For the Student	Finding useful	6
	Finding effective	3

In the data collected regarding in-service training applications, two themes were identified: "Face-to-Face Training" and " Distance Training." Under the theme of "Face-to-Face Training," a total of three codes were created: "Applied training," "Lack of quantity," and Experience sharing." Under the theme of "Distance Education," two codes were determined: "Useful training" and "Inadequate training."

In the data collected regarding the content of the in-service training, two themes were identified: "Subjects Covered in the Training" and "Its Advantages." In the theme of "Subjects Covered in the Training," a total of two codes were identified: "Rich content" and "Sense of inadequacy." Under the theme of "Its Advantages," two codes were determined: "Having contact with experts" and "Cost."

In the data collected regarding the branch of the participants, two themes were identified: "Subject Content" and "Personal Development." Under the theme of "Subject Content," a total of three codes were identified: "Technological knowledge," "Characteristics of gifted students," and "Enriched activities." Under the theme of "Personal Development," two codes were identified: "Sense of adequacy" and "Professional need".

Two themes were identified in the data collected regarding the effect of in-service training on the development of gifted students in science: "For the Teacher" and "For the Student." Under the theme of "For the Teacher," two codes were determined: "Increasing self-confidence in science" and "Variety of activities." Under the article "For the Student," two codes were identified: "Finding useful" and "Finding effective."

In the current study, firstly, the teachers' opinions regarding the in-service training programs they received were examined. The findings regarding the teachers' opinions on the applications in the training program are presented in Table 3.

Table 3. *Participants' Opinions on the In-service Training Applications*

Theme	Code	Frequency
Face-to-Face Training	Applied training	2
	Lack of quantity	3
	Experience sharing	2
Distance Training	Useful training	2
	Inadequate training	6

Table 3 shows that the participants' opinions on the applications in the in-service training program are categorized under the themes of "Face-to-Face Training" and "Distance Training." The relevant table sheds light on the participants' opinions on the applications

in the in-service training program they received, the observed deficiencies, and the areas where they need improvement.

The participants' opinions predominantly concentrate on the code of "Inadequate training" within the theme of "Distance Training," with six participants stating opinions. Some of the participants' related ideas are presented below:

"...I do not personally believe that the current in-service training is very beneficial or of high quality because something that is done at a distance does not seem very useful to me." (P1)

Under the "Face-to-Face Training" theme, the "Lack of quantity" code comes to the fore, with three participants stating opinions about it. Participants' opinions on this code are presented below:

"I am trying to attend the in-service training sessions for BİLSEM, but they are limited. There are restricted quotas, like 20 participants in one group or 30 participants in another group. How will they accommodate 60 people from all over Turkiye, or how they will select participants, remains uncertain." (P6)

The teachers' opinions on the content of the in-service training they received were examined, and the results are presented in Table 4.

Table 4. *Participants' Opinions on the Content of the In-service Training*

Theme	Code	Frequency
Subjects Covered in the Training	Rich content	5
	Being inadequate	3
Its Advantages	Having contact with experts	2
	Cost	2

Table 4 shows that the participants' opinions on the content of in-service training are grouped under the themes of "Subjects Covered in the Training" and "Its Advantages." The teachers' opinions gathered under the theme of "Subjects Covered in the Training" are predominantly concentrated on the "Rich content" code. Participants' opinions on this code are presented below:

"I do not believe there is any problem with their content. I think they have rich and valuable content." (P2)

The participants' opinions are also concentrated on the code of "Being inadequate" under the theme of "Subjects Covered in the Training," with three participants expressing opinions about it (Table 4). Participants' opinions on this code are presented below:

"...They come in a standardized format, not tailored specifically to the needs of individuals within the institution, and those contents do not always fit every organization. As I mentioned earlier, I believe there is a need to enrich the content of the in-service training." (P8)

Two participants expressed their opinions under the code of "Having contact with experts" in the "Its Advantages" theme. Participants' opinions on this code are presented below:

"…There are times when I work closely with an instructor, and they show, do, and implement things right before me. Being able to witness the application firsthand and having the opportunity for immediate intervention was much better, in my opinion." (P1)

The teachers' opinions on the training they need to receive in their own branch regarding gifted students were examined and the results are presented in Table 5.

Table 5. *Participants' Opinions on the In-service Training for Their Branch*

Theme	Code	Frequency
Subject content	Technological information	3
	Characteristics of gifted students	3
	Enriched activities	2
Personal development	Sense of adequacy	3
	Professional need	10

Table 5 provides the participants' opinions on the in-service training regarding their branch, which are grouped as "Subject Content" and "Personal Development." Under the "Personal Development" theme, the teachers' opinions predominantly concentrated on the "Professional need" code, with ten participants expressing opinions about it. Participants' views on this code are presented below:

"I believe I need more education, and I continue to take it." (P4)

Three participants expressed their opinions on the "Technological information" code under the "Subject Content" theme. Participants' opinions on this code are presented below:

"Since 2015, we have been following and knowing about robotics, coding, and technology. We were interested in computers. However, I felt like I was in a narrow framework because there were students with very different characteristics. Therefore, I need more training." (P4)

Three participants agreed on the "Characteristics of gifted students" code under the "Subject Content." Participants' opinions on this code are presented below:

"Training programs that can highlight the characteristics of these children should be provided in BİLSEMs or for teachers who will work with gifted students." (P3)

Three participants expressed their opinions on the code of "Sense of adequacy" under the theme of "Personal Development. Participants' opinions on this code are presented below:

"In my opinion, a teacher in my branch needs to be highly competent and well-equipped." (P1)

The teachers' opinions on the effect of the in-service training on the development of gifted students in science were investigated, and the results are presented in Table 6.

Table 6. *Participants' Opinions on the Effect of the In-service Training on the Development of Gifted Students*

Theme	Code	Frequency
For the Teacher	Increasing self-confidence in science	2
	Variety of activities	2
For the Student	Finding useful	6
	Finding effective	3

Table 6 shows the participants' opinions on the effect of the in-service training on the development of gifted students in science, which are grouped under the themes of "For the Teacher" and "For the Student." In the article "For the Student," participants' opinions are predominantly concentrated on the code of "Finding useful," with six participants expressing opinions about it. Participants' views on this code are presented below:

"Certainly, the in-service training sessions we receive are very beneficial for students' development." (P10)

Three participants expressed their opinions on the code of "Finding useful" under the "For the Student" theme. Participants' opinions on this code are presented below:

"There are very beneficial in-service training courses that will positively impact students' development." (P1)

Two participants expressed their opinions on the "Variety of activities" code under the theme of "For the Teacher." Participants' opinions on this code are presented below:

"…" What can you create with which material? What alternative material can you suggest to children instead of this one? How do you start the activity, and how do you guide them?" I definitely think that findings answer to such questions is very useful." (P6)

Results and Discussion

The results derived from the findings of the study are given below:

In the current study, the participants' opinions on the applications in the in-service training they received were examined. The participants generally evaluated face-to-face and distance training within the context of the applications in the in-service training. The participants mostly find that the in-service training they receive in distance training needs to be improved and more efficient. In addition, some participants stated that the face-to-face training programs need to be improved in quantity, and they expect face-to-face training. Similarly, Ay (2022) demonstrated that the in-service training programs received by the teachers in distance training need to be revised because they cannot interact with the trainer. The program has technical problems and requires increased in-service training with enriched content. Yıldırım (2020), on the other hand, concluded that teachers expect face-to-face training and that they think a program that can provide

the opportunity to practice should be included in the in-service training provided through distance education. Contrary to these research findings, Wasserman and Migdal (2019) concluded that in-service training received by teachers through distance education met the teachers' professional training needs, even though they were not physically together with the instructor in the same environment.

Secondly, the participants' opinions on the content of the in-service training they received were examined in the current study. It was shown that the participants evaluated the range of the in-service training and the advantages of the movement in general. The participants stated that their in-service training is rich in content, instructional, and adequate. At the same time, some participants noted that the content could be more suitable for teachers who teach incompetent and gifted individuals. Although some teachers have positive and some negative opinions about the range of the in-service training, teachers have different expectations, which the different learning abilities of teachers could address. Tekin (2020) found that some teachers think distance training content is effective due to its informative nature and positive impact on their professional development, and the content is easily understandable. On the other hand, some teachers criticized the content for lacking interaction opportunities and being limited to theoretical aspects only. Özer, Suna, and Sunar (2021) demonstrated that teachers found the range of in-service training adequate and expressed satisfaction with receiving in-service training that contributed to their current and professional knowledge.

Thirdly, the participants' opinions about the in-service training they receive about their branches were examined. When the participants' answers were concerned, they evaluated the subject's content and general personal development about the training they should receive for their branch. The participants' responses show that they consider in-service training in their department necessary. They must be well-equipped to appeal to students' interests, particularly in technological areas such as robotics, coding, and Arduino. They also expect to receive in-service training to acquire knowledge about the characteristics of gifted students to provide more accurate and specialized education. In line with the teacher's expectations, Eker (2020) found that teachers lack sufficient knowledge about gifted individuals and their education, and their knowledge is mainly theoretical. They feel inadequate in implementing educational models and expect in-service training that covers functional, practical, and applied content that can be used in the education programs for gifted students. According to the study conducted by Ağca et al. (2022), teachers working in BİLSEMs expressed a need for in-service training regarding the characteristics of gifted students and strategies, methods, and techniques to be used in their education. They emphasized the importance of in-service training being delivered by experts in the field and the necessity of practical and interactive in-service training in addition to theoretical education.

In the study, the participants' opinions on the effect of the in-service training they received on the development of gifted students in science were examined. The participants generally made their evaluations for the teacher and student. It is understood that the participants feel more competent because of the in-service training they receive, design

a greater variety of activities that appeal to students' interests, and find the in-service training beneficial for students' development. They believe in-service training should be continued with increased quantity and quality. A similar conclusion has been reached by Bayram and Şentürk (2022): in-service training programs provide opportunities for teachers' professional development. Additionally, the in-service training received enables teachers to monitor students' development better, recognize gifted students, and approach the education process with more accurate methods. They found that in-service training benefits students' development. Pharis et al. (2019) aimed to examine the changes in teachers' and principals' perspectives throughout the year due to the Teacher Professional Growth and Effectiveness System program implemented in rural Kentucky. They found that the program provided opportunities for collaboration within the institution, and teachers found the professional development training effective. They also identified a greater need for professional development to improve student performance. Eroğlu and Özbek (2020) found that in-service training contributes to teachers' understanding of students, maintaining the relevance of their professional knowledge and skills, achieving professional success, and enjoying their profession. However, they also concluded that they find the in-service training programs provided by the Ministry of National Education inadequate. Finally, some limitations of the study should be mentioned. The findings obtained in the study are limited to the participants working in BİLSEMs in the second term of the 2022-2023 school year. Another limitation is that the investigation is limited to the in-service training received by the participants.

Suggestions

1. In-service training can be planned by using appropriate methods and techniques (context-based teaching, inquiry-based teaching, argumentation, drama...) on subjects that will meet the needs of teachers and attract their attention. 2. Similar studies can be conducted using different methods to determine the educational needs of teachers working with gifted students.

2. A study that allows for a more comprehensive and continuous evaluation, with the contribution of different branch teachers and academicians, can be planned to determine the educational needs of teachers working with specially gifted students.

3. One result of this research is that teachers have a negative attitude towards online in-service education. In this respect, considering that teachers' in-service training is shifting towards online all over the world, it is recommended to carry out in-depth studies focusing on why teachers' insistent demands for face-to-face education continue.

References

Ağca, E. (2019). *Fen bilimleri öğretmen ve öğretmen adaylarının üstün zekâlı ve yetenekli öğrencilerin özellikleri ve eğitim ihtiyaçlarına ilişkin görüşleri* (Yayımlanmamış Yüksek Lisans Tezi). Erciyes Üniversitesi, Kayseri.

Ağca, E., Büyük, U. & Tanık-Önal, N. (2022). Fen bilimleri öğretmenlerinin üstün zekâlı ve yetenekli öğrencilerle ilgili eğitim durumları. *Eğitimde Yeni Yaklaşımlar Dergisi*, *5*(1), 1-21. Erişim adresi: https://dergipark.org.tr/en/pub/eyyad/issue/72044/1098772

Aguilera, D., Perales-Palacios, F. J. (2020). What effects do didactic inventions have on students' attitudes toward science? A meta-analysis. *Research in Science Education, 50*(2), 573-597. Erişim adresi: https://doi.org/10.1007/s11165-018-9702-2

Akhan, O. & Altaş, S. (2021). Bilsem tarih öğretmenlerinin bilsem çalışma koşulları hakkındaki görüşleri. *Manisa Celal Bayar Üniversitesi Eğitim Fakültesi Dergisi, (9)*1, 133-147. DOI: 10.52826/mcbuefd.924337

Avcı, B. & Güven, M. (2021). Öğretmenlerin çevrim içi eğitime ilişkin hizmet içi eğitim gereksinimlerinin belirlenmesi. *Dokuz Eylül Üniversitesi Buca Eğitim Fakültesi Dergisi*, (51), 345-367. DOI: 10.53444/deubefd.882866

Ay, A. (2022). *Sınıf öğretmenlerinin uzaktan hizmet içi eğitimi* (Yüksek Lisans Tezi, Pamukkale Üniversitesi, Denizli). Erişim adresi: https://hdl.handle.net/11499/39064

Bayram, S. & Şentürk, Ş. (2022). Okul öncesi öğretmenlerine yönelik özel yetenekli çocuklarla ilgili hizmet içi eğitim programı etkililiği. *Trakya Eğitim Dergisi*, *12*(1), 396-416. DOI: 10.24315/tred.908272

Berg, B. L. & Lune, H. (2019). *Sosyal bilimlerde nitel araştırma yöntemleri*. Eğitim Yayınevi.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö.E., Karadeniz, Ş. & Demirel, F. (2014). *Bilimsel araştırma yöntemleri* (17. Baskı). Ankara: Pegem Yayınları.

Çoban, A. (Ed.). (2020). *Üstün zekalı ve yetenekli öğrencilere açılan kapı: Bilim ve sanat merkezleri. Eğitim araştırmaları.* Ankara: İksad Yayınevi.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches.* California: Sage Publications.

Creswell, J. W. & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches.* Los Angeles, CA: Sage Publications.

Dilekçi, A. (2021). *21. yüzyıl becerilerine göre tasarlanan öğretim etkinliklerinin eleştirel ve yaratıcı düşünme becerilerini geliştirmeye etkisi* (Yayımlanmamış Yüksek Lisans Tezi). Bolu Abant İzzet Baysal Üniversitesi, Bolu.

Dilekçi, A. (2022). Türkçe öğretmenlerinin hizmet içi eğitim ihtiyaçları. *Erzincan Üniversitesi Eğitim Fakültesi Dergisi, 24*(2), 186-197. DOI: 10.17556/erziefd.981621

Edinger, M. J. (2020). What is in your gifted education online teacher professional development? Incorporating theory-and practice-based elements of instructional learning design. *Gifted Child Quarterly*, *64*(4), 304-318. https://doi.org/10.1177/00169862209380

Eker, A. & Sarı, H. (2020). Özel yeteneklilerin eğitimi alanı öğretmen eğitim programının öğretmen görüşlerine göre incelenmesi. *Turkish Special Education Journal International, 2*(1), 2-35. Erişim adresi: https://dergipark.org.tr/en/pub/tseji/issue/53862/768728

Eker, A. (2020). *Özel yetenekli öğrencilerin öğretmenlerinin mesleki yeterliklerini artırmaya yönelik geliştirilen öğretmen eğitimi programının etkililiği* (Doktora Tezi, Necmettin Erbakan Üniversitesi, Konya). Erişim adresi: https://acikerisim.erbakan.edu.tr/xmlui/bitstream/handle/20.500.12452/5153/616539.pdf?sequence=1&isAllowed=y

Eroğlu, M. & Özbek, R. (2020). Etkili öğretmenlerin mesleki gelişimi. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, *1*(37), 73-92. Erişim adresi: https://dergipark.org.tr/en/pub/zgefd/issue/54277/735479

Erdoğan, F. (Ed.). (2023). *Matematik ve fen bilimleri eğitiminde yeni yaklaşımlar*. İstanbul: Efe Akademi Yayınları.

Heacox, D. & Cash, R. M. (2020). *Differentiation for gifted learners: Going beyond the basics.* Minneapolis: Free Spirit Publishing.

Karataş, K. (2020) Öğretmenlik mesleğine kuramsal bir bakış. *Elektronik Eğitim Bilimleri Dergisi, 9*(17), 39-56. Erişim adresi: https://dergipark.org.tr/en/pub/ejedus/issue/55652/704716

Kızılkaya, M. M. (2021). *Özel yetenekli çocukların eğitiminde kritik konular ve uygulamalar: Bilsem örneği* (Yüksek Lisans Tezi, İstanbul Sabahattin Zaim Üniversitesi, İstanbul). Erişim adresi: https://tez.yok.gov.tr/UlusalTezMerkezi/tezDetay.jsp?id=nGefJqt91XEirxxhWVq3TQ&no=u0C5yPJtLgZ14-5DidrGAw

Kocabaş, İ. (1993). *Teknik öğretmenlerin hizmet içi eğitim etkinlikleri ve yönetime ilişkin görüşlerinin belirlenmesi* (Yüksek Lisans Tezi, Fırat Üniversitesi, Elazığ). Erişim adresi: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Mayring, P. (2011): *Nitel sosyal araştırmaya giriş: Nitel düşünce için bir rehber.* (Çev. Gümüş, A ve Durgun, M. S). Bilgesu Yayınları (Original work published 2000).

Merriam, S. B. & Grenier, R. S. (2019). *Qualitative research in practice: Examples for discussion and analysis.* San Francisco, CA: Jossey-Bass Publishers.

Miles, M, B. & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed). Thousand Oaks, CA: Sage.

Milli Eğitim Bakanlığı, (2019). *Bilim ve sanat merkezleri yönergesi.* Ankara: Milli Eğitim Bakanlığı. Erişim adresi: http://mevzuat.meb.gov.tr/dosyalar/2039.pdf

Önal, T. K., ve Sarıbaş, D. (2019). Okul öncesi dönemde fen eğitimi ve önemi. *Uluslararası Karamanoğlu Mehmetbey Eğitim Araştırmaları Dergisi, 1*(2), 109-118. https://dergipark.org.tr/tr/pub/ukmead/issue/51468/650391

Özbay, Ö. (2021). *Nitel Araştırma Sözlüğü.* Talebe Ders Kitapları Yayınları Serisi, Türk Eğitim Yayınları (E-kitap).

Özer, M., Suna, E. & Sunar, L. (2021). Türkiye'de mesleki ve teknik eğitimde hizmet içi öğretmen eğitimine yönelik öğretmen görüşlerinin değerlendirilmesi. *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*, *54*(54), 233-254. https://doi.org/10.15285/maruaebd.882444

Republic Act No. 10912. (2016). An Act Mandating and Strengthening the Continuing Professional Development Program for All Regulated Professions, Creating The Continuing Professional Development Council, and Appropriating Funds Therefor, And for Other Related Purposes. Manila, Philippines: Professional Regulation Commission, 1-6.

Pharis, T. J., Wu, E., Sullivan, S. & Moore, L. (2019). Improving teacher quality: Professional development implications from teacher professional growth and effectiveness system implementation in rural Kentucky high schools. *Educational Research Quarterly, 42*(3), 29-48.

Polat, A. (2022). Nitel araştırmalarda yarı-yapılandırılmış görüşme soruları: Soru form ve türleri, nitelikler ve sıralama. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, *22*(Özel Sayı 2), 161-182. https://doi.org/10.18037/ausbd.1227335

Saban, A. (2009). Öğretmen adaylarının öğrenci kavramına ilişkin sahip oldukları zihinsel imgeler. *Türk Eğitim Bilimleri Dergisi, 7*(2), 281-326. https://dergipark.org.tr/en/pub/tebd/issue/26107/275061

Sak, U. (Ed.). (2020). *Üstün yeteneklilerin eğitiminde gruplama stratejileri. Üstün yeteneklilerin eğitiminde modeller ve stratejiler.* Ankara: Pegem Akademi Yayıncılık.

Sternberg, R. J., Ambrose, D. & Karami, S. (Ed.). (2021). From I to we: The three C's conception of gifted education. In *Transformational giftedness.* Palgrave-Macmillan.

Tekin, O. (2020). Uzaktan eğitim kullanılan hizmet içi eğitim programlarına yönelik öğretmen görüşlerinin incelenmesi. *Eğitimde Kuram ve Uygulama Journal of Theory and Practice in Education, 16*(1), 20-35. https://doi.org/10.17244/eku.643224

Tupas, F. & Noderama, R. (2020). Looking into ın-service training for teachers in the Philippines: Are they gearing towards education 4.0?. *Universal Journal of Educational Research, 8*(10), 4651-4660. DOI: 10.13189/ujer.2020.081034

Wasserman, E. & Migdal, R. (2019). Professional development: Teachers' attitudes in online and traditional training courses. *Online Learning*, *23*(1), 132-143. https://doi.org/10.24059/olj.v23i1.1299

Yalçınkaya, I. (2023). Türkiye'de özel yeteneklilerin fen bilimleri eğitimi ile ilgili lisansüstü çalışmaların incelenmesi. *Dokuz Eylül Üniversitesi Buca Eğitim Fakültesi Dergisi*, (56), 326-345. DOI: 10.53444/deubefd.1111554

Yıldırım, A. & Şimşek, H. (2003). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin Yayınları.

Yıldırım, Y. (2020). Fatih projesi kapsamında düzenlenen uzaktan hizmet içi eğitimlere yönelik öğretmen görüşlerinin incelenmesi. *Açıköğretim Uygulamaları ve Araştırmaları Dergisi, 6*(2), 76-90. https://hdl.handle.net/11421/24991

Yüceland, E. (2022). *Türkiye'de müzik öğretmenlerine verilen hizmet içi eğitimin çeşitli değişkenler açısından analizi ve ihtiyaçlarının belirlenmesi* (Yüksek Lisans Tezi, İnönü Üniversitesi, Malatya). Erişim adresi: https://tez.yok.gov.tr/UlusalTezMerkezi/tezDetay.jsp?id=c90NjV4j4u4ofvJJWI0pEA&no=VfPD91E0EXig_Nx2klVRjw

Genişletilmiş Türkçe Özet

Problem Durumu: Tarih bize göstermiştir ki özel yetenekli bireyler bilimsel ve sanatsal çalışmalara öncülük ederek var oldukları toplumların gelişmesine katkı sağlamışlardır. Özel yetenekli bireylerin var olan performanslarını en üst düzeyde kullanabilmelerini sağlamak ülkelerin gelişmişlik düzeyleriyle paralellik göstermektedir. Özel yetenekli bireylerin kapasitelerinin farkında olan ve bunun açığa çıkması için eğitim politikalarını özel yetenekli bireylere göre uyarlayan ülkeler, diğer ülkelere nazaran söz sahibi olan ve ekonomik kalkınma gücüne sahip ülkeler haline gelmektedir. Aynı zamanda bilgi çağı olan günümüz dünyasında özel yetenekli bireylerin fen ve teknolojiye eğilimleri gün geçtikçe artmaktadır. Fen ve teknoloji; özel yetenekli bireylerin yaşadıkları evreni anlamaları, bilimsel bilgi süreçlerini takip edebilmeleri, sürekli gelişmekte olan teknolojiye hakim olmaları adına önemli bir alandır. Bu bilgiler ve yapılan çalışmalar doğrultusunda milli ve evrensel geleceğin şekillenmesinde önemli role sahip olan özel yetenekli bireylerin var olan performanslarını en üst düzeyde kullanabilmeleri adına alacakları eğitim büyük önem arz etmektedir. Bu noktada eğitim programlarının önemli bir parçası olan öğretmenlerin eğitimdeki önemi yadsınamaz. Öğretmenlerin uyguladıkları eğitim programlarını; bireysel farklılıklara göre uyarlayabilmesi, dinamik bir eğitim sürecinin devamlılığını koruyabilmesi, güncel gelişmeleri takipte kalabilmesi, farklı ve yeni etkinlikler ile eğitimi zenginleştirmesi adına alacakları hizmet içi eğitimin süreklilik arz etmesi, kaliteli ve yeterli olması gerektiği düşünülmektedir. Literatür incelendiğinde; Milli Eğitim Bakanlığı'nın uyguladığı hizmet içi eğitim programlarının, özel yetenekli öğrencilerle çalışmalar yapan fen bilgisi öğretmenleri üzerindeki etkililiği ve özel yetenekli öğrencilerine olan etkisine yönelik yapılmış çalışmalarda sınırlılık söz konusudur. BİLSEM okullarında proje üretme ve bunları çeşitli yarışma, sunum ve etkinliklerle topluma sunma gibi konularda özel yetenekli öğrencilere rehberlik edecek olan öğretmenlerin mesleki gelişimlerine katkı sağlayacağı düşünülen hizmet içi eğitimlerin güncellenmesi sürecinde yol gösterici olabileceği düşünülen bu çalışma, literatürde var olan boşluğu da doldurması açısından önemlidir. Aynı zamanda BİLSEM'lerde görev alan fen bilgisi öğretmenlerine verilen hizmet içi eğitimin eksikliklerinin çok boyutlu olarak tespit edilmesine katkı sağlaması bakımından önemlidir denilebilir.

Araştırmanın Amacı: Bu çalışmanın amacı BİLSEM'lerde verilen hizmet içi eğitimin yeterliliğinin farklı yönlerden fen bilgisi öğretmenleri açısından belirlenmesidir.

Araştırmanın Yöntemi: Amacı doğrultusunda nitel araştırma türlerinden durum çalışması olarak tasarlanan bu çalışmanın çalışma grubunu, 2022-2023 eğitim öğretim yılı ikinci döneminde Türkiye'nin farklı coğrafi bölgesinde (Karadeniz, Doğu Anadolu ve İç Anadolu) yer alan farklı illerdeki BİLSEM'lerde çalışmakta olan 11 fen bilgisi öğretmeni oluşturmaktadır. Çalışmada verileri toplamak amacıyla araştırmacılar tarafından geliştirilen ve açık uçlu sorulardan oluşan "Görüşme Formu'' kullanılmıştır. Görüşmeden elde edilen veriler, betimsel analiz ve içerik analizi teknikleri ile analiz edilerek tema ve kodlar oluşturulmuştur. Daha sonrasında iki uzmandan güvenirliği test etmek amacıyla elde edilen temalar ve kodlar arasında eşleştirme yapmaları istenmiştir. Karşılaştırma

sonucunda görüş birliği ve görüş ayrılığı sayıları Miles ve Hubermann'ın (1994) "Güvenirlik = (görüş birliği / görüş birliği + görüş ayrılığı) x 100)" formülü kullanılarak araştırmanın güvenirliği %94 olarak tespit edilmiştir.

Araştırmanın Bulguları: Bu çalışmada ilk olarak katılımcıların aldıkları hizmet içi eğitimlerin uygulamalarına dair görüşleri incelenmiştir. Katılımcıların genel olarak "Yüz yüze eğitim" ve "Uzaktan eğitim" hakkında değerlendirme yaptıkları görülmektedir. Çoğunlukla katılımcıların uzaktan eğitim yoluyla aldıkları hizmet içi eğitimi yetersiz buldukları saptanmıştır. Çalışmada ikinci olarak katılımcıların aldıkları hizmet içi eğitimlerin içeriklerine yönelik görüşleri incelenmiştir. Genel olarak "Eğitim verilen konular" ve "Avantajları" hakkında değerlendirmeler yaptıkları belirlenmiştir. Katılımcıların çoğunun aldıkları hizmet içi eğitimlerin içeriğini zengin ve yeterli bulduğu; bir kısmının ise içeriği yetersiz bulduğu görülmüştür. Üçüncü olarak katılımcıların fen branşına yönelik hizmet içi eğitim görüşleri incelendiğinde ise genel olarak "Konu içeriği" ve "Bireysel gelişim" hakkında değerlendirmeler yaptıkları ve aldıkları hizmet içi eğitimi mesleki bir ihtiyaç olarak gördükleri belirlenmiştir. Katılımcıların aldıkları hizmet içi eğitimlerin özel yetenekli öğrencilerin fen alanında gelişimine dair görüşleri incelendiğinde ise genel olarak "Öğretmen açısından" ve "Öğrenci açısından" değerlendirme yaptıkları ve aldıkları hizmet içi eğitimlerin dolaylı olarak da olsa öğrencilere faydalı olduğu düşüncesinde oldukları saptanmıştır.

Tartışma ve Sonuç: Öğretmenlere verilen hizmet içi eğitim programlarının eksikliklerinin tespit edilmesi ve öğretmenlerin hizmet içi eğitimlerden beklentilerinin belirlenmesi mevcut hizmet içi eğitim programlarının yapılandırılması sürecine katkı sağlayacaktır. Bu bağlamda öğretmenlerin hizmet içi eğitimlerde yüz yüze eğitim beklentisi içerisinde oldukları, hizmet içi eğitimlerin içerikleri konusunda farklı beklentilere sahip oldukları, hizmet içi eğitimi bir gereklilik olarak gördükleri, kendi branşları için robotik, kodlama, arduino gibi teknolojik alanlarda hizmet içi eğitim alma ihtiyacı hissettikleri, özel yetenekli öğrencilerin özellikleri hakkında bilgi sahibi olmaya yönelik hizmet içi eğitim almak istedikleri, hizmet içi eğitimlerle daha farklı ve özgün etkinlikler tasarlayarak öğrencilerin ilgi alanlarına hitap ettikleri, hizmet içi eğitimlerin hem nicelik hem de nitelik olarak arttırılarak verilmeye devam edilmesi gerektiği düşüncesinde oldukları sonuçlarına ulaşılmıştır. Bu sonuçlar doğrultusunda, öğretmenlerin ihtiyaçlarını karşılayacak, onların ilgisini çekecek konularda uygun yöntem ve teknikleri kullanarak hizmet içi eğitimlerin planlanması gerçekleştirilebilir. Özel yetenekli öğrencilerle çalışan öğretmenlerin eğitim ihtiyaçlarının özellikle hangi konularda olduğunun belirlenmesi ile ilgili bu çalışmaya benzer daha farklı yöntemlerin kullanıldığı çalışmalar yapılabilir. Hizmet içi eğitimin gönüllü katılımının sağlanmasında motivasyonun artmasına olanak sağlayacak yüz yüze eğitim ile ulaşılabilirliği yüksek olan uzaktan eğitimlerin bir arada bulunduğu hibrit eğitim şeklinde eğitim programları çalışılabilir. Öğretmenlerin katılım sağlayacakları hizmet içi eğitimlerin kendilerine bir getiri sağlayacağı yeni hizmet içi eğitim programları (Maddi teşvik, Araştırma ve Geliştirme birimlerinde veya MEB'te farklı birimlerde görev alma açısından avantaj sağlamak, derece yükselmesi gibi) tasarlanabilir.

Anahtar Kelimeler: Hizmet içi eğitim, fen eğitimi, özel yetenekli öğrenciler, Bilim ve Sanat Merkezi.

Ethics Committee Approval: The ethics committee approval for the study was obtained from the eighth session with decision number 01-54 dated 16.05.2023 from the Gaziosmanpaşa University Social and Human Sciences Research Ethics Committee.

Informed Consent: Informed consent was obtained from the participants.

Reviewer Evaluation: No external review was performed.

Author Contribution: 1st Author: 50%, 2nd Author: 50%.

Conflict of Interest: The authors have declared no conflict of interest.

Financial Disclosure: The authors have declared that they received no financial support for this study.

Authors	Contact
Umay Hira Bozkurt	Tokat Gaziosmanpaşa University, Graduate Education Institute, Turkey, E-mail: umaybozkurt55@gmail.com
Güliz Kaymakcı	Tokat Gaziosmanpaşa University, Education Faculty, Turkey