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PRE-SERVICE SCIENCE AND COMPUTER TEACHERS' VIEWS ON TEACHING PRACTICE COURSES

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Introduction

The concept of education, which mankind is constantly trying to expand and improve, indeed includes an active and dynamic process. Countries are trying to expand their qualified personnel potential by making efficient and effective use of all available educational resources. In addition, modern world countries have attached particular importance to the education factor in constructing a strong future in terms of economy, social life, politics, and health. This situation carries education in the twenty-first century, as in every period of human history, to a position that no individual, no family, and no society can give up (Topbaş, 2001). Atatürk emphasizes the value of education, stating, "It is education that determines whether a nation lives as a free, independent, glorious and sublime society or whether it is dragged into captivity and misery" (Celep, 2008). While Aristotle views education as a means for individuals to acquire moral behaviors, Checheno views it as disciplining the human mind, Descartes views it as learning to use the mind correctly, Rousseau views it as everything gained by adults who are not innately human, and Kant views it as a means for humans to become human (Şişman, 2008). Undoubtedly, teachers are at the forefront of the most critical elements that activate, make sense and add value to the educational process.

Effective teachers are people who can think, ask questions, criticize, open to development and innovation, constantly renew themselves, and love their profession (Kavcar, 1999). Teachers play a leading role in developing countries, raising qualified manpower, and transferring the cultural values of the society to future generations (Özden, 1999). The teacher's professional responsibility in creating and influencing human behavior is quite difficult. The teaching profession is seen as a form of behavioral engineering (Sönmez, 2000). As can be seen, the duties, responsibilities, and expectations placed on teachers have grown daily. Both the teacher education system and the teacher's professional actions contribute significantly to constructing the teacher identity (Ünal, 2011). Teachers in an information society must be educated to a high standard and equipped to carry out their responsibilities (Erdem, 2013).

In education faculties, the qualifications gained by pre-service teachers directly affect the quality of education. A teacher candidate is expected to graduate from the education faculty by gaining professional competence and



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Abstract. *The Teaching Practice course taught in Education Faculties gives pre-service teachers real experience before starting the profession. This study aims to examine the teaching practice courses in the undergraduate programs of education faculties by the views of pre-service science and computer teachers. 50 4th grade students, 25 from the science education department and 25 from the computer and instructional technology education department, participated in the study. Within the scope of the study, the data were collected through online interviews of approximately 30 minutes with the participants, and content analysis was made. According to the findings, pre-service teachers believe that teaching practice courses are insufficient to ensure active participation in lessons in terms of learning gains and content and that they lack a flexible structure that allows them to participate in classes at various grade levels. They also stated that the teaching practice course includes result-oriented measurement and evaluation activities. However, they underlined that the semesters and credits allocated to undergraduate teaching practice courses are insufficient. Furthermore, throughout the process, pre-service teachers reported some communication and coordination issues in the teaching practice course. They suggested that every university with an education faculty should open practice schools that include all levels of compulsory education to overcome the challenges encountered during the process.*

Keywords: *computer teaching, pre-service teachers, science teaching, teaching practice course*

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teaching skills. A course called "Teaching Practice", which plays an effective and important role in gaining these skills has been added to the curriculum of the departments in education faculties (Ermış et al., 2010). Teaching practice activities are related to the dimension of transforming the knowledge gained by pre-service teachers in the pre-service program into practice (Özkan et al., 2005). Furthermore, the Teaching Practices course is critical because it enables a teacher to recognize circumstances that may arise in the professional area and observe his/her professional condition (Yalın Uçar, 2012). Teaching Practice course serves as a kind of internship for the students of the faculty of education to gain experience in the teaching profession. In the Teaching Practice course, the candidates are expected to improve themselves by developing their teaching competencies, using and evaluating textbooks and other tools and materials, developing additional teaching materials as needed, measuring and evaluating, and finally sharing their studies with the guidance teacher and university practice course instructor (YÖK, 1998). The teaching practice course is thought to be effective in the social-emotional development of pre-service teachers (Caires et al., 2010). Pre-service teachers get experience through teaching practice that will help them move from being a student to a teacher, where they will be responsible for educating others (Conderman et al., 2005). According to pre-service teachers, teaching practices are essential in realizing professional success and their characteristics (Singh et al., 1997).

The research topic consists of the problems that science education and computer and instructional technology education students confront throughout their teaching practice course and their expectations for the course's teaching process regarding educational programs and their opinions and solution recommendations. Teaching practice courses provide a real-world learning environment in which science education and computer and instructional technology education students can study the needs of their profession while also practicing and experiencing. This study is considered very significant because it raises the possibility that education faculties can develop and arrange teaching practice courses based on the findings of this study. Furthermore, it is anticipated that the findings of this study will provide faculty members and practice teachers participating in the teaching practice course with an up-to-date perspective on measurement and assessment connected to the process. It is foreseen that it will help improve functionality by ensuring collaboration between universities with education faculties and schools associated with the Ministry of National Education. It is expected that science education and computer and instructional technology education students would provide a new roadmap for teaching this course to all key education stakeholders, along with solution proposals.

Although there are different practices, in many countries, teacher training is carried out with Teaching Practice courses that include practice and institutional preparation processes (Duman & Karagöz, 2016). This research has focused on raising awareness among people who are interested in education in the international arena about how these courses are conducted and giving them the opportunity to evaluate this process from a broader perspective. In addition, it is thought that the results obtained from the research will contribute to the transfer of the Teaching Practice course on a global scale to a platform with more universal validity and applicability. This study aimed to examine the teaching practice courses in the undergraduate programs of education faculties by the views of pre-service teachers who they students of science education and computer and instructional technology education departments. For this purpose, answers to the following questions were sought.

1. What are pre-service teachers' views about the learning outcomes and contents of the Teaching Practice Course?
2. What are pre-service teachers' views about the semester and credit of the Teaching Practice Course?
3. What are pre-service teachers' views about the assessment and evaluation process of the Teaching Practice Course?
4. What are pre-service teachers' views about the problems experienced in the Teaching Practice Course?
5. What are the suggestions of the pre-service teachers for the improvement of the Teaching Practice Course?

Research Methodology

General Background

In this study, the case study, which is one of the qualitative research designs, was used. The case study is defined as when the researcher offers a situation description and then collects detailed and in-depth information about an actual situation, a current limited system, from multiple information sources (Creswell, 2013). In other



words, case studies examine what is happening in the environment through systematic data collection, analysis, and presentation of the findings. The result is a clear knowledge of why things transpired the way they did and what needs to be studied in greater detail in future research (Davey, 1991). Therefore, considering the complexity and diversity of educational environments and goals, case studies for various purposes provide essential data for scholars (Cohen et al., 2000).

Participants

The criterion sampling method was used in the present study. Criterion sampling examines all instances that satisfy a predefined set of criteria. The criteria were determined as enrolling in teaching practice courses in the fall semester of 2021 and being a student in one of the science education and computer education departments in Turkey. A total of 50 students, 25 from the science education department and 25 from the computer education department participated in the study. Demographic properties of the participants were given in Table 1.

Table 1

Demographic Properties of the Participants

		<i>f</i>
Department	Science education	25
	Computer education	25
Gender	Female	32
	Male	18
Age	21-24	45
	25 and over	5

Data Collection Tool

The researcher designed a semi-structured interview form (see Appendix) for data collection. While preparing the questions in the interview form, the relevant literature was reviewed, and four experts in the field of educational programs and teaching, one expert in the field of educational management and planning, and one expert in the field of measurement and evaluation were consulted. One question was removed from the interview form by expert opinions, and the places of two others were changed. Then, as part of the pre-application study with seven pre-service teachers in science education and computer and instructional technology education departments, online interviews were conducted in an electronic environment. As a result of these interviews, the interview questions were rearranged, the questions deemed necessary to ask the participants during the research process were reviewed, and the semi-structured interview form was finalized. These pre-service teachers were not included in the following interviews.

Data Collection and Analysis

The data for this study were collected using a semi-structured questionnaire form applied to pre-service science and computer teachers enrolled in education faculties of various universities in Turkey. Due to the Covid-19 epidemic, individual interviews lasting 30 minutes on average were conducted online with the participants who voluntarily participated in the research. The data from the study were analyzed using the summative content analysis method. Since summative content analysis is an inductive analytical method, it focuses on the origins of the investigated phenomenon or event. The concepts underlying the data and the relationships between these concepts are revealed through coding. The researcher's objective in qualitative research is to uncover the underlying themes of the problem using the descriptive and detailed data he has collected, to transform the data he has obtained into meaningful and systematic structures, that is, to develop or verify a theory based on these facts. Without a theory to ground the event or phenomena under investigation, inductive analysis, or content analysis based on coding, is required (Baltacı, 2019; Şimşek & Yıldırım, 2011). Content analysis involves four stages: (1) coding



the data, (2) identifying codes, categories, and themes, (3) organizing the codes, categories, and themes, and (4) defining and interpreting the findings (Eysenbach & Köhler, 2002; Miles & Huberman, 1994). In addition, a descriptive analysis approach was also employed by including direct quotations from time to time to draw attention to the views of pre-service science and computer teachers who participated in the study. In the descriptive analysis, the data are classified by predetermined themes, the findings associated with the classified data are summarized, and the summaries are evaluated using the researcher's subjective knowledge (Baltacı, 2019). Furthermore, the researcher establishes a cause-effect relationship between the findings and, if necessary, conducts structural difference analyses on the cases (Kitzinger, 1995; Kvale, 1994).

Research Results

The findings of the study were analyzed by considering the views of the pre-service science and computer teachers regarding the following five themes; the sufficiency of the teaching practice course in terms of learning gains and content, the sufficiency of the teaching practice course in terms of semesters and credits covered in the programs, the studies conducted by practitioners to measure and evaluate the success of the teaching practice course, the problems they encountered during the teaching practice course and activities that can be carried out to make the teaching practice course more qualified and richer.

Pre-service Teachers' Views about the Learning Outcomes and Contents of the Teaching Practice Course

In this subsection of the research, the findings were obtained from the views of pre-service teachers regarding the learning outcomes and contents of the Teaching Practice course have been presented.

Table 2

The Views of Pre-service Teachers on the Adequacy of the Teaching Practice Course in Terms of Learning Outcomes and Content

Insufficient in terms of learning gains and content	<i>f</i>
The number of gains that we can participate in class may increase.	21
Must be adaptable to practicing at various grade levels.	8
A new curriculum allowing more classes where we can teach can be developed.	7
The achievements aimed at promoting the work done out of school are insufficient.	5
Sufficient in terms of learning gains and content	<i>f</i>
It is progressing in line with the practice process.	7
The gain expressions are arranged clearly and understandably.	7
They were planned to take us to the targeted point.	4
The process allows me to evaluate myself. In this respect, I think it is sufficient.	4
The scope of the practice was enough for me to learn the basics of the profession.	2

According to Table 2, most pre-service science and computer teachers stated that the teaching practice courses were insufficient in terms of learning gains and content. The pre-service teachers reported that the number of achievements in which they might participate actively in the classroom was insufficient (42%), that the teaching practice courses did not have the acquisition and content that would provide them with the flexibility to practice in the same term (16%). They responded that the curriculum should be constructed to provide students with additional learning opportunities and content (14%) and that the resources available to promote extracurricular school activities were insufficient (10%). The following are the views of some pre-service science and computer teachers on this subject:

"The course's learning gains and content are mostly determined by activities based on our observations. While we must watch the practice teacher's lessons regarding the course, I believe that we are merely spectators and listeners in this process, which renders us passive. Such activities should be minimized, whereas activities in which we may participate actively should be increased." (PT30)



"We can learn about the accomplishments of the school courses we study. However, we cannot develop experience with the acquisitions and contents of subsequent grade levels. We should be allowed to examine different grade levels during the practice process." (PT41)

"I believe that the more classroom lessons I teach, the more I will improve as a result of this process." (PT10)

Some of the pre-service science and computer teachers who participated in the study stated that the teaching practice course met their learning gains and content expectations. The pre-service teachers stated that the course's learning gains and content were consistent with the practice process (14%), that the gains were clear and understandable (14%), that they were organized in a way that would lead them to the desired gain (8%), and that they would evaluate themselves throughout the process. They noted that it gave opportunities for students (8%) and that the practice process taught basic things about the profession (4%). The following are the views of some pre-service science and computer teachers on this subject:

"The course objectives and the subjects that comprise the course's content overlap with the studies we conducted during the course." (PT33)

"In my opinion, the gain statements were clearly and comprehensibly expressed. Everything was crystal clear in that regard." (PT2)

"At the end of the process, I believe I have reached the point expected of me." (PT11)

"While listening to the lecture and teaching, I had the opportunity to examine what, how, and in what way I was unable to perform." (PT25)

Pre-service Teachers' Views about the Semester and Credit of the Teaching Practice Course

In this subsection of the research, the findings obtained from the views of the pre-service science and computer teachers about whether the teaching practice courses included in the programs are sufficient for semesters and credits are presented.

Table 3

The Views of Pre-service Teachers on Whether the Teaching Practice Courses are Sufficient in Terms of Semester and Credits Covered in the Programs

Insufficient in terms of semesters and credits	<i>f</i>
Insufficient in terms of semesters	22
Insufficient in terms of credits	15
Sufficient in terms of semesters and credits	<i>f</i>
Sufficient in terms of semesters	8
Sufficient in terms of credits	5

According to Table 3, most pre-service science and computer teachers (74%) stated that the teaching practice courses in the curriculum were insufficient in terms of semesters and credits. The pre-service teachers reported that they found the teaching practice courses included in the curricula to be insufficient as the most course period (44%) and subsequently deemed the course credits assigned to this course insufficient. The following are the views of some pre-service science and computer teachers on this subject:

"I do not find the time allocated to this course is sufficient. Because I envision a program that is compressed into the last two semesters of our four-year faculty career." (PT4)

"In my opinion, it is adequate in terms of course duration, but the number of practice days and credits for course hours can be increased." (PT36)



Some of the pre-service science and computer teachers (26%) who participated in the study stated that they found the current form of the teaching practice course included in the curriculum was sufficient in terms of semesters and credits. The pre-service teachers stated that they believed it was sufficient as a period covering most subjects (16%) and then as course credits (10%). The following are the views of some pre-service science and computer teachers on this subject:

"I believe that the semester-long duration of this course is enough. As a result, I am unable to dedicate further time to this class." (PT23)

"The credit assigned to this course is adequate. We do not participate actively in class. I believe that we should conduct our lectures rather than relying on observations during this process. However, because this is not the case, I am quite bored in this course." (PT9)

Pre-service Teachers' Views about the Assessment and Evaluation Process of the Teaching Practice Course

In this subsection of the research, the findings obtained from the views of the science and computer teaching technologies pre-service teachers about what kind of measurement and evaluation methods are used by the practitioners while teaching the teaching practice courses and the adequacy of these studies conducted for the assessment and evaluation of the teaching practice course are presented.

Table 4

The views of Pre-service Teachers on the Type and Adequacy of Measurement and Evaluation Methods Used in Teaching Practice Courses

Insufficient measurement and evaluation activities	<i>f</i>
Only practice files and presentations are evaluated.	18
Results-oriented evaluation is done.	11
Everyone is given an average score.	4
Adequate feedback is not provided regarding our deficiencies in the practice process	4
Sufficient measurement and evaluation activities	<i>f</i>
The practice files are reviewed.	10
Our lectures are observed and evaluated.	10
Our absenteeism status is being evaluated.	5

According to Table 4, the majority of pre-service science and computer teachers stated that the measuring and evaluation activities used during teaching practice courses were insufficient. The most frequently encountered measurement and evaluation activities for pre-service teachers in this area were creating and presenting files and delivering presentations (36%), followed by a result-oriented evaluation (22%) and assigning everyone an average score (8%). They also stated that adequate feedback was not provided in the practice process regarding their shortcomings (8%). The following are the views of some pre-service science and computer teachers on this subject:

"Throughout this period, we continued to fill up the pertinent documents in the file. We occasionally delivered lectures. Our practice teachers graded us based on these files we submitted and the lessons we taught." (PT8)

"I simply believe that the process is appraised technically as result-oriented." (PT12)

"Our practice teachers assigned the identical evaluation grade to all of our friends in my group." (PT27)

"I am unaware of how our instructors evaluate our performance in this course at any point during the process." (PT31)



Some of the pre-service science and computer teachers who participated in the study stated that they found the measurement and evaluation activities applied throughout the teaching practice courses were adequate. It was stated that the practice files were screened for the measurement and evaluation activities that the pre-service teachers encountered the most in this regard (20%), then lectures were observed and reviewed at the same rate (20%), and attendance and absenteeism were evaluated at least once (10%). The following are the views of some pre-service science and computer teachers on this subject:

"Our practice teacher evaluated us by examining our files we organized throughout the process and describing how the process worked. This, I believe, is sufficient for the evaluation." (PT19)

"Each of our friends gave lectures for at least four hours. We came to these classes in a planned and prepared manner and delivered our presentations." (PT26)

"Our instructor evaluated us based on our interest in the course and our absenteeism" (PT34)

Pre-service Teachers' Views about the Problems Experienced in the Teaching Practice Course

In this subsection of the research, the findings obtained from the views of the pre-service science and computer teachers regarding the problems they encountered during the execution of the teaching practice course are presented.

Table 5

The Views of Pre-service Teachers on the Problems they Encountered in the Teaching Practice Course

Problems and difficulties encountered during the process	<i>f</i>
The high number of pre-service teachers per practice teacher	30
They need more economic support during this period	17
Lack of communication and coordination	8
Practice studies should be conducted in schools with easy access	3
Heavy paperwork during the process	1

According to Table 5, the majority of pre-service science and computer teachers stated that the number of pre-service teachers assigned to only one practice teacher for problems encountered during teaching practice courses was high (60%). In addition, the pre-service teachers stated that they needed more economic support in this process (34%), they had a lack of communication and coordination (16%), it is necessary to ensure that practice studies were carried out in schools with easy transportation (6%) and that the paperwork should be reduced in the process (2%). The following are the views of some pre-service science and computer teachers on this subject:

"First of all, I believe it is inappropriate for six people to engage in the practice process conducted in a classroom by a practice teacher. Because the practice teacher is also having difficulty coping with large groups of us during this process." (PT42)

"During one of the weeks that I was teaching in the classroom, I had difficulty in obtaining the materials I wanted to use in my class due to economic reasons." (PT7)

"I find it tough to commute to the school where I am required to practice due to the school's opposite location and limited transportation options." (PT21)

Pre-service Teachers' Suggestions for the Improvement of the Teaching Practice Course

In this subsection of the research, the findings obtained from the views of science and computer instructional technology pre-service teachers about what kind of studies can be done to make the teaching practice course more qualified and richer are presented.



Table 6*The Pre-service Teachers' Suggestions for the Improvement of the Teaching Practice Course*

Studies that can be done on the subject	<i>f</i>
More active participation in the class	26
Opportunity to practice at different grade levels should be offered	12
At the compulsory education level, practice schools should be established within education faculties	8
Experienced teachers with high communication skills should be appointed as instructors in this course	7
The activities aimed at identifying school administration works should be increased	4
More time should be spent working with children outside the classroom	4
Candidates for teaching positions should also participate in studies on school-family collaboration throughout the process	1

According to Table 6, the majority of pre-service science and computer teachers stated that they wanted to actively participate in more courses about the types of studies that could be conducted to improve the quality and depth of the teaching practice courses, as well as the ability to practice at various grade levels. Opportunity should be provided (24%), practice schools at compulsory education levels should be established within education faculties (16%), experienced teachers with strong communication skills should be appointed as instructors in this course (14%). They also stated that the number of studies aimed at recognizing school administration affairs should be increased (8%), that more time should be devoted to the work to be done with students outside the classroom (8%), and those pre-service teachers should also participate in the studies on school-family cooperation during the process (2%). The following are the views of some pre-service science and computer teachers on this subject:

"As pre-service teachers, our roles in courses should be more centered on activities in which we can actively engage and learn. It's like we're a little passive in this process." (PT1).

"As part of this process, each teacher candidate must attend at least one class and/or branch. It will not be sufficient for him to simply attend classes at his current level." (PT28).

"I believe that the practice teachers assigned for teaching practice courses should be selected based on a set of criteria. I believe that instructors who lack communication skills and a basic understanding of technology will be unable to contribute much to this process, even if they wish to." (PT45).

"Instead of solely teaching in the classroom, more time should be allocated in the teaching practice course for out-of-class activities in which pre-service teachers will participate." (PT3).

"I believe that we, as pre-service teachers, should participate in activities promoting school-family cooperation throughout the practice phase. This will provide both of us with this type of experience. Additionally, it will allow the families of our students, with whom we spend 12 weeks, to become acquainted with us, and we will become acquainted with them." (PT13).

Discussion

When the views of the pre-service science and computer teachers participating in the study on the teaching practice courses in the education faculties were examined, it was determined that most pre-service teachers found the teaching practice course inadequate in terms of learning gains and content. Additionally, they responded that they believed the teaching practice curriculum was inadequate in terms of learning gains and content because insufficient gains allowed them to participate actively in the program. Although the teaching practice course demands more practice, it is worth noting that pre-service teachers expressed dissatisfaction with the limited number of acquisitions in which they played an active part in learning gains and material in this course. They later indicated that the teaching practice curriculum used throughout the practice phase was not flexible enough to allow for practice at various grade levels. It is stated that science and computer teaching technologies pre-service teachers do not wish to spend their entire twelve-week practice period attending classes and giving lectures at the same grade level and providing them with the opportunity to practice at different grade levels during the same term help them develop more professionally.

Furthermore, they mentioned that they desired to provide more lectures to gain more hands-on experience and knowledge during the teaching practice course. Additionally, pre-service science and computer teachers



stated that the activities in the teaching practice course focused on studies conducted in the classroom and that studies conducted outside the classroom were either not implemented adequately or were overlooked by the practice teachers. This problem can be described as pre-service teachers failing to achieve the appropriate level of acquisitions required outside the classroom as part of the course's curriculum during the teaching practice course. Similar to the findings of this study, Eraslan (2009) and Aslan and Sağlam (2018) concluded that there were insufficient opportunities for practice, no opportunity to observe different classes, brief internship periods, insufficient schools, and insufficient information on pre-service teachers at the start of the process. On the other hand, some of the pre-service science and computer teachers who participated in the study stated that the teaching practice course followed the practice process in terms of adequacy in terms of acquisition and content, that the course's accomplishments were expressed clearly and plainly, that the process was planned to achieve the desired gains, and that the process was self-evaluating. They mentioned that it provided an opportunity for them to understand the fundamentals of the profession.

According to another finding, most science and computer instructional technology pre-service teachers stated that the curriculum's teaching practice courses were insufficient in semesters and credits. This situation demonstrates the importance of conducting a needs analysis study by curriculum development specialists to determine whether the weight assigned to teaching practice courses in undergraduate programs is sufficient. When the relevant literature is examined, similar research findings to those acquired in this study are also found. In Gökçe and Demirhan's (2005) study, practice teachers acknowledged the need to lengthen the duration of the teaching practice course in schools for pre-service teachers. According to Işıköğlü et al. (2007), pre-service teachers complete their practice in a short amount of time without gaining experiences in various aspects of the school environment, such as classroom management, material use, utilizing various teaching methods, evaluation, and school-family cooperation.

Another finding from the research was that practitioners used various measurement and evaluation methods when teaching practice courses. These studies for measuring and evaluating the teaching practice courses were largely deemed inadequate by science and computer teaching technology pre-service teachers. Concerning the subject, pre-service teachers state that they are only assessed on the files they have prepared and the presentations they delivered in the class, that the process favors result-oriented evaluations, that an average score is assigned to everyone and the process is skipped, and that they do not receive adequate feedback about the practice period. When the relevant literature is examined, it is concluded that similar research findings confirm the findings of this study. Beck and Kosnik (2002) emphasized that providing complete and thoughtful feedback to pre-service teachers about their performance is critical to their development as teachers. Şahin (2016) stated that pre-service teachers' progress is not objectively evaluated and that there is an insufficient chance for practice due to a shortage of time.

According to the research findings, the result-oriented evaluation approach, which contradicts the spirit of constructive education, is still applied by practice teachers during the teaching practice course. Additionally, pre-service science and computer teachers stated that the process was skipped, and they did not receive adequate feedback on the evaluation process, indicating some issues with the measurement and evaluation component of the teaching practice course. In general, it is vital to improve the quality of an open education system by providing feedback on each element and stage of the process. In this regard, it should be emphasized that practice teachers either lack sufficient expertise in measurement and evaluation throughout the teaching practice course or have shortcomings. On the other hand, science and computer education technology pre-service teachers who stated that the measurement and evaluation activities used in the teaching practice course were sufficient stated that their instructors conducted measurement and evaluation activities by monitoring their files throughout the process, observing their presentations delivered in the class and attendance in the class.

According to another result obtained from the research, regarding the problems that pre-service science and computer teachers most frequently encounter during the teaching practice course, the number of pre-service teachers given to a practice teacher and the faculty member responsible for the practice course is higher than ever before. In addition, the pre-service teachers stated that they needed economic support more than ever, that there was a lack of communication and coordination during the practice process, that the schools where they would conduct practice studies should have ease of transportation and that the paperwork load should be reduced during the process. In line with these results, it is possible to say that reducing the number of pre-service teachers in the teaching practice course taught by a practice teacher who carries out this job at schools, providing economic support to pre-service teachers, and addressing coordination deficiencies are all seen as critical steps toward improving



the quality of the process. Allocating specific times for each task to the teacher candidate, arranging activities that engage the teacher candidate, and sharing all activities with all stakeholders will facilitate the practice process.

When the relevant literature is examined, it is determined that there are also research findings that support the findings of this study. As a result, keeping the number of pre-service teachers per instructor to a minimum is critical for maintaining a healthy process (Kirksekiz et al., 2015). Another finding from the research is that pre-service teachers of science and computer instructional technology face financial barriers in obtaining materials. When the relevant literature is reviewed, similar findings are found with this conclusion (Aslan & Sağlam, 2018; Demir & Çamlı, 2011; Karaca & Aral, 2011). In line with these results, during the teaching practice course, it is possible to say that science and computer instructional technology pre-service teachers need economic support to participate more effectively in the course, to ensure that they attend the classes in a more prepared way in terms of equipment and materials, and to cover some extra new expenses such as transportation.

Another result from the research is a lack of communication and collaboration throughout the process. Similar research findings parallel these findings emphasized the necessity of communication between the teacher candidate, practice teacher, and practice instructor (Gündoğdu et al., 2010; Karaca & Aral, 2011).

In addition, reducing the number of students per academician and teacher will increase the interest and time allocated to each student to fully reach the desired gains in the teaching process of the teaching practice course, to process the units more healthily, to make the educational situations and testing situations more qualified.

According to another finding obtained from the research, science and computer teaching technologies, pre-service teachers stated that they should participate more actively in the courses to make the teaching practice course more qualified and richer, that they should be able to practice at different class levels and that application schools operating in compulsory education levels should be opened within the faculties of education. When the relevant literature is examined, it has been determined that other research findings are similar to those acquired in this study. Pre-service teachers should gain experience teaching in various educational settings (Cansaran et al., 2006). Pre-service teachers should be provided with multiple types of lessons and opportunities to observe a variety of different kinds of teachers (Aytaçlı, 2012).

Furthermore, they stated that experienced teachers with strong communication skills should be appointed as instructors in this course, that studies on school administration should be increased, that more time should be allocated to work with students outside the classroom, and that pre-service teachers should participate in studies on school-family cooperation. Teachers-in-training who will guide future teachers should be chosen from a pool of trained, experienced and willing teachers (Brooks & Sikes, 1997). Practice teachers should be taught to lead, observe and assess, provide feedback, and exchange data and evaluation forms collected from short-term summer courses with the instructor and should be given the title of "practice guidance teacher" (Brooks, 2006).

In line with these results, it may be an essential step in solving some of the problems experienced in the process that universities with education faculties in Turkey open practice schools that provide education at primary, secondary, and high school levels by the 4+4+4 education system to facilitate and increase the scientificness, coordination, efficiency, productivity, controllability and accessibility of teaching practice and similar courses that require the active participation of the students. In addition, it is possible to say that even though the teaching practice course has a curriculum for practice and active participation of the students, practitioners did not ensure that students participated actively in the lessons during the practice process. The following recommendations can be made based on the research findings.

- Studies can be conducted to eliminate the problems if the achievements in the science and computer instructional technologies teaching practice curriculum are already aimed at ensuring the active participation of students and if the issue arises during program implementation.
- Flexibility in listening and lecturing can be introduced to science and computer teaching technologies pre-service teachers at multiple grade levels in the same semester, as long as they are related to their respective fields in the teaching practice course's curriculum.
- It could be suggested that practitioners involved in the teaching practice course be more sensitive to the activities that should take place outside of the classroom in the program.
- It may be beneficial to do a needs analysis to see whether the teaching practice course offered in undergraduate programs in science and computer instructional technologies is sufficient for semesters and credits.



- In-service training courses on how to include measurement and evaluation activities into the teaching practice course can be conducted for practitioners who are already assigned or will be assigned to the teaching practice course.
- The number of pre-service teachers per teacher and academician can be reduced to increase the quality of the process.
- To address some of the issues raised during the teaching practice course, establishing practice schools covering all obligatory education levels in all institutions with education faculties can provide a different perspective and level of involvement in the process.

Conclusions and Implications

As a result, it is thought that the number and course credits of the teaching practice course should be increased by arranging the teaching practice courses in a way that will ensure more active participation of pre-service science and computer teachers in terms of learning outcomes and content. In addition, it can be ensured that pre-service teachers gain experience in this subject by bringing flexibility to practice at different grade levels in the same term. However, it may be much more beneficial to include a result-based evaluation with the process rather than a result-oriented evaluation of the teaching practice course by the practitioners. On the other hand, it is clear that the number of pre-service teachers assigned to the advisor in the teaching practice course needs to be reduced in a way that will increase the quality of the process. In addition, it would be appropriate to provide economic support to pre-service teachers to meet their needs for transportation and educational materials during the periods they take the teaching practice course. On the other hand, by opening practice schools from all levels of education within the universities that train teachers, teaching practice courses in these schools will be useful in terms of time, process and environment, and will accelerate the resolution of some problems arising in the process.

Declaration of Interest

Authors declare no competing interest.

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Appendix:

This study is carried out to determine the views of pre-service teachers about teaching practice courses in undergraduate programs of education faculties. If you allow, our interview will be recorded and will take approximately 30 minutes. Thank you in advance for your sincere answers.

1. Department:
 Science education
 Computer education
2. Gender:
 Female
 Male
3. Age:
 21-24
 25 and over

Interview Questions

1. Is the teaching practice course sufficient in terms of learning gains and content? Can you please explain?
2. Explain if the teaching practice courses are sufficient in terms of semesters and credits covered in the programs?
3. What type of studies do practitioners conduct in order to measure and evaluate the success of the teaching practice course? Do you think these studies are adequate?
4. Can you please specify if there are any problems you encountered during the teaching practice course?
5. What kind of studies can be done to make the teaching practice course more qualified and richer? Can you please explain?

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