RedFame

Journal of Education and Training Studies
Vol. 6, No. 8; August 2018
ISSN 2324-805X E-ISSN 2324-8068
Published by Redfame Publishing
URL: http://jets.redfame.com

Examining Mathematics Pre-service Teachers' Experiences of School Practicum*

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Received: May 10, 2018 Accepted: June 11, 2018 Online Published: June 19, 2018

doi:10.11114/jets.v6i8.3264 URL: https://doi.org/10.11114/jets.v6i8.3264

Abstract

This article presents findings from research about a practice teaching course designed to help mathematics pre-service teachers to learn from the practices of school teachers and supervisors. For this reason, the aim of this study is to research the contribution of the practicum course to the teacher candidates understanding of the teaching process. The participants in this study were 61 pre-service teachers, enrolled in a required six-hour teaching practicum course taught in the last year of the mathematics education program at a large state university located on the north coast of Turkey. To answer the research question, information was primarily obtained from reflection reports prepared by the supervisor. Content analysis was completed to reveal the emerging themes and codes. The results indicate that practicum contributed in several ways to novice teachers' view of teaching. These include preparing for the profession; application of theory-practice; getting to know students and being aware of the difficulties.

Keywords: pre-service teachers, mathematics education, teaching practicum course

1. Introduction

1.1 Introduction to the Problem

Teaching requires the specified application of knowledge, skills and attributes designed to provide the educational needs of society. The main purpose of teacher education has been to develop an understanding of pedagogical content knowledge, a higher level of human psychology and classroom skills for prospective teachers to engage students in the learning process and to guide them to their own knowledge about any subject (Parkay & Stanford, 2010; cited in Akarsu & Karıper, 2015).

There are two globally accepted approaches in the training of teachers. One of them is a theory-practical approach and the other is a practical-theory approach. According to these two approaches, the theoretical knowledge given to teacher candidates will not make sense for them unless they are educated with the knowledge and skills they will need in the real classroom environment (Ceylan & Akkuş, 2007). Educating teacher candidates with the qualifications expected of them occurs during the theoretical and practical lessons they taken in education faculties.

In this respect, in addition to the theoretical education they receive in the faculties, the experiences of prospective teachers during applied school practice have an important place. At this point, the practice of teaching in the application schools within the scope of pre-service training fills an important gap for teachers. The student teaching practicum is a fundamental aspect of most undergraduate teacher preparation programs. Aslan and Sağlam (2018) note that the experiences gained by pre-service teachers in schools are closely related to the development of the professional skills and their ability to comprehend the subtleties of the teaching profession. During the practicum, student teachers are sent to placements for the purposes of observing the cooperating teacher, teaching the actual class by themselves with the guidance of the school teacher for at least six hours and spend several weeks assuming full teaching responsibilities (Markworth, Goodwin & Glisson, 2009). As students of the practice of teaching, pre-service teachers on practicum participate in the activities and rituals of teachers in the field as they actively participate in teaching.

1.2 Teacher Practicum in Turkey

In Turkey, teacher education programs are basically shaped by the decisions of the Higher Education Council (HEC) with cooperation of Ministry of Education. When designing pre-service teacher training programs for higher education

*Long abstract of this paper was published in the PME 40 Conference Proceedings book in August 2016.

institutions, the Ministry of National Education (MEB, 2008) identified personal and professional development of teachers, as well as general and specific fields of competence, to be the focus of their in-service training (Tanrıseven, 2013).

With the restructuring initiated in 1998 in our country, the Higher Education Council (HEC) set a common curriculum for the new teacher education program and set out to increase the activities of school teaching and field teaching courses. In this new structure, two new courses were added to the education faculty programs, under the name of School Experience I and School Experience II, in addition to Teaching Practice, in order to enable prospective teachers to gain more experience in practice schools (YÖK, 1999). According to Faculty School Cooperation (1998), the School Experience and Teaching Practice course within the framework of HEC-World Bank National Education Development Project for Pre-Service Teacher Training are the courses designed to test and develop the knowledge and skills that teacher candidates have gained in a school setting and to acquire the qualifications required by their profession. Thus, it was emphasized that candidate teachers should have more practice in the educational environment in schools and new tools were developed to enable regular and systematic monitoring of their performance during the implementation period (YÖK and World Bank, 1998). In addition, the co-operation between faculties and schools has been reorganized and made more effective and operational so that practice teachers can take a more active role in this process. After implementing this program in education faculties for more than eight years, in 2006 the Council of Higher Education initiated a study aimed at eliminating the disadvantages of the program and within this framework, the Subject Area Course Book Review and School Experience I courses were abolished, the faculty was given the authority to determine about 30% of courses and the elective course opportunities have been increased (YÖK, 2007).

HEC identifies certain essential qualities which must be gained by pre-service teachers (PTs) during their teaching practicum in their university education.

Teacher candidates are expected to acquire important qualifications from the teaching practice course held in the last year of university education (YÖK, 2011). These qualities are;

-- developing the efficacies required for the teaching profession through practice with various grades in the school they are assigned to

-- obtaining a grasp of the curriculum related to their subject and presenting their opinions about the textbooks used, as well as about student assessment techniques

-- sharing and improving their practicum experiences gained in the school with their mentor and their friends

The most basic characteristic of the teaching practice course is that it is a course for the teacher candidates taken in the last period of their education and it is completely based on application. After taking this course, pre-service teachers (PTs) are expected to be able to organize and control the students, establish strong communication and make students actively participate in the teaching-learning environment (Aktağ, 2011).

1.3 Rationale and Problem Statement

Various studies address the effect of teacher training courses on the approaches that PTs adopt, and most suggest that proper training will help develop constructivist attitudes (Baştürk, 2009; Erdem & Erdoğan, 2012; Krull, Koni, & Oras, 2013). In general, these studies use self-reporting instruments to obtain PTs' opinions after their training; however, the issues that they largely overlook are the extent to which PTs are able to integrate the approaches and beliefs acquired by means of these courses into their teaching practice (Doruk, 2014). Among these, Baştürk (2009) investigates the characteristics of lessons developed by student teachers for Teaching Practice Courses in the department of Elementary Science Education with regards to certain variables such as difficulties in combining theory/practice, their interactions with mentors, nature of their teaching, etc. The findings revealed that there was a difference between student teachers in terms of the quantity of hours taught in one semester because of arbitrary applications by mentors. It was also very difficult to qualify the recommendations and requests of mentors about student teachers' lessons for their pedagogical and professional development because mentors ask student teachers to teach based on solving questions in exams, particularly. Similarly, Erdem and Erdoğan (2012) aimed to determine the acquisitions that chemistry teacher candidates of obtained from the activities at application schools and the difficulties that both teacher candidates and chemistry teachers face in the framework of faculty-school cooperation. According to the data, expectations of teacher candidates and mentor teachers from each other and solutions were presented regarding what should be done to make the course more effective in accordance with maintaining proper cooperation.

There are also fewer studies that thoroughly examine the thoughts and experiences of elementary mathematics PTs in relation to the school practicum in Turkey (Demircan, 2007; Eraslan, 2009; Baştürk, 2010; Özçelik, 2012; Duman, 2013). Among these, Demircan (2007) aimed to reveal the process involved in the School Experience II Course based on the point of view of senior year students at the Faculty of Education. The result of the study showed that pre-service teachers attached importance to the School Experience II course; however pre-service teachers have negative attitudes towards

practice schools, mentors and supervisors. Eraslan's (2008) study aimed to discuss the experiences of prospective mathematics teachers with the School Experience II course. His findings suggest that neither university mentors nor supervising teachers assumed responsibility for the practicum program, or devoted the attention and commitment needed. On the other hand, a few prospective teachers working with trained and experienced supervisors and university mentors had good experiences. Baştürk (2010) is another scholar who investigated mathematics student teachers work experience in the schools. The results revealed that the student teachers' lessons generally involved doing exercises and examples.

As seen from the literature, most previous studies examining field experience concentrated on roles, experiences, views and expectations of student teachers and university supervisors as well as cooperating teachers for teaching and learning different subjects (e.g., Fernandez & Erbilgin, 2009; Aslanargun et al., 2012; Bektaş & Ayvaz, 2012). For mathematics, Hacıömeroğlu (2013)'s study investigated the cooperative teachers' supervision for effective mathematics teaching from the perspective of elementary student teachers during their field experience. Results revealed that cooperative teachers seemed to be deficient as a supervisor for interacting with student teachers as well as assisting them to develop critical points of view about teaching mathematics effectively.

There were also some studies which concentrate on the effectiveness of the teaching practice course and the characteristics of a good practice teacher (Argon & Köstereliogğlu, 2010), measuring the types and level of student teachers' concerns and problems over the course of the practice teaching period (Kale, 2011; Demir & Çamlı, 2011; Yeşilyurt & Semerci, 2012; Bangir-Alpan, et.al., 2014); evaluating the classroom teacher candidates' attitudes towards the school experience courses (Otacıoğlu, 2010); determining the views and opinions of prospective teachers about School Experience and Practice Teaching courses (Şaşmaz-Ören, Sevinç & Erdoğmuş, 2009; Saracaloğlu, Yılmaz, Çöğmen, & Şahin, 2011; Yılmaz, 2011; Aslan & Sağlam, 2018); evaluating the school experience course according to the aim and content of the program, teaching process and opinions of practitioner teachers and supervisors (Yeşilyurt & Semerci, 2013; Arslantaş & Yıldız, 2013). Above all, few studies also focused on pre-service mathematics teachers as a research sample (Eraslan, 2009; Baştürk, 2010; Hacıömeroğlu, 2013).

The literature makes it clear that school experience and teaching practice (Zeichner, 2010) are powerful tools in helping pre-service teachers make sense of what they see and do in mathematics classes. Besides, pre-service teachers report the time spent in classrooms during internships to be the most influential and useful part of their preparation programs (Guyton & McIntyre, 2010; cited in Schwartz, 2015). Therefore, the need to enhance and extend the impact of the Teaching Practicum course for pre-service teachers is concrete. For this reason, we must make a solid assessment of the contributions of the teaching practicum course to the understanding of teaching held by mathematics pre-service teachers.

2. Method

Investigating a contemporary phenomenon in its real-life context (Yin, 2003), the present study effectively uses a case study methodology enabling the researcher to analyze "how" the teaching experience contributes to pre-service teachers' vision of teaching in a real school setting. As a qualitative research method, case study enables researchers to thoroughly examine and interpret a group, events or relations within a context, and to make analytical generalizations, rather than realistic estimations (Cohen, Manion & Morrison, 2007).

2.1 Participants

The research was carried out with 61 pre-service teachers in the final year of an Elementary Math Teaching Program at the secondary stage (grades 6-8) in elementary schools. These participants were also registered for a required six-hours/week teaching practicum course offered as part of the elementary teacher education program at a large state university located on the northern coast of Turkey.

2.2 Data Collection and Analysis

To answer the research question, data were primarily obtained from reflection reports prepared by the supervisor after pre-service teachers had completed their teaching experience. In the existing practicum model, pre-service teachers are required to attend at least six hours of mathematics classes per week during the spring semester. They were assigned to specific schools for the purposes of observing the classroom teacher and teaching the actual class by themselves, with the guidance of the mentor teacher, for at least six hours.

Since the study was conducted as qualitative research, the content analysis method of inductive analysis was used to analyze the data. This method is employed to reveal the concepts behind the data and the relations between these concepts by means of encoding (Miles & Huberman, 1994; Bogdan & Biklen, 2001). After coding, in light of the main themes observed during preliminary analysis, the emerging subthemes were identified.

3. Results

In this section the participants' responses to teaching practicum experience are explored and illustrated through

qualitative data from the study. The section will first present the themes that emerged from data analysis and findings obtained from the written reports. The results indicate that practicum contributed to teacher candidates development in several ways. After analyzing the data, we found four main themes and under these, several subthemes emerged. Table 1 represents all of the themes derived from the analysis of data.

Table 1. Themes related to PTs vision of teaching practicum

Main Themes	**Sub Themes**	**Related PTs' codes**
Training for profession	professional development gaining experience motivation and desire self confidence self evaluation teacher responsibilities comparing teachers outside activities	S14, S18, S23, S33, S40, S48, S51, S53, S56, S61; S42, S44, S50, S52, S56, S57, S60; S24, S43, S48, S29, S32, S38, S39, S44, S51, S53; S55, S54, S56
Application of theory-practice	observing the classroom making plans classroom and time management teaching using activities and materials methods and techniques assessment	S6, S11, S33, S39; S12, S29, S5, S8, S21, S24, S25, S26, S28, S30, S32, S34, S39, S43, S52, S55; S34, S45; S36, S38, S43, S53, S58, S60, S36, S37, S43, S51; S25, S43, S46, S60
Getting to know students	developing an affection for mathematics approaching students individual differences determining the level of student communication understanding student behavior	S6, S7, S10, S17, S22, S24, S28, S31, S33, S34; S36, S38, S39, S41, S43, S59, S35, S51, S53, S54, S55, S57, S59
Being aware of the challenges	attracting students' attention making mistakes seeing deficiency coping with unexpected situations	S1, S5, S11, S24, S28, S30, S31, S34, S39, S45, S 52, S56, S58, S61

As Table 1 indicates, the vision of teaching practice that pre-service mathematics teachers gained can be explained by the following themes training for the profession, application of theory-practice, getting to know students and being aware of the challenges.

Training for profession: Pre-service teachers often referred to the contributions of teaching practice course in terms of training for the profession. They noted that the course was useful in terms of furthering their professional development, helped them become aware of the intricacies of their profession, gave them experience, instilled self-confidence and they began to assess their own teaching with reference to the feedback. This simultaneously led to increased levels of motivation after witnessing an actual teaching environment. Furthermore, the pre-service teachers compared themselves with the mentor they worked with, learning about the responsibilities of a teacher, and stated that they tried to prepare for the job through participation in some extra-curricular activities. Quotes from pre-service teachers, discussing certain sub themes are presented below.

S14: "*Every time I went to the school, I realized what the teaching profession means, and that I chose the right job*." (professional development)

S18: "*Practice reinforced my will to become a teacher. I feel motivated."* (motivation)

S23: "*It gave me self-confidence and experience... I served as the on-duty teacher... I also took part in some celebrations.*" (self confidence)

S29: "*Meeting two distinct mathematics teachers through the year helped me make comparisons and understand the characteristics of a good teacher*." (comparing teachers)

S38: "*I was very excited, now I am calmer... This is the first time I left my student perspective behind*." (desire)

S39: "*I learned about the duties teachers have inside and outside the school."* (teacher responsibilities)

S44: "*It helped us to set quotas, and think about what kind of a teacher we could be*" (self evaluation)

S51: "*Meeting the requirements of our job will allow us to create a lifelong career; it helped not only in taking the first step to becoming a good teacher, but also building up my self-confidence.*" (responsibility and confidence)

S55: "*I was able to get a view of the school and the classroom as a teacher, rather than a student... My self-confidence regarding my profession grew substantially."* (self confidence)

Application of theory to practice: The majority of the pre-service teachers who took part in the study emphasized the importance of the teaching practice course as an opportunity to apply the theoretical information they learned at university. With reference to this theme, the participants stated that they observed the classroom and the students at the school where they were assigned to for the course, tried to develop plans and apply teaching accordingly, tried to make use of activities and materials, understand classroom management and the means of effective time control, learned about the importance of applicable methods and techniques, as well as gained experience of assessment of the subjects taught. Below are a few quotes from pre-service teachers concerning these secondary themes:

S25: "*I learned how teachers achieved classroom management, as well as about the methods and techniques employed while teaching the course, specifics of assessment and evaluation, and how to make targeted and applicable use of the materials within the class*." (management, methods, assessment, materials)

S27: "*I tried to observe the application of the theoretical knowledge I gained so far and personally apply it in a classroom environment.*" (observing classroom)

S34: "*We faced the truth. We prepared course plans and taught the subjects*." (making plan)

S37: "*This practice answered my questions about how to effectively teach a course, how to design the materials, what strategy I should take with the activities, and which types of questions I should ask*." (teaching, materials, methods)

S43: "*I investigated and applied various methods and techniques to provide a more effective teaching of the topics; I got the chance to teach courses at different grades...I learned how to take the classroom under control and how to make efficient use of time. I learned how and when to make effective use of visual materials and information technologies*." (methods and techniques, classroom and time management, materials)

S60: "*First of all, I should note that controlling the class was difficult. I tried to impress and motivate them with the materials I prepared...I believe I gained extensive experience about achieving discipline and managing the class*." (management, materials)

Getting to know students: Another contribution of teaching practicum to pre-service teachers was about getting to know the students. The participants noted that the practice helped them learn about how to approach the student, how to establish communication, taking into account differences between individuals, the need to communicate at the level of the individual student, and getting a better grasp of student behavior. Some of the quotations supporting these statements are provided below.

S6: "*We learned how to get to know the students better, and how to establish a teacher-student relationship with them.*" (communication)

S7: "*I learned how to approach to the students, and how to communicate with them.*" (approaching student, communication)

S22: " *In practicum, I wanted to help students to like mathematics...they loved to spend time with me.*" (developing an affection for mathematics)

S24: "*We came to realize that communicating with students is harder than it looks*." (communication)

S28: "*It contributed to my communication with the students in the classroom...I learned how to behave towards the students."* (understand student behavior)

S33: "*I realized that there were slow-learners as well as quick-learners, and that securing the participation of all students was the most crucial as well as the most difficult job*." (individual differences)

S54: "*This course gave me the opportunity to assess myself before graduating as a teacher, questions about asking if I can communicate with the students, and if I can recognize their individual traits*." (communication, individual differences)

S59: "*I should make every student feel valuable. I should never forget that they are still children, and I should teach in a simpler way.*" (reach out at the level of student)

Being aware of challenges: Some of the pre-service teachers who took part in the study noted that it was the first occasion for them to understand the challenges of the profession, and what is expected of them in the real world. Under this theme, pre-service mathematics teachers mentioned the difficulty of attracting the attention of the students, their own imperfections and tendency for error, and the real-life experience of coping with unexpected circumstances. Some of the participants' comments supporting these views are quoted below.

S1: "*In the fall semester, I had been questioning the errors made by our teacher in the classroom. I was really surprised when I made the same error myself and did not know how to get over it*." (making mistakes)

S31: "*It is very important in terms of avoiding the repeating of the errors we often make*."

S34: "*We realized what is needed to make students listen to us, and what kinds of misconceptions the students had*." (drawing students' attention)

S39: "*I developed an understanding of the students' expectations; I achieved progress in reducing my deficiencies, thanks to warnings from the mentor*." (seeing deficiency)

S56: "*It made us see the challenges lying ahead and gave us the opportunity to test ourselves, and to fix our mistakes through feedback and correction."*

S58: "*It gave us the chance to see some of our deficiencies, as it was in effect a practice. We also saw how to behave in some unexpected cases*." (seeing deficiency; unexpected situations)

S61: "*It gave me a preview of the problems I will face with the students in the future, and to learn about how to handle these problems, revising my perspective accordingly*." (coping with unexpected situations)

4. Discussion

The study aiming to understand the contribution of the teaching practice course to development of pre-service mathematics teachers revealed the fact that the course contributed to their development from a number of perspectives. Participants noted that the course was most useful for them particularly from a professional development point of view, providing them with experience as well as an awareness about the profession, and ultimately increasing their level of eagerness and motivation. In this context, the study by Yılmaz and Kab (2013) found that the teaching practice course was very useful for social studies pre-service teachers in terms of gaining first-hand experience, promoting their teaching skills, and constructing more realistic views of the profession.

Pre-service teachers emphasized the fact that this course, which they deem invaluable for the teaching profession, provided them with perhaps the only chance to practically apply the theoretical knowledge they acquired at university, and to "have a chance to transform their theoretical knowledge to empirical by observing the functioning of the school" (Varış, 2011; p.177). They stated that they gained experience about many issues including observing the classroom, planning and application, activity and material development, assessment-evaluation, and classroom management. Akpınar, Çolak and Yiğit (2012) support these results by revealing pre-service teachers had adequate knowledge and skills about the use of teaching technologies and the materials and the preparation of activities on evaluation and assessment. Contrary to our results, Akpınar et.al (2012) found that pre-service teachers were incompetent in terms of in teaching methods, content knowledge, classroom management and communication skills.

Contrary to our results, Karadüz et.al. (2009) study with the senior year Primary School Teaching and Turkish Education Department students and found that after school experience, there was no change on the novice teachers' abilities in relation to the use of teaching methods and techniques, while there was a meaningful difference in their classroom management and communication skills. However, according to findings of Kaya and Samancı (2013), half of the participants found it difficult to apply classroom management in the real environment. Soylu (2012) argued that teaching practice courses did not have a positive effect on the success of prospective teachers in employing the teaching methods and techniques in mathematics courses. The comments about the effect of practicum on professional training given by our pre-service math teachers were also similar to the research by Demirbulak (2012). She found that student teachers use their potential skills and knowledge and create an appealing learning climate by reflecting on the theories from their teaching practice.

Another point emphasized by pre-service teachers was the experience it provided in terms of getting to know students. The participants who had their first experience with students in an actual classroom setting noted their enhanced awareness about the characteristics of the students, communicating with them, understanding their behavior, and taking into account individual differences. Eraslan (2009)'s study similarly concluded that pre-service teachers feel like real teachers during teaching practice and get to know more about the students and classroom environment. The results of the study by Argon and Köstereliogłu (2010) about the effectiveness of the teaching practicum also referred to the necessity of the course perceived by participants as well as their view that they had the chance to get to know students and become familiar with the individual differences among the students. However, teacher candidates found themselves insufficient in dealing with individual differences among the students in research by Özkılıç, Bilgin and Kartal (2008). Finally, the participants noted their experience of realizing the challenges involved in teaching practice and mentioned the difficulties of attracting student's attention, making mistakes, coping with unexpected situations as well as the deficiencies they had. Parallel to our results, Yeşilyurt and Semerci (2012) found that pre-service teachers faced some problems with difficulties in teaching based on their lack of subject matter knowledge and pedagogical knowledge. Similarly, Yılmaz and Özçakmak (2015) indicated that student teachers could not get enough output in the practice process while the practice process provided them professional experience.

A review of all these conclusions, with a view to understanding the contribution of teaching practicum experience to pre-service teachers, indicates that even greater importance should be attached to the organization and contents of the course within the framework of teacher training programs. Pre-service teachers should be provided with any means of support to prepare them for the profession, by making utmost use of cooperation between the university and schools. The participants also voiced a positive outlook regarding the benefits of the practicum for their pedagogical and professional development from various aspects and stated that such practice-oriented courses should be offered in earlier years of the training program.

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