ISSN: 2148-9955

International Journal of Research in Education and Science (IJRES)

www.ijres.net

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Sundus Yerdelen[1], Aslihan Osmanoglu[2], Yasemin Tas[3]
Kafkas University, Department of Mathematics and Science Education, Turkey
[2]Trakya University, Department of Mathematics and Science Education, Turkey
[3]Atatürk University, Department of Mathematics and Science Education, Turkey

To cite this article:

Yerdelen, S., Osmanoglu, A., & Tas, Y. (2019). The influence of a teaching practice course with video-case enriched microteaching on prospective teachers' self-efficacy for teaching. *International Journal of Research in Education and Science (IJRES), 5*(2), 560-573.

IJRES International Journal of Research in Education and Science
Volume 5, Issue 2, Summer 2019 ISSN: 2148-9955

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Sündüs Yerdelen, Aslıhan Osmanoğlu, Yasemin Taş

Article Info

Article History

Received:
21 November 2018

Accepted:
19 March 2019

Keywords

Mentoring
Prospective science teachers
Science teaching
Sources of self-efficacy
Teaching practice course

Abstract

In this study, we aimed to investigate prospective science teachers' development of self-efficacy beliefs for teaching during Teaching Practice Course. Besides regular implementations such as teaching practice in real classrooms and mentoring, a Teaching Practice Course enriched with microteaching supported by video-cases was designed. The participants include four female senior prospective science teachers from an eastern state university in Turkey. In this case study, the data were collected through pre- and post-questionnaires. The findings mainly indicated that prospective teachers' self-efficacy levels were generally high both before and after the course without any decrease. Furthermore, the participants benefited from the teaching practice and micro teaching with video-cases, and made good use of observing their mentor and the other interns as well as getting feedback. Their physiological and emotional state was also improved. The implications of the findings are discussed.

Introduction

Teachers' self-efficacy for teaching is among the important topics in the literature as it influences how effectively teachers teach (Tschannen-Moran & McMaster, 2009; Tschannen-Moran & Woolfolk Hoy, 2001). It is defined as teachers' beliefs regarding their abilities to perform teaching related tasks (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Tschannen-Moran and Woolfolk Hoy (2001) considered teaching self-efficacy based on three dimensions of teaching; student engagement, classroom management, and instructional strategies. Accordingly, self-efficacious teachers feel confident about motivating their students to learn, control disruptive behaviors in the classroom, and use a variety of teaching strategies. Studies on teachers' self-efficacy suggest that teachers with high self-efficacy for teaching have higher job satisfaction (Caprara, Barbaranelli, Borgogni, & Steca, 2003: Yerdelen, 2013), have a lower level of burnout (Skaalvik & Skaalvik, 2007: Yerdelen, 2013), and are more successful in using a variety of instructional methods (Woolfolk, Rosoff, & Hoy, 1990). Research also indicates that the students, whose teachers are more efficacious to teach, have higher motivation to learn (Ashton & Webb, 1986) and are academically more successful (Caprara, Barbaranelli, Steca, & Malone, 2006; Ross, 1992). Self-efficacy beliefs are more likely to change during the first stages of the learning process (Bandura, 1977) and once self-efficacy beliefs are established, they are very difficult to change (Tschannen-Moran et al., 1998). Prospective teachers may experience substantial changes in their self-efficacy beliefs in the course of teaching and teaching practice experience (Hoy & Woolfolk, 1990; Ross, 1994). Therefore, the prospective teacher training period seems to play an important role in the formation and maintenance of high self-efficacy beliefs of future teachers.

Sources of Self-Efficacy

In the Social Cognitive Theory, Bandura (1986) defines four sources of the development of self-efficacy; mastery experience, verbal persuasion, vicarious experience, and physiological and emotional state. Among these sources, *mastery experience* indicates that previous performances on a specific task help people make comparisons between the old and new, and allow development of self-efficacy following these new experiences. Individuals develop beliefs about their ability to perform future tasks by judging their previous performance on a particular task. In this process, if individuals have a successful experience such as accomplishing difficult goals, then, they develop strong self-efficacy beliefs. On the other hand, experiencing failures (especially those occurring at the beginning of a process), decreases their self-efficacy beliefs. Experiences that individuals

acquire through their own practice are described as the most influential source of self-efficacy (Bandura, 1986). Another source that is named *verbal persuasion* defines the self-efficacy people gain through the verbal praises they receive from the trusted others (Tschannen-Moran & McMaster, 2009). As an accessible and easy way, praising others is widely used to influence individuals' behavior. The praises coming from the valued people such as colleagues, supervisors, and consultants increase confidence in individuals' ability to perform the desired performance (Tschannen-Moran & McMaster, 2009). While positive evaluations of others within the limits of reality may increase self-efficacy of individuals, negative evaluations may reduce self-efficacy (Bandura, 1986). *Vicarious experience* refers to people developing efficacy beliefs by comparing their performance to the performance of others who are in similar positions (Bandura, 1986). When individuals do not have enough experience, and are unsure about their abilities, their self-efficacy beliefs develop as they observe successful or unsuccessful experience of those whom they see similar to them and accept as role models (Usher & Pajares, 2009). If individuals see their role models overcoming challenging situations well, they start to believe that with increased work and effort, they can also successfully handle similar difficulties (Bandura, 1977). Lastly, *physiological and emotional state* explains that people's physiological and emotional state including anxiety, stress, and fear has an influence on their self-efficacy (Bandura, 1977). These physiological and emotional states are used by individuals to make judgements about their capabilities to perform a particular task (Bandura, 1986). People develop self-efficacy beliefs based on a combination of these four sources explained above, depending on a specific area and cognitive process strategies (Britner & Pajares, 2006). According to Tschannen-Moran et al. (1998), although several quantitative studies provided great information from large body of teacher samples, the need for the qualitative studies should not be ignored because qualitative studies such as case studies would be helpful in increasing our understanding of the self-efficacy development processes by providing rich descriptions.

Self-Efficacy Development and Teaching Practice Experience

The courses prospective teachers (PTs) take during their initial teacher education are more likely to affect their general self-efficacy beliefs for teaching, while the experience they gain during teaching practice has a greater influence on their personal self-efficacy beliefs for teaching (Tschannen-Moran et al., 1998). Namely, these researchers stated that initial teacher education programs mostly provide verbal input and vicarious experience and they include insufficient experience to develop PTs' teaching competence perceptions, while teaching practices provide PTs opportunities to gain information about their teaching capabilities. According to Tschannen-Moran et al. (1998), PTs often underestimate how complicated the teaching task is, or they have mostly optimistic ideas about teaching, but when faced with facts and difficulties of teaching during the teaching practice period, their self-efficacy beliefs may decrease. Experiencing difficulties in managing the classroom and communicating with the students whilst teaching may disappoint PTs because of the difference between the standards they set for themselves and their actual performance (Tschannen-Moran et al., 1998). While teaching practice experienced by "sink or swim" strategy may have negative consequences, this process may also become a way for PTs to gather information about their own capabilities in teaching (Tschannen-Moran et al., 1998, p. 235).

Initial teacher education programs should provide more opportunities for PTs to teach in real classroom settings with increasing level of complexity in order to gain mastery experience and receive specific feedback (Tschannen-Moran et al., 1998). Therefore, teaching experience and effective mentoring during the Teaching Practice Courses (TPC) are among the most effective sources of developing PTs' self-efficacy for teaching. Moreover, receiving feedback on their accomplishments from experts (verbal persuasion) and being guided by them is beneficial for PTs' self-development (Tschannen-Moran et al., 1998). Hudson (2006) added that good mentors should help PTs with effective lesson planning, selecting and practicing effective teaching methods, classroom management, and understanding the teaching program as well as being good models for them. Wan (2005) also states that for the development of teaching self-efficacy, it is important that PTs teach in real classes to gain teaching experience, and they need effective mentoring and positive feedback from experts. Moreover, Philippou and Charalambous (2005) found that PTs modeled their mentors' teaching style. In addition to all these sources, PTs may also benefit from the use of cases in microteaching through self-reflection and peer-feedback in the TPC.

The Use of Video-Cases in Microteaching

Microteaching, used in teacher training programs worldwide, is important for PTs' development of teaching skills and gaining teaching experience (Remesh, 2013; Sevim, 2013). This method aims to provide PTs with

opportunities to prepare lesson plans, implement teaching strategies, manage classroom, make self-monitoring of their own performance, and receive feedback by putting theories into practice within the initial teacher education process (Bell, 2007; Brent & Wheatley, 1996; Fernandez, 2010). Microteaching practices play an important role in PTs' self-efficacy development for teaching through the inactive mastery experience, verbal persuasion via the feedback they receive, and vicarious experience (Arsal, 2014; Mergler & Tangen, 2010).

One of the important aspects of microteaching method is taking video records during PTs' teaching practice. Videotapes recorded during microteaching make substantial contributions to PTs' teaching skills by providing a chance of observing their own performance, getting feedback, and making self-evaluations (Arsal, 2014; Kpanja, 2001; Savaş, 2012). These videotapes present cases that are expected to contribute to PTs' self-development and prepare them for the real classroom environment (Mayo, 2004).

The use of video-cases is regarded as an effective way to prepare PTs for the teaching profession (Harrington & Garrison, 1992; Mayo, 2004) as analyzing teaching videos is believed to improve their professional vision (Blomberg, Stürmer, & Seidel, 2011). It also provides an opportunity to practice theoretical knowledge (Butler, Lee, & Tippins, 2006; Kleinknecht & Schneider, 2013) which promotes the development of PTs' teaching skills (Sherin & Han, 2004). Through the use of cases, PTs find opportunities to develop their reasoning and decision-making skills (Harrington, 1999; Jay, 2004; Lundeberg, 1999; Merseth, 1992). In particular, through the use of cases -beyond the current practice- individual observation and teaching experience are carried one step further, and PTs find an opportunity for a shared experience (Masingila & Doerr, 2002). Considering the aforementioned benefits of the use of cases in teacher education, in the present study, video-cases were incorporated into the TPC as a part of microteaching experience in order to observe its influence on the development of PTs' self-efficacy for teaching.

Significance of the Study

In Turkey, PTs only experience teaching practices in real classroom environments during the TPC in the last semester of teacher education programs. During this course, PTs may experience several incidents that can play a role as a source of self-efficacy (Tschannen-Moran & McMaster, 2009). During the TPC, PTs' self-efficacy might be influenced by their mastery experience through teaching experience in the real classrooms and microteaching experience with video-case use. Besides, feedback given by the mentor teachers, course instructors, and other interns regarding their performance might affect their self-efficacy as verbal persuasion. Additionally, their observation of performances of other interns and mentors might change their self-efficacy as vicarious experience. Lastly, PTs' feelings, beliefs, and motivation about teaching might also influence their self-efficacy as physiological and emotional state. This indicates that the role of teaching practice period in PTs' development of self-efficacy beliefs for teaching should not be ignored. In the present study, we examined the role of a Specially-Designed TPC (SD-TPC) which is enriched by microteaching practices with video-cases on the PTs' self-efficacy development and investigated the sources of self-efficacy.

We believe that via this study, we can contribute to the field of initial teacher education since it attempts to identify the effect of the SD-TPC on PTs' self-efficacy beliefs. In this process, the course was designed as a combination of the microteaching method with the use of video-cases, the teaching practice in secondary schools with real students, and mentoring. In the present study, we further concentrated on to the microteaching practices in the university with the corporation of video-cases as well as to the feedback provided by the course instructor with the purpose of supporting PTs' self-efficacy development through mastery experience, verbal persuasion, and vicarious experience. To the best of our knowledge, no researchers have qualitatively examined the combined influence of the above factors on the development of PTs' efficacy beliefs in TPC within the framework of Social Cognitive Theory. Therefore, it is considered that through our study, we might guide future researchers in terms of designing TPCs to enhance PTs' self-efficacy for teaching and thus contribute to the creation of more effective initial teacher education programs.

Purpose and Research Questions

In the light of the above discussion, we aimed to investigate the influence of the SD-TPC on the prospective science teachers' development of self-efficacy beliefs for teaching in view of the sources of self-efficacy. The study explored the following research questions:

1. What are prospective science teachers' levels of self-efficacy for teaching before and after participating in the SD-TPC?

2. What are prospective science teachers' sources of self-efficacy for teaching before and after participating in the SD-TPC?
3. What are prospective science teachers' suggestions to improve the SD-TPC?

Method

The study was qualitative in nature, namely it was a case study (Merriam, 2009). In case study research, an issue is "…explored through one or more cases within a bounded system like a setting or a context" (Creswell, 2007, p. 73). This methodology is employed when an in-depth examination of a phenomenon is needed (Feagin, Orum, & Sioberg, 1991) as well as "how" and "why", and "what" questions are wanted to be answered (Yıldırım & Şimşek, 2008; Yin, 2003). In the present study, the aim was to understand whether and how the SD-TPC influenced on the PTs' development of self-efficacy beliefs for teaching in view of the sources of self-efficacy. As in case study research, the aim was to understand the meaning that the participants gave to the experience. The bounded system -unit of analysis- (Merriam, 2009) in the present study was the SD-TPC.

Participants

The participants were four female senior (referring to the fourth year being the last year of initial teacher education program) prospective science teachers studying in the department of science teaching at a state university in the eastern part of Turkey in the academic year 2015-2016. The first author was the academic mentor of these four participants enrolled in the Teacher Practice Course (TPC). Although there were six prospective teachers (PTs) in this TPC group, only four of them volunteered to participate in the study. The GPAs of the participants obtained by considering all of the courses which they had taken before the term that they were taking the TPC ranged from 1.90 to 2.70 on a 4.00 points scale, and their age ranged between 22 and 26 years. All participants had the same in-service teacher (with 5 years of teaching experience as a science teacher in public secondary schools) as their mentor in the school where they had their internship as a teacher trainee. The average number of students in the classrooms where the participants did their internship was 22.

The Teaching Practice Course (TPC)

In Turkey, PTs take the TPC at the eighth (last) semester of their four years of initial teacher education program. Indeed, in the data collection period, in Turkey, each course instructor could have been assigned with maximum 15 PTs and they should have divided into two groups. Moreover, each mentor teacher cannot have been assigned with more than six PTs. Within the course, PTs attend classes at the university and, each week, they visit the secondary school that was determined by the Faculty-Teaching-Practice-Coordinator at the beginning of the semester. Each PT is also assigned to a science teacher (working in that secondary school) who was to be their mentor teacher. They are expected to teach at least 24 hours in total during the semester under the guidance of their mentor. In the present study, the TPC was specially-designed through focusing on three sources of self-efficacy (mastery experience, vicarious experience, and verbal persuasion) in order to support PTs' self-efficacy development. Moreover, as the fourth source of self-efficacy, participants' physiological and emotional state was also expected to change during the teaching practice period. The course was a combination of the microteaching method enriched by the use of video-cases (applied in the classes at the university), and the teaching practice in real classrooms as well as mentoring (applied in the secondary school).

Teaching Practice Course at the University

Within the TPC, the PTs take a two hour-class per week at the universities. In the present study, during the course at the university, the course instructor scheduled tasks to be followed during the 14-week period. PTs were asked to perform two microteachings in which they were expected to teach a 15 to 20 minutes long lesson. In order to decide on the topic and schedule the teaching practice dates, the PTs came together with the mentor teacher at the beginning of their teaching practice. PTs were asked by the course instructor to determine two science topics from the science curriculum for microteaching which was to be done at university, and following the microteaching practices, they were asked to teach the same topic in the secondary school which provides a real classroom setting. During the preparation for the microteaching at the university and teaching practice in the secondary school, the course instructor provided PTs with guidance about lesson planning, selection of instructional strategies, and any other issues they needed help for their lesson preparation.

During the class at the university, the PTs conducted two microteachings in total. Accordingly, in the first week, two of the PTs performed their microteaching while the remaining PTs imitated as if they were secondary school students. At the end of each microteaching, all of the PTs in the classroom and the course instructor discussed the performances. Namely, PTs received feedback by the instructor and the classmates about the weaknesses and strengths of their performance, and how they could improve the effectiveness of their practice. The PTs performing the micro teachings also criticized their own performance. The microteaching performances were video-recorded, and these PTs were given their own video-recordings. They were free to watch them before or after their actual teaching performance in real classrooms. Then, in the following week, they taught the same topic in real classrooms with real students. With this flow, each week one or two PTs performed their microteaching, were provided with their own video-recordings, and then taught in real classrooms. When all of the PTs completed their microteaching performances, within a class-hour, they reflected on their experience based on their own video-records with the instructor and classmates. The same processes were repeated for the second (the last) microteaching period. The flow of the TPC is presented in Figure 1

The microteaching experience at the university was aimed to provide PTs with more opportunities to teach (mastery experience). Moreover, the course was supported with the feedback received from the course instructor and other interns (verbal persuasion), and also with the chance of observing their own video-records and other interns' performance (vicarious experience).

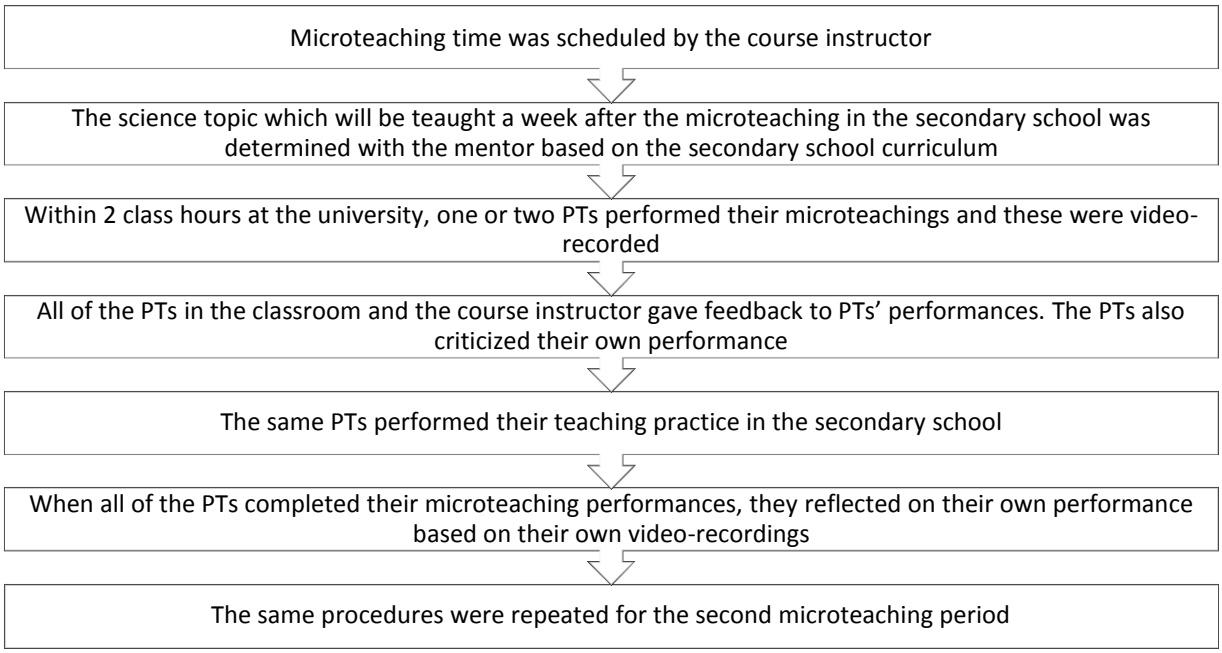

Figure 1. The flow of the Teaching Practice course

Teaching Practice Course in the Secondary School

Within the secondary school phase of the TPC, each week, one or two PTs were assigned to teach in a classroom. The mentor teacher was expected to observe PTs during their teaching practice, give grades based on a structured observation form which is provided by National Ministry of Education, and provide feedback for their performance. This observation form has prepared to evaluate PTs' teaching practice based on 36 questions under six categories: subject matter knowledge, pedagogical content knowledge, planning, teaching, classroom management, and communication. Evaluations are based on 3-point likert type response scale: weak, average, and good. A total score obtained from this form is used as a part of PTS' course grade. Besides, whenever they needed, the PTs asked their mentor teacher for guidance about instructional strategies, lesson planning, objectives of the curriculum, and time and class management strategies and so on during preparation for teaching practice. During the teaching practice period, except when practicing teaching, the PTs observed the mentor teacher's performance and modeled her in terms of the use of instructional strategies, communication with students, classroom management and so on. The PTs' second teaching practice was also observed by the course instructor in the secondary school, and oral feedback was provided.

In this part of TPC, the PTs were expected to develop self-efficacy beliefs for teaching via teaching in real classroom environments (mastery experience), getting feedback from the mentor (verbal persuasion), and observing the mentor teacher's performance and modeling her as well as observing other interns' teaching practices (vicarious experience). Physiological and emotional state of PTs was also expected to change during both parts (in secondary school and university) of the TPC.

Data Collection

To collect data, a questionnaire consisting of open-ended questions was prepared by the researchers in the light of the teaching self-efficacy literature and in line with Teachers' Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Hoy (2001). TSES has three dimensions which are efficacy for instructional strategies, classroom management, and student engagement. In the present study, open-ended questions addressed PTs' sense of efficacy in these three areas. For instance, regarding efficacy for instructional strategies, PTs were asked if they considered themselves being able to use a variety of teaching methods depending on student characteristics, content, and course objectives and they were asked to explain their rationale for their answers and, if possible, provide concrete examples. Another question tapping efficacy for classroom management asked PTs whether they thought that they could easily make students follow the rules of the classroom and ensure that classroom activities are done as planned. One other question addressed efficacy for student engagement and asked PTs whether they thought they could ensure student engagement in science classes on occasions where students are uninterested and/or unsuccessful. Besides teaching efficacy related items, pre-questionnaire included questions about PTs' expectations from their mentors and thoughts about potential benefits of TPC. Parallel to the pre-questionnaire, the post-questionnaire included open ended questions about PTs' teaching efficacy beliefs in the three areas mentioned above, how they benefited from the SD-TPC as well as how their mentor and TPC met their expectations and how to improve TPC. For these questionnaires, expert opinion was requested from two educational researchers who study on teacher self-efficacy. After completing suggested modifications, they were administered to the participants at the beginning and at the end of TPC, respectively.

Data Analysis

The data collected through the PTs' responses to questionnaires were subjected to content analysis technique in order to identify themes (Yıldırım & Şimşek, 2008). After developing the initial coding scheme together, the researchers independently coded a randomly selected PTs' responses to pre- and post-questionnaires. Then, through a three-way conference, the codings were reviewed and any possible discrepancies were resolved. After agreeing on the final version of the coding scheme, the data from the questionnaires of the remaining participants were independently coded by the authors. The inter-rater reliability coefficient was calculated as .84, indicating a high level of reliability (Yıldırım & Şimşek, 2008). Moreover, for the trustworthiness of the study, direct quotations are provided (Yıldırım & Şimşek, 2008).

During the data analysis, we first tried to identify PTs' self-efficacy levels under the theme "sense of efficacy" via drawing upon the work of Tschannen-Moran and Woolfolk Hoy (2001). This theme pointed to the sub-themes of sense of efficacy: student engagement, classroom management, and instructional strategies. While coding the responses given to the questionnaires, some of the responses did not fit into any of these three subthemes. Therefore, a new sub-theme ''other'' within sub-codes emerged. The self-efficacy levels of the PTs were coded as low, medium, and high (see Table 1). Participants' responses were coded as "low" if they stated that they could not succeed in the stated teaching task. The responses were coded as "medium" if they stated some doubts about their capabilities to complete the given teaching task while it was coded as "high" if they confidently stated that they could succeed in the given teaching task.

In order to identify PTs' expectations from and outcomes of the TPC regarding their self-efficacy development, the researchers drew upon the Social Cognitive Theory (Bandura, 1986). Accordingly, PTs' expectations and outcomes were coded under the theme *self-efficacy sources* with four subthemes (see Table 2). For example, if a participant stated that she benefited from observing mentors' teaching in terms of instructional strategies as well as communication with students then that response was coded under the vicarious experience theme, and coded under its two sub-themes that were instructional strategies and communication with students. Finally, PTs' suggestions on improving the TPC with mentoring process were identified, and after open-coding process, the researchers came up with five sub-themes (see Table 3).

Findings

This section is organized under the three research questions with the related main themes, subthemes, and sub-codes.

Sense of Efficacy

In order to understand the levels of the PTs' sense of efficacy regarding teaching during the TPC, we coded PTs' sense of efficacy as low, medium, and high. As stated before, PTs' sense of efficacy was analyzed under four sub-themes that were *efficacy for student engagement, efficacy for classroom management, efficacy for instructional strategies (including assessment strategies)*, and *other*. The sub-theme *other* included the sub-codes that were: *content knowledge, communication with students,* and *time management*.

Table 1. Prospective teachers' levels of self-efficacy before and after taking the TPC

Teaching self-efficacy	Time	Low	Medium	High
Student engagement	Before	---	---	(P1,P2,P3,P4)
	After	---	---	(P1,P2,P3,P4)
Classroom management	Before	---	---	(P1,P2,P3,P4)
	After	---	---	(P1,P2,P3,P4)
Instructional strategies	Before	---	---	(P1,P2,P3,P4)
	After	---	---	(P1,P2,P3,P4)
Other				
Content knowledge	Before	(P4)	---	(P3)
	After	---	---	---
Communication with students	Before	---	---	(P4)
	After	---	---	---
Time management	Before	(P2)	---	---
	After	---	---	---

The content analysis results revealed that PTs' (numbered as P1, P2, P3, P4) sense of efficacy was high both before and after the course with respect to three main subthemes (see Table 1). With respect to their sense of efficacy for content knowledge under the *other* subtheme, we identified that while P4 stated that before the course, her sense of efficacy was low, P3 thought that her efficacy for content knowledge was high. These PTs did not share whether their sense of efficacy for content knowledge increased after the course or not. P1 and P2 did not mention about their sense of efficacy for content knowledge neither before nor after the course. Among four PTs, only P4 stated that her sense of efficacy for communication with students was high before the course. Additionally, P2 shared that her sense of efficacy for time management was low before the course. These participants, again, did not mention whether their sense of efficacy for communication with students or time management increased after the course or not. In general, it might be summarized that PTs' sense of efficacy was quite high both before and after the course with respect to 3 main subthemes of sense of efficacy.

Sources of Self-Efficacy

In order to understand the sources of PTs' self-efficacy regarding teaching during the TPC, we employed the subthemes of the sources of self-efficacy by Bandura (1986) that were *mastery experience*, *verbal persuasion*, *vicarious experience*, and *physiological and emotional state.* The sub-codes related to these subthemes are provided in Table 2. PTs' responses to the pre-questionnaire were treated as their expectations from TPC, while responses to the post-questionnaire were treated as their outcomes during TPC.

As can be seen in Table 2, PTs' expectations from the TPC were related to instructional and communicational aspects of the experience as well as getting to know students and self-assessment (including gesture and mimics) under the sub-theme of *mastery experience*. After analyzing their perceived gains from the course (including teaching practice, microteaching, video experience, and mentoring), we realized that while they found the course not that effective in terms of opportunities to practice teaching (giving instruction), PTs explained that it was effective in terms of the experience for using a variety of instructional strategies and self-assessment. Other gains mentioned were related to PTs experience regarding communication with students, classroom management, and getting to know students.

Table 2. Prospective teachers' sources of self-efficacy before and after taking the TPC

Sources of Self-Efficacy	Expectations	Participant	Outcomes	Participant
Mastery experience	Giving instruction	(P1)	Giving instruction	
	---		Enough	(P2)
	---		Not enough	(P1,P2,P3,P4)
	Communication	(P3)	Communication	(P3)
	Getting to know the student profile	(P1,P4)	Getting to know the student profile	(P2)
	Self-assessment	(P2)	Self-assessment	(P1,P2,P3,P4)
	---		Classroom management	(P2)
	---		Instructional strategies	(P1,P3,P4)
Verbal persuasion	Ineffective aspects of their teaching	(P1,P3,P4)	Ineffective aspects of their teaching	(P1,P2,P3,P4)
	Solving weaknesses	(P1,P2)	Solving weaknesses	(P1,P2,P3)
	Instructional strategies	(P4)	Instructional strategies	(P1,P2,P3)
	---		Material use	(P1,P2)
Vicarious experience	Communication	(P2,P3,P4)	Communication	(P2,P3,P4)
	---		Lesson planning	(P2)
	---		Giving instruction	(P1,P3)
	---		Content knowledge	(P4)
	---		Material use	(P1)
	---		Identifying and solving weaknesses	(P1,P2,P3,P4)
Physiological, emotional state	Positive	(P1)	Positive	(P1,P2,P3,P4)
	Negative	(P2,P3,P4)	Negative	(P3,P4)

Under the second sub-theme of the sources of self-efficacy that was *verbal persuasion*, we observed that PTs mostly expected to receive feedback related to instructional strategies such as lesson planning and instructional abilities in which they considered themselves as lacking and wanted to develop in such areas. When outcomes were examined, we found that this expectation was met for all participants. Their expectation related to ineffective aspects of their teaching and to strengthening their weaknesses were also highly fulfilled after the course. The PTs also shared that the course was effective in terms of developing their use of instructional strategies and their ability to use instructional materials through the received feedback.

Under the third sub-theme that was *vicarious experience*, PTs mostly focused on their expectation as developing communication with students through modeling their mentors. When we analyzed their gains from the course, we noted that their expectation was met after the course. The PTs also maintained that the course was effective in terms of helping them identify and solve their weaknesses regarding teaching through comparing others' (the mentor and/or other interns) performance with theirs. A number of other aspects mentioned as the gains from the course were related to instructional skills, content knowledge, and material use.

Under the last sub-theme of the sources of self-efficacy that was *physiological and emotional state*, we recognized that while only one of the PTs (P1) was positive (relaxed, happy, motivated, enjoying, and self-confident) at the beginning of the course in terms of content knowledge and instructional abilities, the other three were negative (worried, anxious, and having difficulty) about either their communication skills with students, their content knowledge, or classroom management skills. After the course, the participants mostly declared that their physiological state was positive with respect to several aspects of teaching including communication, instruction, and management skills. Still, although she did not report her level of self-efficacy regarding content knowledge after the course (see table 1), we realized that P4 shared that she felt anxious about her possible lack of content knowledge. Moreover, P3 worried about her instructional skills at the end of the course, although she stated a number of positive feelings, as well.

Suggestions to Improve the TPC

The data analysis revealed that PTs' suggestions on improving the TPC were categorized under five sub-themes (see Table 3).

Table 3. Prospective teachers' suggestions related to the course

Suggestions	Participant
Extension	
To four years	(P2,P3,P4)
Last year full	(P1)
Practice-based	(P1,P4)
Being accepted as potential teachers	(P2)
Trust	(P2)
Motivation	(P2)

Accordingly, three out of four PTs suggested that the course should be extended throughout the four years of initial teacher education. The other PT's (P1) idea was to take only the TPC throughout the last year of the initial teacher education rather than taking this course with the other last-year courses. Two of the PTs also suggested making the course more practice-based rather than being theoretical. The other suggestions were related to their relationship with their mentor teacher. These PTs shared that the mentor teachers -in general- should see them as future teachers (not as students), trust them, and motivate them.

Discussion

Self-efficacy beliefs develop through the interaction of the four sources mentioned above (Britner & Pajares, 2006), and TPCs provide teaching experience opportunities for PTs to develop self-efficacy beliefs (Tschannen-Moran et al., 1998). With regards to the first research question which investigated PTs' levels of self-efficacy for teaching before and after the SD-TPC, PTs' levels of self-efficacy were found to be high in general both at the beginning and at the end of the course. Although it seems that the participants' self-efficacy levels were not influenced by the SD-TPC, it can be argued that this finding was promising, because there was no decrease in PTs' self-efficacy, in general. As stated before, prior to real practice opportunities, PTs may underestimate the difficulties of teaching, and might have only positive perceptions, but when they face with the realities of teaching, their self-efficacy beliefs may decrease (Tschannen-Moran et al., 1998). Muñiz-Rodríguez, Alonso, Rodríguez-Muñiz, De Conninck, Vanderlinde, & Valcke's, (2018) study also reveal similar results regarding the level of self-efficacy of participants before and after intervention. From here, we believe that in the present study, being in interaction with the mentor teacher and the course instructor as well as receiving continuous guidance from them helped prospective teachers maintain their level of self-efficacy.

The second research question focused on determining the PTs' sources of self-efficacy for teaching before and after the TPC. As mentioned earlier, the experience that individuals acquire through their own practices (mastery experience) is considered to be the most important source of self-efficacy. Thus, acquiring positive experiences at the beginning of their career is important for PTs to develop strong self-efficacy beliefs (Bandura, 1986). In this study, besides the teaching experience in real classrooms, PTs gained mastery experience through microteaching. To provide examples, the PTs' explanations reveal how they made use of the course with regards to developing *mastery experience* during microteaching: "It was very effective in helping me gain experience and learn to use different instructional methods. I clearly saw my mistakes as well as how to fix them" (P1), "I see this experience as a first step to teaching. I realized my deficiencies and my strengths" (P4). Parallel to our findings, Arsal (2014) and Mergler and Tangen (2010) pointed that PTs' self-efficacy was developed as they benefited from microteaching practices through the enactive mastery experience, verbal persuasion, and vicarious experience. Those researchers found that microteaching had an important influence on PTs' self-efficacy for teaching as they had the chance of observing, practicing, and discussing the teaching skills. Similar results were found by Cinici (2016) who concurred that microteaching practices supported PTs' science teaching self-efficacy. In the present study, we believe that PTs have gained positive experience through microteaching especially in terms of instruction and self-assessment skills. Positive experiences such as communication with students, classroom management, getting to know the student profile and so on are also expected to be positively reflected in their future career.

In addition to the gains from the microteaching experience itself, the participants also had an opportunity to reflect on the videos of their own teaching which is believed to contribute to their gains from the experience. It is considered that using video cases during the microteaching was helpful for PTs especially in terms of gaining mastery experience as they found a chance to observe their own performance and reflected on it through cases. Parallel to our findings, a number of researchers suggested that using videotapes during microteaching contributed to PTs' teaching skills as they had an opportunity to observe their performance, receive feedback, and evaluate their own performance (Kpanja, 2001; Savaş, 2012). Çam and Geban (2017) also indicated that the

use of cases is effective in fostering PTs' chemistry motivation including self-efficacy. Moreover, Arsal (2014) found that during Teaching Methods course, PTs who were exposed to microteaching training including video-cases exhibited significantly greater progress in terms of teaching self-efficacy than those who enrolled in the same course exposed with different methods such as lecturing, questioning, and group discussions. In another study with prospective science teachers, participants reported that they overcame their fear, got relaxed, and felt more confident after watching their own video recordings of their microteaching, and they found videos helpful for self-evaluation and peer critique (Cinici, 2016). In the present study, we believe that the use of video-cases during microteaching played a role in PTs' self-efficacy belief development. The PTs explained their learning outcomes from the video-cases as follows: "When I watched myself, I could see how the tone of my voice and gestures were, and whether it was appropriate for what I was describing. Then, I tried to talk more calmly and clearly" (P1), "It was helpful for us to correct our mistakes by observing what we did with our tone of voice during our instruction, with our accents, our behavior towards students, and our instructions" (P3).

Another source of self-efficacy of prospective science teachers emerged as *verbal persuasion*. It seems that in the present study, the feedback provided by the mentor teacher, the course instructor, and the other interns helped PTs believe that they had the capability to overcome deficiencies, improve skills, and thus teach successfully. To provide examples, the following quotations may give ideas on participants' gains from the course: "The feedback I received from my instructor played an important role in evaluating the instructional strategies I've chosen, minimizing the deficiencies in my lesson plans, and thus giving a better instruction" (P3), "The feedback we have received motivated us. They increased our success in teaching practice" (P4). Similar to our findings, Philippou and Charalambous (2005) found that mentors had positive effect on prospective primary school teachers' efficacy by providing feedback and conveying latent messages. Moreover, Hudson (2006) included mentor teachers' oral and written feedback to PTs' teaching practices as indicators of effective mentoring.

The findings of the present study also suggested that the PTs made use of their mentor teacher's teaching style and modeled them indicating *vicarious experience* of sources of self-efficacy. Effective mentors do not only guide PTs on lesson planning, instructional method use, and classroom management and so on, but they also are good models for PTs (Hudson, 2006). As stated before, TPCs are important opportunities since they provide a place for PTs to develop self-efficacy beliefs through observing positive experience of trusted others when they do not have enough experience and are not confident about their own abilities (Usher & Pajares, 2009). In the present study, we believe that PTs had a chance to model their mentor teachers in overcoming their difficulties and developing their instructional skills. This finding was expected, because as PTs observed their mentor teachers and interacted with them, they saw how their mentor teachers used teaching methods effectively, managed classroom, handled problems in the classroom, and communicated with students. A number of examples from the participants' statements may reveal how they modeled their mentor: "Observing her helped me a lot with choosing the correct examples, choosing the right instructional strategies, and turning abstract subjects into concrete" (P1), "She made me to ask myself how to plan my lessons better and communicate with students more effectively" (P2). We believe that observing the mentor teachers' achievements in teaching practices may lead PTs to believe that they can also successfully teach. Previously, Philippou and Charalambous (2005) found that mentors had an influence on prospective primary school teachers through their teaching style, especially if they appealed to students. In that study, some of the participants stated that they modeled their mentors' execution of teaching tasks, and even tried to imitate them. However, few participants in Philippou and Charalambous' (2005) study were rather scared and believed that they could never teach as good as their mentors. On the contrary, in the present study, none of the PTs felt disappointed, and they were all positively influenced by their mentor teacher's teaching style. This might be due to the PTs' feelings of good match with their mentor teacher, the similarities they found with their mentor teacher, and thus the fact that they persuaded themselves that they were competent and possessed the capability to teach, as well. In the present study, there was not a big difference of age between participants and the mentor teacher and they were all females, and this might have been encouraged the participants in terms of accomplishing the same teaching tasks.

Additionally, participants were also asked to report whether they compared their own performance with other interns' performances and whether they were influenced by the other interns' teaching practices, microteachings, and feedback they received about their performances. We found that the PTs made use of observing the other interns' performances held in the secondary school and during microteaching at the university as well as the feedback the other interns received from the mentor teacher and the course instructor regarding their teaching performances. We believe that PTs' positive experiences regarding *vicarious experience* with the other sources of self-efficacy beliefs during the TPC have the potential to improve their future success. The following examples from PTs responses reveal that their self-efficacy beliefs were positively influenced: ''Yes, I was influenced by them. They helped me to change and increase the number of my

examples and teaching materials. By observing them, I saw my weaknesses and strengths more vividly'' (P1), "As I think my friends also did similar mistakes that I did, I had been seeing their weakness in myself and I had been trying to correct my mistakes. The negative feedback they received was also influential for me" (P3).

Finally, regarding physiological and emotional state, PTs shared about how they felt about their teaching before and after the course. It was observed that although most of them had negative feelings before taking the TPC, their feelings about teaching turned to positive after the course. The following explanations reveal this change: "I feel better now. My worries are minimized. If I get better in my field, then I can better explain myself and maintain the control" (P2), "I think that I can be comfortable with classroom management and communication with students. The only thing disturbing me is the possibility that I cannot give the right instruction to students" (P3), "I feel happy now. I believe that I can be a good teacher from all aspects. I have deficiencies of content knowledge, and I know that I should minimize them" (P4). We believe that the statements of P3 and P4 above are not surprising, because it would be difficult for PTs to leave all their worries regarding content knowledge deficiencies and so on after just a one-semester course in their last year of initial teacher education.

When it comes to the last research question that dealt with PTs suggestions to improve the TPC, it was observed that the PTs did not think they had sufficient opportunities for practice teaching during the course, and they suggested extending the duration of the TPC. In another study, researchers also found that PTs complained that they did not have sufficient opportunities for practice teaching (Çetintaş & Genç, 2005). It should be noted that MoNE (2012) requires PTs to teach at least 24 hours per semester during the TPC, but in the present study, the participants reported that they only found opportunities to teach for 4-8 hours in real classrooms. This implies that the principals and mentor teachers in schools should ensure that PTs are provided with enough opportunities to fulfill the required teaching practice period in real classrooms. The participants further suggested that the course of teaching practice should be kept more intensive and should start earlier. Although PTs benefited from teaching experience mainly in terms of instructional strategies and self-assessment, their gains should still be improved by providing more opportunities to teach.

Conclusion

In the present study, the SD-TPC was found to be able to keep PTs' self-efficacy levels high by supporting different sources of self-efficacy. We believe that the enrichment of the course with microteaching and video-cases provided extra opportunities for PTs to have mastery experience, verbal persuasion, and vicarious experience. Namely, the PTs stated that the aspects of the course were beneficial as they provided more teaching experience; more opportunities to receive feedback including different perspectives from the mentor teacher, instructor, and other interns; and more opportunities to observe their own and other interns' teaching performance. Moreover, PTs also showed some improvements in their physiological and emotional states after the TPC. These aspects of the course might have prevented a possible decrease in PTs' self-efficacy for teaching.

Implications

The findings of the study are expected to shed light on prospective science teachers' development of self-efficacy for teaching during their TPC. These findings can inform educational policy makers, teacher educators, and mentors in finding ways to improve the effectiveness of the TPCs. The current generic teacher education program in Turkey has been seen insufficient in terms of providing rich teaching practice opportunities (e.g. Aslan & Sağlam, 2019; Çetimkaya & Genç, 2005). As stated by the participants, the TPC can be started at the first year of the initial teacher education program and course hours can gradually be increased until the last year to allow for more teaching opportunities in real classrooms as well as putting theory into practice.

Additionally, it has been found that microteaching experience enriched with the video-cases was useful for PTs' self-efficacy development since it supported their sources of self-efficacy beliefs, especially mastery and vicarious experiences. Thus, teacher educators can use this method in TPC to sustain and/or increase prospective teachers' self-efficacy. Additionally, since few of the PTs did not feel confident about content knowledge, providing more teaching practice opportunities in courses during the teacher education programs may allow them become more aware of the topics covered within the secondary school science curriculum and enhance their subject matter knowledge. We also consider that PTs -especially those who have such difficulties and worries about content knowledge- should receive longer periods of teaching practice to strengthen their emotional state.

Finally, mentor teachers were found to be important in terms of supporting vicarious experiences and verbal persuasion of PTs. This suggests it is vital that mentors give realistic and constructive feedback to PTs' teaching performance. Moreover, they should emphasize the most effective aspects of teaching and curriculum as well as avoiding the use of ineffective teaching strategies as they form a role model to PTs. School principals should be careful while assigning the mentor teachers to PTs. Selecting effective teachers and each term assigning a new teacher from this group of teachers might provide PTs with a chance to interact with a variety of effective teachers until they graduate.

Limitations and Recommendations

As in every research study, the present one also has a number of limitations. Firstly, with regards to the use of video-cases as a part of the TPC, we believe that taking video records in real classroom in addition to the records taken in microteaching practices would have been more beneficial for PTs to more realistically observe their own performance. Unfortunately, however, taking video records in the classrooms was not permitted by the provincial directorate for national education. Another limitation is that although the course instructor consulted with the mentor teacher at different time points during the term, it is thought that a closer communication between the course instructor and the mentor teacher would increase coherency in PTs' practice. Thus, in future studies, we suggest that course instructor meet with the mentor teacher regularly and exchange information about how to support PTs' efficacy in a more favorable manner. Such an approach also has the potential to contribute to data triangulation. It should be pointed that such an exchange and close communication between the course instructor and the mentor may not be feasible if the number of the PTs is high. Thus, we believe that the implementation of SD-TPS might be appropriate for small group of PTs. While the findings are promising, follow up studies might provide more evidence for a stronger conclusion. Lastly, the findings of this study are limited with the information obtained from only four PTs. Therefore, the effect of the SD-TPC should be studied with a larger group of participants and their self-efficacy development can be compared with the findings of the present study.

Acknowledgement

This work was supported by Kafkas University Scientific Research Projects Commission under Grant 2016-EB-11.

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Author Information

Sündüs Yerdelen
Kafkas University, Department of Mathematics and Science Education, Kars, Turkey
Contact e-mail: *suyerdelen@gmail.com*

Aslıhan Osmanoğlu
Trakya University, Department of Mathematics and Science Education, Edirne, Turkey

Yasemin Taş
Atatürk University, Department of Mathematics and Science Education, Erzurum, Turkey