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Preservice science teachers' ability to identify good teaching practices

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Abstract

Teacher practice course plays a vital role in preservice teacher education. As a part of this course, preservice teachers are expected to observe classroom dynamics and to practice the theoretical framework and skills they were taught during the three years of their education. The use of videos can be a useful instructional tool to present different cases to preservice science and technology teachers. However, one aspect of the effectiveness of this approach relies on preservice teacher's ability to recognize strength and weaknesses of teaching practices. Therefore, this study focuses on preservice teachers' ability to notice strength and weaknesses of teaching.

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Keywords: Preservice teacher education; teaching practice course; video.

1. Introduction

Current preservice teacher education programs in Turkey, requires teacher candidates to enroll in the teacher practice course as a part of their education. In elementary science and technology teacher education program, this course is offered during the last year and is divided into two semesters. During the first semester preservice teachers are expected to spend 54 hours per week in elementary schools. During the second semester the amount of time is increased to 96 hours and preservice teachers are expected to teach under the supervision of mentor science teachers.

The general goal of teacher practice course is to provide an opportunity for preservice teachers to practice and experience the theoretical framework and skills they were taught during the three years of their of education.

This experience is supported by university faculty and in-service science and technology teachers who serve as mentors in elementary schools. Both first and second semester courses include experiencing daily responsibilities of teachers and observing the dynamics of schools as well as the classroom environments.

Time spend in classrooms allow preservice teachers to observe teacher-student interactions, classroom management, student-student interactions and different teaching activities. While preservice teachers are supervised by in-service science and technology teachers through mentor relationships, faculty members at the university also support preservice teachers' development through one hour classroom discussions at the university.

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During the practice teaching course, enrolled students are assigned to different schools and mentor teachers in groups of six. This distribution causes preservice teachers to experience different mentor relationships as well as different classroom environments. The diversity of experiences among preservice teachers presents different cases to discuss among them. However, the lack of common experience may be considered a limitation. To overcome this limitation, videos can be used as an instructional tool in preservice science and technology education.

Using videos as an instructional tool is becoming a widely accepted approach in both preservice and inservice teacher education due to its benefits (Beck, King & Marshall, 2002; Brunvand & Fishman, 2007; Madsen & Cassidy, 2005, Sherin & van Es, 2005). First of all videos are reasonably cheap and becoming more available to be used in different formats such as microteaching, video-cases or to model expert-teaching (Star & Strickland, 2007). The history of using videos in teacher education goes back to 1960s in the United States with the availability of portable video equipment. Since then variety of programs have been implemented including microteaching sessions, multimedia programs and recordings of field observations (Sherin & Han, 2004). Lampert and Ball's work pioneers in the field of mathematics education with *Space for Learning and Teaching Exploration* which presents a detailed collection of writings and videos of an entire year of teaching (cited in Star & Strickland, 2007). There is an increase in use of videos in all subject areas in the last 15 years and videos are more frequently used as short segmented videos to be viewed and discussed in teacher education (Star & Strickland, 2007). Such examples include Madsen and Cassidy's work which focuses on use of videos to examine teaching experience on perception in music education or Star and Strickland's (2008) work studying preservice teachers' ability to notice in mathematics education.

Regardless the format videos are used, the common goal is to "help teachers learn what to do in the classroom" (Sherin & van Es, 2005, p.475). In addition, using such videos provides the advantage of giving the whole class a chance to observe and share the same examples and discuss on them (Star and Strickland, 2007). Star and Strickland (2007) argues on the benefits of using videos in comparison to field observation experiences. Preservice teachers who are taking part in field observations do so either individually or with few classmates. Therefore, the experience may not be shared by the whole class in comparison to using videos, where videos provide wide range of different examples and an opportunities for the whole group discussions.

Different approaches can be used while implementing videos in preservice teacher education. Educators can use short fragments of videos to emphasize particular aspects of teaching, present best practices or use preservice teachers' own videos to allow them to recognize strengths and weaknesses in their own teaching (Star & Strickland, 2007). Videos presents preservice teachers with the opportunity of experiencing wide range of different examples in terms of teachers, students, classroom settings, pedagogies or content (Star & Strickland, 2007) which may not be possible in case of field observations. Also development of a shared language by preservice teachers would help them to discuss what they observe on the same grounds. Since videos provide permanent records of classroom interactions they provide better opportunity to preservice teachers in comparison to their memory of what is happening in classrooms. In addition, since the demands of a classroom is not present preservice teachers can reflect on what they are noticing on videos more comfortably (Sherin & van Es, 2005).

Successful teaching practices requires teachers to be able to recognize students' ideas and make necessary pedagogical decisions (American Association for the Advancements of Science [AAAS], 1993; National Council of Teachers of Mathematics [NCTM], 2000) while forming their lessons based on these ideas. Teachers need to be skillful in noticing and interpreting these interactions to be able to use this adaptive style (Sherin & van Es, 2005).

When using videos, what teachers' notice becomes an important element. According to work of Berliner and colleagues, the ability of noticing differs among teachers based on their experience. They report, experts to recognize subtle differences of instructional strategies while advanced beginners and novices can not. In addition, they also report on the advanced beginners and novices focus on teacher but not student actions or discussions (cited in Star & Strickland, 2007).

Success of using videos relies on teachers' ability to recognize / notice the dynamics of a classroom; the strengths or weaknesses of classroom management, teaching skills or student-teacher interactions. According to van Es and Sherin (2002):

Teachers' ability to notice is categorised under three aspects (a) identifying what is important and/or noteworthy about a classroom situation; (b) making connections between the specifics of classroom interactions and the broader principles of teaching and learning they represent; and (c) using what one knows about the context to reason about classroom interactions. (p.572)

As mentioned by the researchers using videos as an instructional tool in preservice teacher education have an impact on improvement of teachers' observation skills. The purpose of this study is to investigate preservice teachers' ability to notice classroom dynamics and interactions and explore how preservice teachers' ability to notice changes through a period of instructions and use of videos.

2. Methodology

For this study a qualitative research methodology was chosen to analyze the data. The study was conducted during the first semester of the fourth year of preservice science and technology teacher education program. Three different videos were used during this study as an instructional tool. These videos were recorded as a part of teaching practice course during the previous year. Video content includes preservice teachers teaching 6-8 grade level science classes. Videotaped teachers were fulfilling their course requirement. Main purpose of choosing these materials as an instructional tool was to provide preservice teachers who are participating in this study with an example that they can relate. The video content shows real classroom environment preservice teachers may face during their teaching requirement.

During the previous year of teaching practice course twenty-eight students were enrolled in two sections of the practice course and they were videotaped while completing the course requirement of teaching. Out of these twenty-eight videos three of them were selected to be used in this study. The main selection criterion for the videos was to provide various examples addressing issues related with teaching strategies. No particular topic was chosen since the main purpose of this study is to investigate preservice teachers' ability to notice and explore what they are focusing on in regards to classroom practices.

2.1. Participants

Participants of this study were 26 fourth year preservice teachers majoring in science and technology teaching at one of the major public universities in Turkey. All of the participants were enrolled in teaching practice course. This course consists of two semesters which are Practice Teaching I and Practice Teaching II. First semester of teacher practice course requires enrolled students to get familiar with the school system and observe mentor science teachers in school environment. Students were expected to spend at least four hours per week at schools throughout the semester and take part in daily activities. Preservice science teachers started to take part in this study after completing the third week of the semester at their assigned practice school.

2.2. Data Collection

Data collection was completed in three stages. The first stage was consisting of initial assessment, aiming to explore preservice teachers' ability to notice and identify strengths and weaknesses of a sample teaching. Therefore, without any instruction preservice teachers were asked to watch the first video. Then they were asked to rate the teaching practice they have watched and write a report on their observations. After completion of the first report; preservice science teachers were assigned to investigate and identify the criteria on how to evaluate a teaching practice. Preservice teachers were expected to provide a written document of the evaluation criteria they have found.

The second phase included watching the second video on the following week. This time, preservice teachers were asked to evaluate the second sample teaching video based on the criteria that they reported on their assignments. At the end of the second phase, participating teachers were provided with an evaluation criteria sheet which was developed by the researchers for the purpose of this study. The participating teachers were expected to comment and respond on several questions through online discussions.

The third phase included watching of the third video. However, before the video was watched; Preservice teachers were instructed by the researchers on how a teaching can be evaluated and the content of the criteria was discussed in the classroom to make clear definitions and prevent any misunderstandings.

The criteria discussed include the following topics; sequence of the lesson, teaching skills, classroom management, experiments, and appearance and mannerism. After watching the third video, preservice teachers were asked to evaluate the video based on the latest criteria discussed.

All three evaluation phases were based on three questions; first question was asking participants to rate the video based on a 1 to 10 rating scale (1: lowest and 10: highest rating). Following two questions were open ended and focusing on the strength and weaknesses of the teaching practice video.

2.3. Data Analysis

Document analysis technique was used to analyze the data. Each student's responses from three phases were coded by the researchers separately. Upon completion of the coding, the themes were compared among researchers. The themes that are in conflict were reanalyzed and a consensus was reported.

The ratings from the first question were analyzed to explore the distribution of scores given by each student for each video. Preservice teachers' responses to question two and three were analyzed together for each video. The results of the analysis are discussed below.

3. Results and Discussion

Analysis of the first question included examining the scores given to each video by the participating preservice teachers. The findings reveal that there is an inconsistency of score distribution for the first and second video. This outcome may be interpreted as the result of differences on how preservice teachers perceive the strengths and weaknesses of teaching practice which is based on their own criteria. On the other hand, the distribution of ratings shows consistency for the third video among participants. This may be attributed to the classroom discussions on the criteria of identifying strengths and weaknesses of teaching practice

Analysis of second and third questions by each video revealed the following results. For the first video; the themes and categories identified by the preservice teachers were focusing on the general aspects of teaching such as "teacher asking questions" or "classroom management related issues". There is a big emphasis on the themes such as communication, using resources, time management and sequence of the lesson. Almost all the comments were focusing on the teacher behavior with little or no emphasis on the students, student behavior, teacher-student interactions, quality of teaching or teaching practices.

After the first video, preservice teachers were asked to submit a criteria to evaluate teaching practices. They were asked to evaluate the second video based on the criteria they submitted individually. Preservice teachers' responses to the second video reveal similarities to the comments that were made for the first video in some aspects. However, while in the first video, participants were not recognizing or making any comments on lesson planning and approach on teaching and learning; on the second video some of the participants were making either positive or negative comments on these topics. Besides, preservice teachers were recognizing details for some categories such as the category of feedback and monitoring student progress by teacher. These details include how teacher verbally responds to a student or use of non-verbal feedback by the teacher.

Evaluation of the third video was completed after the discussion on the criteria of assessing teaching practice in the classroom. Results suggest that preservice teachers were more capable of identifying strengths and weaknesses of teaching in detail. In comparison to the first and second video, at this point some of the preservice teachers were making comments on; if the purpose of the lesson was clearly stated or not, if the lesson placed in context. Another important recognition point was on the questioning technique. Preservice teachers started to make comments on the quality of the questions that were asked by the teachers and if these questions were designed to promote higher order thinking skills or not. In addition, more students were focusing on the details of the feedback and monitoring of the students. In the first and second videos, while preservice teachers were recognizing classroom management as only the control of student behavior, now they were also referencing on the control of the oral responses as well as classroom activities as a part of classroom management. Previously, preservice teachers were not making any comments on student involvement as a part of learning atmosphere but only focusing on the setting. However, by the third video, participants were making comments especially on the student involvement.

4. Conclusion

Student teaching practices plays an integral role in preservice teacher education program. While students are expected to spent time in practice schools and teach actual classrooms as a part of their student teaching requirement, in many cases there is less emphasis on their ability to recognize strength and weaknesses of a teaching or how to improve their abilities. In this study our goal was to first investigate preservice teachers ability to recognize such practices and then to improve their abilities to recognize by means of watching video materials.

First of all using videos allows preservice teachers to experience an actual middle school science classroom dynamics in their own learning environment. Findings of this study reveal that there would be little benefit of using such videos without the skills of observation and evaluation. Through a systematic approach of assignment and discussions in the classrooms, preservice teachers show progress in their ability to recognize the important details of teaching practices. Videos can be successfully used as an instructional tool to improve preservice teachers' ability to recognize details of teaching practices.

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