



Pre-service Teachers' Changing Visions of Themselves as Reform-Oriented Teachers

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Abstract

Both teacher educators and researchers have been trying to ensure that teacher education programs prepare teachers to take on the role of “reform-oriented” teachers upon entering the classroom. Pre-service teachers' visions of themselves as future classroom teachers have been found to influence their teaching. The purpose of this study was to further the discussion and understanding of how pre-service teachers envision themselves as future teachers by examining the experiences of 11 pre-services teachers who taught a course in their content area while completing their undergraduate education. Interviews and survey data show that some of the pre-service teachers from this cohort shifted their visions toward a more reform-oriented stance.

Keywords: teaching visions, pre-service teacher education, mathematics education, reform, secondary education.

Pre-service Teachers' Changing Visions of Themselves as Reform-Oriented Teachers

The role of pre-service teachers' visions of themselves as future teachers is a current issue of study by many (Hammerness, 2003; Shulman & Shulman, 2004; Urzua & Vasquez, 2008; Wilke & Losh, 2008). Shulman and Shulman even claim that the vision someone has about his/her future teaching influences his/her teaching practices. Hence, we as educators have a responsibility to help pre-service teachers create visions of their future teaching that align with our visions of how we want them to teach in the classroom.

Currently, the hope that most teacher educators hold is that our pre-service teachers will become reform-oriented rather than traditional teachers. In mathematics, the National Council of Teachers of Mathematics (NCTM, 2000) views this as a teacher who engages students in their learning and helps them to discover the knowledge on their own. The traditional teacher, on the other hand, tells students the information acting like the "sage-on-stage." In this study I examine an atypical teaching experience that afforded one cohort of pre-service secondary mathematics teachers the opportunity to obtain a more reform-oriented vision of themselves as teachers. It should be noted that even though the subjects in this study were studying mathematics, this experience is seen as valuable to all pre-service teachers.

Reform-Oriented Teaching

Although there is some debate on whether reform-oriented teaching is the best method of instruction for all students, the reality is that these are the standards our teachers are being held to in the classroom. Therefore, for the purposes of this article, I am using reform-oriented teaching as one goal of teacher education programs.

Discussing field of education in general, Korthagen et al. (2006) writes about how traditional approaches to teaching pre-service teachers are being critiqued and how teachers need

to do more than learn just theory to become non-traditional (reform-oriented) teachers. This is also true in the field of mathematics where the first standard for the professional development of mathematics teachers found in NCTM's (1991) *Professional Standards for Teaching Mathematics* states within a teacher education program pre-service teachers should "experience good mathematics teaching" (p. 127) in order to learn and understand how they too can teach in reform-oriented ways. By experiencing teaching similar to what is expected of them in their future classrooms, pre-service teachers may develop visions of themselves as non-traditional, reform-oriented, teachers. This notion of good teaching is referred to as reform-oriented teaching in this document. To clarify what was meant by reform-oriented the NCTM standard stated:

Mathematics and mathematics education instructors in pre-service and continuing education programs should model good mathematics teaching by:

1. posing worthwhile mathematical tasks;
2. engaging teachers in mathematical discourse;
3. enhancing mathematical discourse through the use of a variety of tools, including calculators, computers, and physical and pictorial models;
4. creating learning environments that support and encourage mathematical reasoning and teachers' dispositions and abilities to do mathematics;
5. expecting and encouraging teachers to take intellectual risks in doing mathematics and to work independently and collaboratively;
6. representing mathematics as an ongoing human activity;
7. affirming and supporting full participation and continued study of mathematics by all students. (p. 127)

Although this list contains aspects of teaching, all of which appear valuable for pre-service teachers to experience, more research needs to be implemented related to this conception of reform-oriented teaching and pre-service teacher's visions of themselves as future teachers.

Teaching Visions

It is hoped that if pre-service teachers experience reform-oriented teaching, coursework in a specific content area, and authentic experiences in their undergraduate education they will be able to envision themselves as reform-oriented teachers. Hammerness (2003) proposed that "understanding teachers' vision – teachers' images of their ideal classroom practices - may provide a means for us to better appreciate what decisions teachers make and what experiences they have in their classrooms" (p. 45). The hope is that if they are able to envision themselves as reform-oriented teachers, they will be able to engage in reform-oriented practices in their classrooms. If teachers cannot picture themselves teaching in a particular manner, then it is unlikely they will be able to teach in that manner. As stated in the introduction, Shulman and Shulman (2004) further claimed that teachers' visions guide their teaching. Preliminary observations of a seminar course, given the pseudonym "Teaching Seminar," suggested that particular aspects of the seminar course had the potential to shed light on ways to strengthen the education of pre-service teachers in relation to their visions as future teachers.

This seminar course allowed pre-service secondary mathematics teachers an atypical opportunity to each independently teach one section of an undergraduate college algebra class at a Midwestern university prior to their student teaching. The material in the College Algebra course was secondary level algebra, which provided pre-service teachers with the experience of teaching a complete course containing material similar to what many will teach in the future.

Furthermore, the pre-service teachers were provided with daily opportunities for reflection on this experience.

Specifically, the pre-service teachers concurrently attended the Teaching Seminar where they engaged in tri-weekly discussions related to their teaching experiences with their peers and a mathematics faculty member. Through a collaborative learning experience, pre-service teachers were provided the opportunity to practice and discuss the teaching of mathematical topics before they were taught, as well as reflect upon their actual teaching experiences in the classroom (Hodge, in press). I was interested in finding out how the pre-service teachers' visions of themselves as future teachers, including the role they see themselves as having in the classroom, would change as a result of this experience. An understanding of how the teaching visions of the pre-service teachers changed after taking the course as they engage in such an activity at the undergraduate level will help both researchers' teacher educators understand the value of these types of learning experiences.

Research Question

The purpose of this study was to further the discussion and understanding of how pre-service teachers envision themselves as future teachers. This study was guided by the following research question. How, if at all, did pre-service teachers' visions of themselves as future teachers change after partaking in a unique experience: teaching their own university class and regularly reflecting upon their teaching?

Methods

Participants

The pool of participants in this study was a cohort ($n = 11$) of pre-service secondary mathematics teachers enrolled in the Teaching Seminar course. All 11 pre-service teachers enrolled in the course agreed to participate in the study. From this cohort of pre-service teachers, 4 participants were selected to serve as focal participants in the research study. These focal participants were selected based upon their gender (2 male and 2 female), as I wanted to have equal representation of males and females. All students were traditional-aged students with similar reported exposure to reform-oriented teaching practices, so these variables were not the focus of the study. Rather the practical issue of time was another consideration. I had to select focal students who taught at a time that did not conflict with my own teaching responsibilities. These students gave valuable insights on how their visions as teachers changed from this experience.

Prior to the first day of the semester, each participant was informed of the research goals aligned with this study. They were told the overall goal of the project was to gain an understanding of the experiences afforded to them in the Teaching Seminar. Although this course focused on the teaching of college algebra, this paper will focus on the visions of the pre-service teachers in general.

Role of the researcher

In order to view the setting in the most natural way possible, I served as an inactive observer (Patton, 2002) in the Teaching Seminar classroom and while conducting teaching observations. I sat in a desk near the back corner of the classroom, and observed the happenings of the classroom in an unobtrusive manner. I attended all but two of the seminar sessions to

establish my presence in the classroom as familiar to the pre-service teachers. My consistent presence also helped to ensure the data collected reflects the day-to-day interactions of the pre-service teachers in the Teaching Seminar and not occurrences that are out of the ordinary.

Although I was not an active participant in the Teaching Seminar, my experiences influenced the lens through which I examined the data. My educational work and experiences prepared me to conduct research on pre-service teachers' experiences in the seminar course and while they were teaching. My undergraduate education in pre-service secondary mathematics education served as a foundational background for my work with pre-service teachers. By completing the mathematics and mathematics education coursework myself, although not at the same university, I developed my own perceptions on undergraduate teacher education programs. I concur with Putman and Borko (2000) that teachers should be afforded with more experiences that align with their future teaching. Hence, the educational experiences afforded to pre-service teachers in the Teaching Seminar were of interest to me.

At the graduate level, I have built upon this foundation in a variety of ways: (a) obtained my master's degree in mathematics, (b) completed coursework in the field of education, (c) taught general mathematics courses, (d) taught mathematics content courses to undergraduate pre-service elementary school teachers, and (e) supervised pre-service teachers who were student teaching at both middle and high school levels. These experiences helped to give me expertise in the subject matter area, but some may argue that they biases the way I examined the data. To minimize bias, my thesis director and other members of my dissertation committee checked for an agreement with the results I found from the data.

Data collection

Data collection included multiple modes of inquiry: (a) pre- and post- course questionnaires, (b) pre- and post- course interviews with each of the four focal pre-service teachers, and (c) videotapes and field notes from the observed Teaching Seminar sessions. I administered the surveys, conducted the interviews, and recorded all sessions of the Teaching Seminar except for one session.

The questionnaires were used, in part, to determine how all ($n = 11$) of the pre-service teachers' visions of themselves changed from the beginning to the end of the semester. The questionnaires contained nine questions (most with multiple parts) concerning both their role in the classroom while they were teaching and the role of their students in the classroom. Sample question: Pre: Describe what you think your role will be in teaching your section of College Algebra; Post: Describe your role in teaching your section of College Algebra. Pre-service teachers' responses were used to guide interviews with the focal participants to probe how the Teaching Seminar altered their current visions of themselves as teachers.

Two semi-structured interviews (Patton, 2002) were conducted with each of the focal pre-service teachers to gain an understanding of how the seminar supported their visions of their roles as teachers. The initial interviews were conducted during the third and fourth weeks of the Teaching Seminar, and the final interviews were conducted during the last two weeks. To gauge the evolution of their experiences, responses to the first questionnaire regarding their perceptions of themselves as a teacher were stated, and they were asked to respond to how they felt this has changed throughout the semester. These data allowed for triangulation (Patton, 2002) with the observed findings from the Teaching Seminar related to pre-service teachers' ways of talking about themselves as teachers.

The pre-service teachers were each observed at the beginning and end of the semester teaching in their classrooms. They were observed on two consecutive days (50 minute class periods) at each time period. In addition, the pre-service teachers were observed indirectly on a regular basis in the Teaching Seminar. For the purposes of this study, since it focused on visions, observational data were used for purposes of triangulation rather than to make direct claims about the pre-service teachers.

Data analysis

Following standard methods of qualitative (e.g., Miles & Huberman, 1994; Patton, 2002) research, I analyzed and interpreted the data. Coding (grounded theory approach), case records, and assertion creation were used in the analysis of this study. Coding was completed using both the guidelines for coding given in Patton (2002) and details of coding found in Miles and Huberman (1994).

Results

In making comparisons between the pre- and post- seminar questionnaires, I was interested in examining if there were changes in the roles pre-service teachers envisioned themselves having as teachers in relation to reform versus traditional teaching. To determine this, each description of their roles as teachers provided by the pre-service teachers was coded as reform, traditional, or undecided. Reform responses were often characterized by envisioning themselves as a facilitator of information, traditional responses as a “teller” of information, and undecided as hard to infer from the information provided. The following table provides the results:

Table 1: Pre-Service Teachers' Visions as Teachers

Pre-Course Response	Post-Course Response	Participant
Traditional	Traditional	2 males, 2 females
Traditional	Undecided	1 male, 1 female
Traditional	Reform	1 female
Undecided	Undecided	1 male
Undecided	Reform	1 male, 2 females

Using this coding scheme, 7 of the 11 pre-service teachers' pre-seminar responses were traditional and 4 of the 11 responses were undecided. There were no original responses that fit under the reform style of teaching. Although 4 of the pre-service teachers' descriptions of themselves as teachers remained traditional, 4 of them provided more reform-oriented responses in the post-seminar questionnaires. The other 3 pre-service teachers provided responses that were difficult to decipher and coded as undecided. Below are two of the extreme cases. Garrett's responses illustrate both traditional responses, while Mandi's responses shifted from traditional to a more reform-oriented response.

Garrett (pre): To relay knowledge to the students, and doing what it takes to accomplish that task.

Garrett (post): I was a provider of information to the students. I didn't make class fun. I showed them what they need to know.

Mandi (pre): We have a lot of material and not much time - I am forced to be the "sage on the stage." I am the one who has to have knowledge. Shows the students how to work the problems. We can't get too in depth.

Mandi (post): My role...hmmm...I am a facilitator of information. I help students decipher the stuff the book is telling them.

Garrett kept his position as the provider of knowledge, while Mandi shifted her description of her role as a teacher from one that tells students what they should know to one that helps students understand mathematics. The statements provided by Garrett and Mandi were consistent with their classroom teaching. Garrett asked students for questions they had on their homework and solved the problems for the students. Then he gave examples for students to reference for their next set of homework questions. Even though Mandi also provided help with homework problems in her classroom, she tried to involve the students in the thinking process and recognized that it was not how she wanted to conduct her future teaching.

To illustrate a pre-service teacher whose view shifted from one which was hard to categorize to a more reform-oriented view, consider a few excerpts from Lisa's interviews.

Pre-seminar interview excerpt:

Author: So in terms of your teaching, can you describe to me a little more your role as a teacher in that class?

Lisa: I found that I work good with my students when I'm at more of a friendly level instead of an authority level.

Author: Uh, huh.

Lisa: Because I'm not comfortable just kind of feeling mean [laugh] standing up there.

Author: Uh, huh.

Lisa: As an authority. I like to hear my students talk back and be comfortable with me, so I think I'm better with that.

Author: So can you give me an example of some teaching that would be in a friendly level and some that would be in authority level?

Lisa: Well more of a friendly level is just asking them, you know, “how’d you guys do on your test?”, and just caring about them and being open to questions and.

Author: Yeah.

Lisa: You know, if they ask me questions, as long as it’s not like too unprofessional, you know, I can answer pretty much anything and those sorts of things. More of an authority is just like standing up there saying “do this, listen to me.”

Author: Uh, huh.

Lisa: You know, “be quiet while I teach,” that sort of thing.

Author: So it’d be fair to say getting their input on things?

Lisa: Yeah.

Post-seminar Interview:

Lisa: You don’t just want to memorize something because a couple years from now you might not use it enough and forget it...

Lisa: You know I get that impression from a lot of students and so when you’re in a high school, you know, they’re there, they wanna, they really want to have fun in a class if they can so I would try to do more like games and things like that in a high school class. I mean obviously, like we talked about before, you have to be careful about when fun can just be in the way.

Author: Uh, huh.

Lisa: So I mean, I would definitely make it more interactive, more student-centered.

Author: Did you do anything to try to make this class student-centered, you were limited by quite a few factors, but is there anything you did, yourself?

Lisa: Um, a lot of times what I just tried to do is ask them “How do I do this problem?,” “How do you start this problem?”

Author: Yeah.

Lisa: That’s the main thing that I do. And then I did that group thing with the word problems and um, I’m trying to think if I did anything else. Just, I’ve never really had them come up to the board except for when they did the group things.

In Lisa’s pre-seminar interview, she did not give a direct inclination on her stance as either a traditional or reform-oriented teacher. Rather Lisa discussed her rapport with students in the classroom. In her post-seminar interview, however, Lisa used the phrase “student-centered” and discussed how she hoped her students would go beyond memorizing procedures. This shift in her discussion of her teaching may be slight, but it is a step in the direction of envisioning herself as a reform-oriented secondary mathematics teacher. Once again, her teaching was consistent with her interview responses. Lisa did, in fact, ask her students for input on how to solve problems that she worked in class. She recognized that her teaching was not one hundred percent student-centered, but it fit the class she was working with and her comfort zone as a first time teacher. Yet she also wanted to continue to make her class more interactive as she grew as a teacher.

In general, it is important to note that only 4 pre-service teachers provided traditional responses at the end of the Teaching Seminar. Hence, evidence supports some of the pre-service teachers’ visions of themselves as teachers became more reform-oriented after partaking in the experience of teaching College Algebra and discussing this teaching in the Teaching Seminar.

In any case, the Teaching Seminar provided pre-service teachers with an authentic experience of teaching a mathematics course and reflecting upon it with their peers and an

experienced mathematics professor. This experience offered pre-service teachers the opportunity to think about and reflect upon their classroom teaching in ways that went beyond most standard teacher education programs.

Discussion

As stated by Shulman and Shulman (2004), pre-service teachers' visions are thought, in part, to guide the style of their future teaching. Some of the pre-service teachers' visions of themselves as teachers changed after completing the Teaching Seminar, while others did not appear to change. Data indicated that the pre-service teachers were showing evidence of reform-oriented discussions in the Teaching Seminar. However, when asked about this in questionnaires, not all of them provided descriptions of themselves falling under the National Council of Teachers of Mathematics' (2000) classification of reform-oriented teachers. This is not surprising, since many have had a least 13 years of experience as a student where most, if not all, of their teachers taught in a traditional manner as opposed to a reform oriented manner. Altering the visions of pre-service teachers is not an easy task with the experiences pre-service teachers bring with them to the classroom (Shulman & Shulman, 2004). After all, the pre-service teachers selected to be in the Teaching Seminar were deemed successful at mathematics by the department and were taught the subject using traditional teaching methods. In addition, there was little pressure on the pre-service in the Teaching Seminar to conform to reform-oriented views of teaching. Developing a reform-oriented style of teaching was not an explicit goal of the course. Rather, it was me who examined pre-service teachers' visions to find out if they changed after attending the Teaching Seminar. Nonetheless, after attending the Teaching Seminar 4 of the 11 pre-service teachers did describe themselves as more reform-oriented teachers of mathematics. At the beginning of the semester, none of the pre-service teachers described themselves as

reform-oriented teachers. By the end of the semester, some of their descriptions of themselves as teachers had become more reform-oriented or had become descriptions that were not as extreme on the traditional side.

Both the change and lack of change, exhibited in different pre-service teachers' visions bring about important questions: (a) What was it about the Teaching Seminar that impacted some of the pre-service teachers in a way that made them alter their visions of themselves as mathematics teachers?, (b) If the Teaching Seminar were to have pre-service teachers' visions become reform-oriented as one of its goals, would the results be different?, and (c) What could be done differently to alter pre-service teachers' visions of teaching to a more reform-oriented stance? If this study were to be replicated, follow up interviews could be done with the pre-service teachers to investigate their perceptions of these questions.

In addition to bringing about future questions, I envision general education faculty and content specialists gaining perspectives and ideas from this study to design teaching seminars for different disciplines. The general education faculty and content specialists could collaborate more on the design and goals of this seminar to enhance the outcomes in relation to reform-oriented teaching. This does not mean that the seminar has to run differently, but it does mean pre-service teachers' ideas about their visions of teaching could be challenged in the Teaching Seminar. The discussion of facilitating discourse is one aspect, for instance, that should be added to the Teaching Seminar. In addition, pre-service teachers could be encouraged to think outside of their normal domain of teaching and attempt new methods for teaching their students more frequently. These ideas, of course, should be investigated further. It does necessitate additional research to be conducted on the Teaching Seminar at the researched university, as well as trying to establish and research similar seminars at other schools and in other subject areas.

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