

Windows into Classroom Practice:
Using Instructional Videotapes in an Elementary Mathematics Methods Course

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Abstract

The purpose of this study is to investigate preservice teachers' views about the value of and purposes for the use of instructional videotapes of teaching and learning situations in mathematics in an elementary mathematics methods course. A variety of written and interview data were collected from five preservice teacher participants. Reactions from the participants ranged from skeptical about the classroom situations they viewed, to surprised at the engagement of the videotaped students in mathematics and their own positive reactions to these situations, to reflective about the videotaped situations and how they related to their own teaching. Whether the participants were characterized as skeptical, surprised, or reflective, they all came to feel that viewing the videotapes was a worthwhile experience. The evidence indicates that the preservice teachers found the videotapes useful and attributed some of the changes in their thinking about the teaching of mathematics to their use.

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Background Information

More and more, we are recognizing that the preparation of teachers is a developmental process that focuses on understanding the dilemmas of teaching (Harrington, 1995). Clinical and field components of teacher preparation programs provide the primary opportunities to address these dilemmas. However, professional courses that have traditionally presented techniques and methods of teaching also can serve as a means to help preservice teachers discuss and analyze situations that illustrate dilemmas of teaching.

Instructional videotapes are now available that provide brief windows into models and dilemmas of classroom practice which can support reasoning about instruction (e.g. Fennema, Carpenter, Levi, Franke, & Empson, 1996; Kamii, 1990; Richardson, 1990; TERC, 1998a, 1998b; WGBH Boston, 1995). By viewing teaching and learning situations on videotape, prospective teachers may be introduced to some experiences of teaching by seeing examples of actual classroom practice as well as students describing their mathematical thinking. Video technology is beginning to be used more and more as a way to link theory and practice in teacher education (McIntyre, Byrd, & Foxx, 1996). Although there is not yet a great deal of research on the topic, “there does appear to be a trend toward finding video technology useful in providing additional and richer ‘classroom’ experiences and for enhancing prospective teachers’ reflective thinking” (McIntyre, et al., 1996, p. 182).

The use of videotaped episodes as cases for study and reflection emerges from prior work with print-based cases (e.g. Merseth, 1996). In contrast to print cases, “video offers users the opportunity to listen to real student voices in real time and provides rich images of classrooms

organized around student thinking” (Schifter, Bastable, & Russell, 1997, p. 7). These video episodes provide an actual classroom context that illustrates the actions, affect, and dialogue of teachers and students as they interact.

The use of a variety of instructional videotapes was integrated into a course called Methods for Teaching Elementary School Mathematics (mathematics methods course). It was the instructor’s intent to use the video episodes in theoretical contexts developed through the use of readings (primarily from Van de Walle, 1994), a consideration of the developmental sequence of selected mathematics content over the K-5 curriculum, and ongoing analysis of selected hands-on activities explored as ways to teach specific mathematics content. The use of these videotapes in this context to stimulate discussions and focus on reflection, decision-making, and analysis may help facilitate changes in thinking about teaching mathematics in preservice teachers.

Data Collection and Analysis

The use of instructional videotapes was integrated into the mathematics methods course, a part of a “methods block” that preservice teachers take twice a week for 1 ½ hours each during the fall semester of their senior year. This course was comprised of 20 students (18 traditional age and 2 non-traditional age, 18 female and 2 male). Videotapes of situations related to the teaching and learning of mathematics were shown during class sessions, and some were required to be viewed outside of class. Appendix 1 provides a brief summary of the videotapes viewed. Preservice teachers reacted to the videotapes through written responses and group discussions. Discussions focused on mathematics content and on pedagogical and instructional issues related to the video vignettes. Written responses were prompted by questions from the instructor and, for some assignments, submitted by email. This was the first semester that the instructor made

systematic use of these videotapes, and she was interested in descriptions of the preservice teachers' views and impressions of the use of video materials.

Without the presence of the instructor, the students in this course were introduced to the study and asked to volunteer to participate. Five students (4 female/1 male; all traditional age) volunteered to participate in the study. Data were collected through observations of the use of videotapes in the course, review of the participants' written assignments for the course, and interviews with each of the participants.

I. Observations: Observations of the course were done on three separate occasions, once each in October, November, and December, 1996. Study participants were observed during normal class activities, which included viewing and discussing videotapes. Extensive field notes were made of each observation. Although the participants interacted with the entire class of 20 students, field notes focused only on the volunteer participants.

II. Document Review: Three written assignments completed by each of the participants were examined. The assignments reviewed were: responses to questions about the videotape *Pumpkin Seeds* (WBGH, 1995); responses to questions about knowledge of mathematics content, pedagogy, and children; and responses to questions about the videotape, *Marshmallows* (WGBH, 1995).

III. Interviews: Each participant was interviewed twice, once in late October and once in early December, 1996. Participants were questioned about the use of the videotapes, as well as their thoughts about teaching mathematics. The interviews were audiotaped and later transcribed and merged with field notes taken during the interviews. Although the interviews did not follow a prescribed pattern, possible questions were developed prior to the interviews to use as a guide (Appendix 2).

It is important to acknowledge that the mathematics methods course included more than just the use of the video episodes, so that attributing results exclusively to the use of these videotapes is not possible. However, the goal of the study was to explore the potential impact of videos as part of a mathematics methods course. Consequently, the analysis of data is focused on students' perceptions related to the impact of the video component of the course. It is our belief that the analysis of the interviews triangulated with the document review and observations provides a useful description of the preservice teachers' views about both the value and the purposes for use of the videotapes. Because only five of the 20 students in the course agreed to participate in the study, this analysis clearly cannot be generalized to all mathematics methods students, or even to the other 15 students taking this course. However, examining the in-depth responses and views of these participants can allow us to develop an initial framework with which to consider other preservice teachers. The participating preservice teachers, all elementary education majors, are briefly described below.

Kris¹

Kris had a second major in psychology. She worked with a kindergarten class in a suburban school which she described as “developmentally appropriate.” Kris' s background in mathematics included courses through Pre-Calculus. She remembers doing well in math, saying, “I was good at it, but I didn' t ever like it.” For her, math was a series of seemingly irrelevant activities and she couldn' t “remember ever thinking that math was useful, or you could really apply it.” In fact, math was “the least subject I liked.”

Sarah

¹ Names have been changed to provide anonymity.

Sarah had a second major in English. She worked with a second grade class in a suburban school which she described as “traditional.” In high school, Sarah found math to be a problem, taking courses through Trigonometry. To meet her college math requirement, she took Symbolic Logic. At the beginning of her interview, she quickly identified herself as “not a very math person” who was “dreading having to take this math (course).” She described her feelings about math in high school: “I didn’ t completely despise it, you know. But they bored me when it started getting really hard, so I didn’ t completely hate it, but I thought, like, it wasn’ t the most useful subject in the world.”

Steve

Steve had a second major in sociology. He worked with a third grade class in a rural/suburban school which he described as “traditional.” Steve took mathematics classes through Calculus in high school, and he took Statistics as his required mathematics course at the university. He recalled “learning one set way to figure something out” in math classes. He explained that “my mom always said I was good at it, but I didn’ t feel like I was really good at it. I think it was more because I had to work at it than anything, but, I liked it okay.”

Kelly

Kelly had a second major in history. She worked with a third grade class in a rural/suburban school which she described as “fairly progressive.” Kelly’ s background in mathematics included advanced classes in high school through Advanced Placement Calculus, and she took Statistics to fulfill her college math requirement. She remembers learning math in a rote manner, saying, “I did it and I memorized it, but it didn’ t make a whole lot of sense to me.” However, she felt reasonably successful in math, saying that it wasn’ t a “stumbling block” for

her. As she progressed in math, she felt that “higher level math was not as much fun as certainly the stuff I did before, but, yeah, I liked math overall.”

Rachel

Rachel had a second major in psychology. She worked with a second grade class in a suburban school which she described as “student-centered.” Rachel’s background in mathematics included an Honors Algebra II course and, in high school, stopped at Pre-Calculus. Her math requirement in college was met by taking Symbolic Logic. She described a varied response to math: “It’s had really high ups and really, really bad downs for me, even from kindergarten through now, like, you know, college.” Despite these ups and downs, she said, “But I feel comfortable with math. I don’t feel like it’s something I can’t do or something I really hate.”

These five preservice teachers came to elementary school teaching with various backgrounds in and feelings about mathematics. The experiences they had with mathematics provide a context for their learning about teaching mathematics. The videotapes they viewed demonstrated student-centered, manipulative-based, problem solving approaches to teaching mathematics that are very different from the didactic, “traditional” teaching most of the participants described as receiving in mathematics classes.

The analysis of the data involved identifying themes mentioned by the preservice teachers in their written and interview responses that emerged over the course of the study (Copeland & Decker, 1996). As the data were analyzed, patterns emerged among the participants with regard to their responses to the teaching and learning situations demonstrated in the instructional videotapes. Of the five students involved in this study, two students began with doubts about the classroom situations they viewed, wondering whether teaching could and should really be as it

was presented. Two students were surprised by the engagement of the videotaped students in mathematics and their own positive reactions to these situations. The final student viewed the videotaped cases as providing a realistic basis for deep discussion and reflection on her own teaching. Their reactions are exemplified by using three characterizations, that of the skeptical student, the surprised student, and the reflective student. These characterizations are not the only possible classifications of mathematics methods students, and a single student might demonstrate aspects of different categories; however, these students exhibited their primary orientations toward these characteristics.

The Skeptical Student:

Kelly best exhibits the characteristics of a skeptical student, expressing doubts about many of the new ideas and examples to which she was being exposed. She had concerns about “allowing students to have so much control over their own learning.” Her initial responses to the videotapes were tentatively positive, but she remained largely skeptical about the practicality of the lessons she viewed.

“We would sort of wonder ..were they really all doing as well as they looked to be doing on the tape?” “I always sit there and go, ...‘ I wonder if the teacher actually put all these things out?’ ”

When asked to write about a videotape showing a lesson counting pumpkin seeds scraped out from pumpkins, she expressed concern about “how this lesson would go if it were taught in a room without an aide or volunteer.” She also suspected that there would be children “who would find it too tempting to play with the seeds rather than work with them.” In responding to another videotaped lesson, *Marshmallows*, she found that stepping back and encouraging students to learn on their own was “quite a leap for most adults (myself included) to take comfortably with

children.” She expressed these doubts in the first interview, in her written work, and even in her participation in class.

Kelly appeared to be impressed by the interviews of individual children, seeing them as “an introduction to the whole idea of individually assessing what a child knows.” By the end of the course, this skeptical preservice teacher became more open to ways of teaching mathematics that were not consistent with her didactic mathematical background and found the videotapes helpful in bringing concepts she learned in class to life with teachers and children in the classroom. She suggested that, after introducing a concept, activity, or use of a manipulative in class,

“even if we didn’ t watch an entire (videotaped) lesson, just a little blip about ..what we used today,” it would reinforce the course content. “I would learn just as much ..from a video as opposed to just stepping into someone else’ s classroom.”

This skeptic expressed a belief that it was possible to teach mathematics differently than the way she was taught.

“I watch what teachers are doing and I say to myself, ‘ I can do that. If I sit down and really think about what materials I have, what could I use, that I think I could do it given the time and energy to make that happen. I could do that.”

Kris was also skeptical about the benefits of the lessons she saw on the videotapes. When writing about the pumpkin seed lesson, she doubted whether the students would really “learn” from the activity.

“I wonder if the children were able to pick up the concept of estimation from this activity. ..Math is such a relevant and useful thing ..I just hope the children will realize how valuable a thing it is through these types of practices.”

She had a similar response to the videotape with the lesson, *Marshmallows*, questioning whether students could really learn on their own.

“I question whether you would be able to use this lesson with any class at the age level ... There should probably be more instruction from the teacher explaining how these problem solving skills ..could be used in other situations and perhaps name a few or tell some examples.”

By the end of the course, however, Kris appeared to value the types of student-centered activities shown in the videotapes. When asked to explain ways that are effective in helping students learn mathematical concepts, she referred to “presenting problems that relate to the students’ lives and interests (as in) the *Marshmallows* and *Pumpkin Seeds* videotapes.” She also listed “activities that allow students to experiment and actively engage with the number concepts, cooperative work, use of manipulatives as teaching tools,” themes that were developed throughout the course. Kris did express a desire to “have the children active” and that she wanted to learn from the students, as demonstrated in some of the videotapes.

“I think having children explaining their, what they’ re doing and stuff, this also helps direct which way the teaching’ s going to go, so it’ s going to be helpful for me, the teacher, and also to know if they’ re understanding what’ s going on.”

Both of the “skeptics” seemed to become more accepting of the student-centered focus to teaching mathematics that their professor was advocating, and both cited the videotapes as playing a role in that change.

The Surprised Student:

Sarah expressed her surprise throughout observations, interviews, and written work. From the first videotape she watched, the thinking and enthusiasm the students displayed seemed to amaze her.

“It shows that by using real-life situations to teach concepts, children are much more open to learning and taking the assignment as far as they can.”

She compared her background in mathematics with the types of mathematics instruction seen on the videotaped pumpkin seed lesson.

“I came into this class only knowing about the didactic way of teaching math. ..We’ ve seen in the videos of how you have a problem and you say, ‘ Okay, you guys solve it the way you want,’ and then showing different ways – that is an exciting way of teaching for me ..I’ m definitely going to use that because it makes sense and is more interesting to me.”

“This video for me gave another example of how to make teaching math hands-on and fun.”

As the class progressed, she continued to be surprised by the achievements of the students she saw and the problem solving encouraged by the teachers. She also wrote about the students’ willingness to participate and learn in these classrooms, which was different from the experiences she had already described as a math student herself.

“I also was surprised that some of the children wrote about their conclusions even though they were not asked to. It shows that by using real-life situations to teach concepts, children are much more open to learning and taking the assignment as far as they can.”

Sarah became enthusiastic about the prospect of teaching mathematics in a way she had never considered before.

“I was clueless when I was starting out. I was so nervous because I had no idea. ...

(Now) I feel more excited about it!”

Steve also expressed a degree of surprise about how he was learning to teach mathematics. He found that the way he had been taught was very different from the methods he was learning and saw demonstrated on the videotapes.

“I think it gives a different approach than how I was taught. ..I see that when kids are allowed to think and try to solve problems on their own, they seem to do much better than when they have an example to follow. The kids have more freedom to explore how to solve the problem instead of worrying about doing it the way the book tells them to. ... Now I like to make it more hands-on than just straight out of the book.”

Although Steve had these positive reactions to the types of teaching and learning demonstrated on the videotapes, he still wrote of a lack of confidence in actually implementing these types of lessons.

“My only concern that I can think of is that I am not creative enough to find hands-on lessons like this one to teach the kids. I just don’ t want math to be boring for my students and I am not sure I could make lessons as fun and educational as this one.”

Despite this concern, Steve found aspects of the videotapes relevant to teaching not only mathematics, but also other subject areas.

“This has been the only class we’ ve actually seen the videos, the examples of actual classrooms doing these kind of hands-on activities, and I think you can definitely apply it to other subjects, you know, kind of trying to see what the kids know and see what they, how they understand something ..just making all the other subjects more hands-on, too,

where the kids actually got to be active learners and not just kind of sit there and kind of take it all in.”

Both of these preservice teachers may be characterized as surprised by the type of teaching they saw, as well as by the success of that teaching.

The Reflective Student:

Rachel may best be described as a reflective student. While she acknowledged the effect of her earlier experience with mathematics, she remained open-minded about how to teach mathematics. She viewed the videotapes as an opportunity not only to see examples of students and teachers, but also to discuss them in depth. When asked about the value of the videotapes, she continued to stress the processing of the material.

“I think the videos are definitely more effective than (lecturing or reading), especially since we discuss them ..I think the real deep discussions that we have about them ..really help to get our thinking going in the right direction.”

In her writing, Rachel often reasoned through situations on the videotapes, moving beyond a “like/dislike” reaction to a more specific consideration of aspects of the lessons.

“One of the questions I thought of was do we or don’ t we step in to help a group come to a consensus if we sense there is discord. From one perspective, it’ s good because the problem is short-lived, but from another it might make kids rely on a teacher or authority figure rather than solving problems on their own.”

At the end of the course, her concerns about teaching mathematics also showed reflection on what she had learned throughout the semester.

“I think in my (student teaching) classroom the kids don’ t talk a lot about their thinking and their strategies behind doing things ..so I think one of the hardest things will be just to

move the kids from how they' re thinking now about their answers to the process ..I' ve tried to start to integrate a little bit of, ' Tell me why you did that' or ' What were you thinking when you used this way to get this answer?' ”

“I think my hardest thing is making sure that I' m addressing the whole range of, from the lowest achieving to the ones that are doing square roots in second grade like some of my kids are right now.”

Rachel' s reflective stance helped her bridge the viewing of the videotapes with her own practice in the classroom.

Findings

Regardless of whether they were classified as skeptical, surprised, or reflective, the preservice teachers were generally positive about the videotapes in the written work turned in to their instructor. They also expressed positive attitudes during their interviews. In addition, their behavior while watching and discussing the videotapes suggested that they were engaged and had positive reactions. Whether characterized as skeptical, surprised, or reflective, the preservice teachers viewed the videotapes as offering worthwhile learning experiences, suggesting that the use of videotapes can help instructors move students with different orientations in intended directions.

Upon examination of the various types of data, a composite picture of the reasons the preservice teachers had positive reactions to the videotapes emerged. They are described in three main categories:

- Help for the instructor to “get across what she' s trying to teach us to do”
- Demonstration of “new ways of teaching”
- Reinforcement of the belief that “you really can teach that way”

Help for the instructor to “get across what she’s trying to teach us to do”

Students recognized the instructor’s logistical difficulties in providing a lesson they could all observe as a basis for discussion and appreciated that the videotapes gave them that opportunity.

“It’s a lot easier than all of us trekking out to a school and watching a lesson and we would be totally intruding ..it would definitely not be an authentic situation.” (Rachel)

“(We can use the videotapes) to observe kids in the math class and then analyze it as a group ..since we can’t go into a math class and do it as a group.” (Kris)

The videotaped assessment interviews with children also provided a model for the preservice teachers’ interviews with their own students.

With the interviews of the specific kids, it was – that was very helpful to me because nobody has ever really talked with us about how to interview one kid at a time, what kinds of things you do, whether or not it’s okay to say to them, ‘Are you sure?’ ‘Would you like to try again?’ ‘Would it help if I did this?’ and just sort of gauge where they were.

So those were very helpful. (Kelly)

“When we were talking about them in class before – the interviews and what the child had learned, it didn’t seem that relevant. But then once we did our interviews, it was neat to reflect back on the tapes and how similar the children –since we had to do an interview ourselves, I don’t think they would’ve meant as much if we didn’t have to do one ourselves.” (Kris)

In general, the videotapes allowed the preservice teachers to see examples of what their instructor wanted them to take from the course about teaching mathematics. As Rachel described,

“They’re a way for her (the instructor) to get across to us the philosophy behind her class and what she thinks about teaching math in an actual classroom setting. Even though it’s on a video, it’s, you know, it’s real teachers and real kids.”

Demonstration of “new ways of teaching”

Most of the teaching strategies demonstrated in the videotapes were very different from the ways these preservice teachers were taught mathematics. They came to value many of the characteristics of these strategies, such as:

- Appreciation that different students have different ways of thinking: Steve realized that “different students ..think differently or at different levels.” He also admired

“the whole group instruction where it’s kinda – the kids are free to raise a hand and just say, ‘This is what I think,’ ‘I’m doing this differently,’ and not be afraid to say, ‘Ooh, I didn’t do it that way,’ ..instead of saying there’s just one clear-cut answer.”

Sarah was surprised to see how “individual kids solved their problems and, you know, where they are in their math understanding.” She expressed that the videos “showed how children at the same grade level can be so far apart with what they think and understand.”

- Use of manipulative-based, “hands-on” instruction: Kris felt that

“(the lessons) that stand out the most are the ones like the pumpkin seeds, the ones that used interesting things like manipulatives and stuff other than just the problems on the board.”

She wanted to “use the objects and visuals and hands-on manipulatives and stuff for them to make it more real to them.” Steve found the videotapes gave him “neat ideas of things to do with manipulatives, like the pumpkin seeds and the marshmallows.” Sarah felt the videotaped pumpkin seed lesson “gave me another example of how to make teaching math hands-on and fun.”

- Focus on problem solving in authentic contexts: When asked for ways that are effective in helping students learn concepts, Kris cited the videotaped lessons because the teachers “present the problem, letting students share their problem solving strategies with one another” and “present problems that relate to the students’ lives and interests.” One strategy that Kelly viewed and wanted to implement in mathematics as well as other subject areas was “just having the kids explain and just letting kids come up with things until they ran out of ways of solving the problem.” Sarah summarized the value of using authentic contexts.

“It shows that by using real-life situations to teach concepts, children are much more open to learning and taking the assignment as far as they can.”

- Encouraging students to take active roles in their own learning: Throughout viewing the videotapes, Kelly “was most struck by the active role that the students had in creating their own learning.” The videotapes gave clear examples of

“just letting the kids help each other learn and describing each others’ strategies instead of the teacher always saying, ‘Well, Steven did this and this and this, and does everybody understand? Okay, now we’re going to move on.’” (Rachel)

Rachel also admired how the teacher in one lesson “let the students learn actively, got parents involved, ..gave them strategies for counting, but did not dictate how they had to work.”

Steve identified that, in the student-centered environment, “another thing that stood out was that the students were really free to explore different solutions and be creative.”

Reinforcement of the belief that “you really can teach that way”

The videotapes allowed the preservice teachers to learn new strategies for teaching mathematics, but they also gave the students a “big picture” of teaching math in “real life,” rather than just in the university classroom.

“It’s giving us some of that, some time in classrooms but in our university classes to see how real teachers do it and how successful teachers teach their children.” (Sarah)

“It was very good, because you can actually see lessons being done rather than, ‘Here’s what you do and hope it works for you’ kind of thing.” (Kelly)

The videotaped teaching and learning situations served as an example that the students want to follow.

“I hope that I can create learning situations similar to this, get kids involved and excited, and at the same time teach (or let kids experiment with) new skills .. and, I think they’re all examples of really good teaching.” (Rachel)

“Showing just the different activities that you could do with it makes it seem more useful and relevant. And I didn’t see that before this class.” (Kris)

The videotapes changed even skeptical Kelly’s doubts about whether this type of teaching would really work.

“Now I can see how teachers teach some lessons that are math lessons that aren’t number crunching, that aren’t very blatantly number manipulation .. the video works out because it’s obvious proof that some kids can do this.”

Although the overall response to the use of the instructional videotapes was positive, the preservice teachers expressed a few concerns. Some felt that, although the videotapes were worthwhile, they would prefer not to have as many written assignments, especially writing lesson plans of the videotaped lessons, associated with them.

“I can see the value of the videos, though I didn’t like particularly writing the lesson plans, the discussion to write that up was what was helpful to me.” (Kelly)

“Watching the videos is good. But about making, having to do lesson plans, I mean, maybe like one. ..I mean, still keep the videos, watching them and discussing them, but doing four or five of those, it’s kind of, ‘O.K., now, we’re doing it over and over again.’” (Sarah)

Some students also recognized that the videotapes only gave them a piece of the “big picture.”

“..it doesn’t really show, like, the whole process.” (Sarah)

“That’s something we haven’t really seen, how much do you, like if you’re going to do a unit on something, how far do you try and take it? Because in class we’ve touched on how to teach different topics, place value, fractions, but we haven’t really talked about what exactly would be in this if you were doing it for three weeks.” (Rachel)

These concerns, however, did not seem to negate the benefits of using the videotapes.

Although every student in a mathematics methods course will not fit neatly into a category, we find these characterizations helpful in examining types of possible student reactions to the use of the instructional videotaped teaching and learning situations and in examining the reasons for their reactions. In addition, these preservice teachers revealed a great deal about their views of mathematics and their approaches to the strategies exhibited in the videos and advocated by their instructor. They articulated what they wanted to do as a teacher of mathematics.

“Getting the hands-on activities incorporated and instead of teaching as telling, using the manipulatives and getting the students engaged and active instead of just telling and paper-and-pencil, using active learning.” (Kris)

“(Before) I would probably have tried to funnel them into the traditional way of doing things. And I think now I would say, ‘ Well, if that makes sense to you and if you can do it consistently, go for it, use it, do whatever you want.’ ” (Kelly)

“I want to cover the diversity of learning styles and reach all of these kids that are at different levels and also just think differently, too ..it has to be a lot more individualized than I thought beforehand.” (Steve)

“..having the students create their own understanding ..you have to let go of how you think about it and open your mind to other ways and that kind of thing.” (Sarah)

“You can let kids construct their own ways to do things and they will get things right. They don’ t have to do it in the set algorithms that we’ ve been taught, or that are the ‘right’ way to do things. ..just let kids construct their own strategies and their own knowledge.” (Rachel)

The videotapes seemed to help these preservice teachers develop a new picture of what a mathematics teacher is.

“I have noticed that, by watching the videos, my concept of a math teacher and of math has changed.” (Sarah)

Other instructors may want to examine these views and impressions to consider the impact of the use of these types of videotapes with their own students. Perhaps the use of this classification scheme will help other instructors begin to consider their students’ characteristics when coming to a mathematics methods course and how videotapes might help facilitate changes in their thinking about teaching mathematics. An additional study follows these students into their student teaching placements and examines the preservice teachers’ changing views over the entire school year (Friel & Carboni, 2000). In addition, further research is needed to examine the

transfer of these attitudes into the actual practice of teaching mathematics beyond the teacher preparation experience.

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WBGH Boston (1995). *Teaching math: A video library, K-4*. (Available from The Annenberg/CPB Math and Science Collection, P.O. Box 2345, South Burlington, VT, 800-765-7373).

Appendix 1

Summary of the instructional videotapes used

Manipulative-based, problem solving classroom lessons

WBGH Boston (1995). *Teaching math: A video library, K-4*. (Available from The Annenberg/CPB Math and Science Collection, P.O. Box 2345, South Burlington, VT, 800-765-7373).

Videotapes and study guides

- *Marshmallows*, grade 2
- *Pumpkin Seeds*, grades 1-2
- *Dominoes*, grades 1-2
- *Meter Cords*, grades 3-4
- *Cookies to Share*, grade 4
- *Fractions with Geoboards*, grades 4-5
- *Arrays and Fractions*, grades 1-3

Videotaped interviews and classroom situations examining children's thinking

Fennema, E., Carpenter, T.P., Levi, L., Franke, M.L., & Empson, S. (1996). *Cognitively guided instruction* [Set of videotapes and manual]. Madison, WI: Wisconsin Center for Educational Research, School of Education, University of Wisconsin.

Kamii, C. (1990). *Multiplication of two-digit numbers: Two teachers using Piaget's theory* [Videotape]. (Available from Teachers College, Columbia University, New York 10027).

Richardson, K. (1990). *A look at children's thinking* [Videotape I & II and study guides]. (Available from Education Enrichment, Inc., P.O. Box 1524, Norman, OK 73070).

TERC (1998a). *Number and operations: Building a system of tens* [Videotape]. (Available from Dale Seymour Publications, 10 Bank Street, White Plains, NY 10602).

TERC (1998b). *Number and operations: Making meaning of operations* [Videotape]. (Available from Dale Seymour Publications, 10 Bank Street, White Plains, NY 10602).

Appendix 2

Interview Guides

1st Interviews:

- Describe the parts of the videotapes that stand out for you. Why do they stand out?
- Describe the discussion your group had after viewing one of the videotapes.
- What do you think are your professor's reasons for using these videotapes?
- How does what you've seen in the videos affect your teaching in other subject areas?
- Do you or have you liked math? Why or why not?
- If you were the instructor of this course, would you use these videotapes? Why or why not?

2nd Interviews:

- You're now just about done with your methods courses. If you were redesigning your mathematics methods course, how would you make it different?
- What do you think the challenges of teaching math will be?
- How, if in any way, do you think what you saw in the videos will fit in?
- Imagine a practicing teacher. Do you see any value in these videotapes as a help for him or her?
- What questions do you still have about teaching math that have not been addressed or not addressed completely enough?
- Will you be able to use anything you've learned in math methods in your other areas of teaching?
- How are you thinking differently about teaching math now as opposed to the beginning of the semester?