Preservice teachers' perceptions of gender equity issues in the mathematics classroom

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The purpose of the study was to identify preservice teachers' perspectives on gender equity and to explore how they process the information they receive about gender issues. Data were collected through written surveys administered to 225 preservice and inservice teachers enrolled in mathematics and science education (methods) courses at the university. Data were analyzed using Paine's (1990) categories of orientations to diversity: individual difference, categorical difference, contextual difference, and pedagogical difference. The study suggests that most preservice teachers have an individual difference view of gender equity in which they strive to treat all students the same to avoid discrimination. Some students hold a categorical view of gender equity in which they strive to overcome stereotypes about boys and girls. A small number of students actively denied that gender issues have any relevance to education.

The current reform movement in mathematics education in the United States (e.g., National Council of Teachers of Mathematics [NCTM], 1989, 1991, 1995) is predicated on the notion that all students can learn significant mathematics and should have adequate opportunities to do so. The professional standards for teaching mathematics (NCTM, 1991) places a lot of emphasis on classroom discourse as a vehicle for engaging students in meaningful learning. Teachers, as the orchestrators of classroom discourse, have a responsibility to make sure that no group of students is being denied access to mathematical ideas by the discourse in the classroom.

> *"Teachers, through the ways in which they orchestrate discourse, convey messages about whose knowledge and ways of thinking and knowing are valued, who is considered able to contribute, and who has status in the group" (NCTM, 1991, p. 20).*

The same document also notes that *WHAT students learn is fundamentally connected with HOW they learn it. (p. 21).*

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Thus, teachers have a great deal of responsibility to see that classroom discourse is used to enhance, not to limit, student learning in mathematics. Concomitantly, teacher educators have a responsibility to make sure that the preservice and inservice teachers with whom they work are prepared to create classroom environments that are compatible with the NCTM reforms.

However, there is a significant body of research that suggests that mathematics classrooms do not provide the same opportunities for all students. In particular, the different ways in which teachers interact with male and female students in mathematics classes have been consistently identified in the literature. Classroom organization patterns and sources of authority in the mathematics classroom have also been studied. Some of those studies are reviewed briefly here.

Related Literature

At the elementary school level, teachers tend to have more academic and management contacts with males, and males receive more instructional time than females (Becker, 1981; Fennema & Peterson, 1986; Good, Sikes, & Brophy, 1973; Leinhardt, Seewald, & Engel, 1979). Good et al. (1973) found that teachers asked male students more process questions and female students more product questions. Male students received more positive and negative attention, initiated more contacts with the teacher, and called out answers and guessed more frequently. Fennema and Peterson (1986) noted differential effects of teacher-student interactions. For example, receiving praise for the strategy used in solving a mathematics problem was significantly related to female students' high-level achievement. For male students, receiving praise for the answer was more effective in encouraging their mathematics achievement.

At the middle school level, Hart (1989) found that male students in selected seventh-grade mathematics classrooms were more involved than female students in public interactions with the teacher. However, Hart also coded private teacher-student interactions and found that there were no gender differences. Further analysis revealed that in classes where teachers interacted more often with male students there were more (a) teacher attributions concerning the causes of students' success or failure, (b) teacher control, and (c) overt sex stereotyping in the language and materials used. On the other hand, in the classes where teachers interacted more frequently with female students, there was a greater increase in the students' self-reports of confidence in learning mathematics.

At the secondary level, Becker (1981) collected data on teacher-student interactions in ten different geometry classes. As in the studies of elementary and middle school classrooms, Becker found that teachers tended to interact more frequently with male students than female students. These interactions included calling on male students who volunteered more often than female students who volunteered did. Asking male students more process questions, acknowledging male students more often than female students when they called-out answers, spending more time helping male students, and interacting informally with male students more often than with female students.

Koehler (1992) observed that in six of eight beginning algebra classes, male students were involved in more interactions with the teacher than were female students. However, male students outperformed female students in only one of the six classes. In two classes, female students outperformed male students and in each of the other three classes, there was little or no gender difference in mathematical achievement.

Another classroom process that has received attention in the research on gender and mathematics is classroom organization. Webb (1984) investigated gender differences in the interaction patterns and achievement of small groups in two junior high school mathematics classes and found that, in general, female students were more responsive to requests for help and usually responded to all group members. In contrast, male students tended to respond more often to other male students and to seek help from other male students. In another study, Forgasz and Leder (1995) found that in some groups male students tended to work actively on the mathematics while the female students organized or recorded the work. These findings suggest that teachers need to carefully consider group composition, the nature and requirements of the tasks, and means of assessment. Otherwise, small-group work may perpetuate gender inequitable behavior in the classroom and female students may be denied equal opportunities to learn mathematics.

Another important gender-related factor in classroom processes is the source of authority. In a traditional classroom, the teacher is the authority and he or she controls the learning environment. Boys may exert some control over the classroom activities because their behavior often demands the teacher's attention (Leder, 1992; Sadker & Sadker, 1994). Furthermore, they often assume responsibility for

their own learning by acting autonomously (Fennema & Peterson, 1985). However, girls have very little power or responsibility in the classroom. They tend to be quiet and are often ignored by the teacher and by other students (Leder, 1992; Sadker & Sadker, 1994; Webb, 1984). Also, girls are often more dependent on the teacher than are boys (Fennema & Peterson, 1985). To dismantle these classroom power structures, Barnes (1996) suggests that teachers design investigative activities that encourage collaboration, discussion, conjecturing, and justification. She also suggests that students be allowed to pose their own mathematical problems.

Rationale for the Study

The studies reviewed here allude to the complexity of the issues surrounding gender and mathematics. The literature does not suggest any simple solutions. Indeed, Fennema (1996) noted that research has failed to show a definitive link between teacher-student interaction and gender differences in student achievement in mathematics. Thus, it is difficult to know what should be taught to future and practicing teachers about gender issues. What is clear is that we must help current and future teachers become aware of gender issues so that they can proactively address them in their classrooms. As Campbell and Sanders (1997) note:

> *It is unnecessary, year after year, to graduate new classroom teachers who, because they do not know any better, unintentionally diminish the educational, career, and economic prospects of females and thus of the nation. Teacher educators can and must do better" (p. 75).*

To provide effective instruction for preservice teachers in the area of gender equity issues, we must first know what information and perspectives they bring with them to their teacher preparation programs. Therefore, we conducted a study of 225 preservice and inservice teachers at the University of (Georgia) in order to get a sense of their views of gender equity issues in mathematics and science.

The purpose of the study was to identify the perspectives about gender equity that preservice teachers bring with them to their methods classes. We were also interested in knowing how preservice teachers process the information they receive about gender issues. Specifically, we were interested in knowing what teaching strategies these teachers thought they might employ in their own classrooms to create a gender equitable learning environment. Knowing how

preservice teachers think about gender issues as they enter their teacher education program and as they are exposed to information about gender issues can provide the mathematics teacher education community with information about what aspects of gender equity might be addressed and how they might be addressed in ways that are most meaningful to teacher education students.

Description of InGEAR

The study reported in this manuscript was conducted as part of a federally funded research project titled: Integrating Gender Equity and Reform (InGEAR) [1]. InGEAR is a three-year collaborative project being conducted by Clark-Atlanta University, the Georgia Institute of Technology, Georgia Southern University, Georgia State University, and the University of Georgia. Each institution has a team of mathematics educators, science educators, mathematicians, scientists, and others working on the project on its campus. The American Association of University Women of Georgia and the Georgia Initiative in Mathematics and Science (a statewide systemic initiative also funded by the National Science Foundation) are also collaborating on the project. The purpose of the project is to change the ways in which preservice elementary, middle, and high school teachers learn to teach science and mathematics. The project has two main objectives: To initiate and implement the redesign of teacher preparation programs, including instruction in science, engineering, and mathematics courses, so that teachers entering K-12 classrooms are able to address issues that discourage girls and women from participating in scientific and technological fields; and to provide professional development opportunities for faculty and teaching assistants that will equip them with positive support and intervention strategies. To achieve the project goals, the project has four strands: an institutional self-evaluation; professional development of faculty and teaching assistants; a toolkit[2] of materials for teacher preparation courses; and a framework for teacher education. The collaboration was designed so that each educational institution in the partnership would take a leadership role for one strand, but all campuses would implement each strand. The study that is reported in this paper was conducted as part of the institutional self-evaluation.

Theoretical Framework

Paine's (1990) categories of orientations toward diversity provided a framework for analyzing the data gathered in the study. The framework consists of four layers of meaning for diversity: individual difference, categorical difference, contextual difference, and pedagogical difference. We chose this framework because it reflects various levels of understanding of diversity issues and their implications for teaching and learning. Though Paine's categories were developed to analyze prospective teachers' views of cultural diversity, the categories seem relevant for the specific diversity issue of gender as well. Paine's descriptions of these categories are summarized below and in table 1.

From an individual difference orientation, people are seen as different in all dimensions. Preservice teachers holding this orientation toward diversity often try to respond to students on an individual basis. The source and solution of a problem will depend on the individuals concerned. These preservice teachers usually disregard gender as having implications for teaching and learning.

Preservice teachers with a categorical difference orientation associate specific characteristics and patterns of difference with people in various categories. These categories include social class, race, and gender. However, the social construction of these categories is not examined. For example, in the category of gender, this means that the mathematical achievement and participation of white males are accepted as the norm, and females are seen to be disadvantaged or deprived because they do not measure up to these norms. Efforts to address these gender differences focus on removing the barriers to females' participation in mathematics or on changing females so that they will find mathematics more enjoyable and rewarding.

Preservice teachers with a contextual differences orientation toward diversity connect patterns of difference to a social situation. From this perspective, individual or categorical differences are not fixed but constructed through social interaction. Thus, a contextual orientation takes into account the causes of difference, unlike the individual or categorical orientation.

As preservice teachers question the social construction of individual or categorical differences, they may realize that these patterns of difference have implications for teaching and learning. This realization

characterizes a pedagogical differences orientation toward gender. An understanding of differences is combined with knowledge of equitable teaching strategies.

Orientation Toward Diversity	Source of Equity Problems	Solution to Equity Problems
Individual	Individual differences	Deal with students on an individual basis
Categorical	Categorical differences (e.g., gender, race, social class)	Remove barriers that limit participation of certain groups of students
Contextual	Social situations	Change social contexts in which learning occurs
Pedagogical	Pedagogy	Implement equitable teaching strategies

Table 1: *Paine's categories of orientations toward diversity*

Paine (1990) used the four categories described above to analyze preservice teachers' orientations toward diversity. In a survey of elementary and secondary preservice teachers, Paine found that preservice teachers relied heavily on an individual or categorical differences orientation toward diversity. They indicated the importance of fairness and equality for all students, but rejected certain differences (e.g., gender) as having important implications for teaching. When asked about specific teaching practices that would address diversity in the classroom, they generally responded with vague or confusing answers.

Methodology

Participants

Written surveys were administered to 225 undergraduate and graduate students enrolled in teacher education courses at the University of (Georgia). The sample included 183 preservice teachers enrolled in mathematics and science education (methods) courses. Typically, these students were college juniors and seniors, aged 20-21, who had no teaching or other full-time work experience.

	Male	Female	Not Specified	TOTAL
Elementary	5	72	1	78
Middle School	8	48	1	57
Secondary	15	31	2	48
TOTAL	28	151	4	183

Table 2: *Preservice (undergraduate) teacher sample*

The remainder of the sample consisted of 42 graduate students who were studying for masters or doctoral degrees in elementary education, middle school education, or secondary mathematics education. Data were not collected on the work history of this population, but the majority of students enrolled in teacher education graduate programs at this university have teaching experience. These students are often completing their degrees in the evenings and summers while teaching full-time during the school year.

	Male	Female	TOTAL
Elementary	1	1	2
Middle School	1	5	6
Secondary	7	16	23
Other	4	7	11
TOTAL	13	29	42

Table 3: *Inservice (graduate) teacher sample*

An overview of the total sample is presented in table 4

	Male	Female	Not Specified	TOTAL
Elementary	6	73	1	80
Middle School	9	53	1	63
Secondary	22	47	2	71
Other	4	7	0	1
TOTAL	41	180	4	225

Table 4: *Total sample*

In most cases, instructors administered the written survey during class time. In a few cases the survey was given to students to be completed outside of class and returned to the instructor. In all cases, participation was voluntary.

Instrument

The survey consisted of three questions, which were adapted from questions used by Campbell and Sanders (1997). The first question dealt with students' definitions of gender equity and was posed in two different formats during the study. Initially, we asked the students to what extent they agreed or disagreed with McCormick's (1994) definition of nonsexist education:

> *Nonsexist approaches to educational programs attempt to ensure fairness and equity to all students regardless of gender and to foster knowledge, respect, and appreciation for the contemporary and historical contributions of both sexes to society. Nonsexist programs provide equal educational opportunity (e.g., equal access to and participation in courses and programs) to both female and male students and reflect the wide variety of roles open to both women and men through the instructional materials presented to students (p. xiii).*

Students were asked to add to or delete from the criteria given for nonsexist education. We thought it was important to give students a definition of gender equity in order to provide a common starting place for answering the rest of the questions. After administering the survey in this format to about 50 students, we decided to modify the first question because we were not getting useful responses to this item. Generally, students were responding that they agreed with the definition or that it *looks fine to me.* Thus, in subsequent administrations of the survey, we changed the first question to read, *What are some characteristics of a gender equitable teacher or a gender equitable classroom environment?* This question allowed students to provide their own interpretation of the definition of *gender equity* and gave us more information to use in data analysis.

The second question asked students what they planned to do in their classes to ensure that their students would receive gender equitable instruction. The third question asked students how satisfied they were with what they were learning in their degree program about gender equitable instruction. After each question there was space for written comments. At the bottom of the survey were optional items asking the respondent to identify gender, degree objective, and intended level and content for teaching (i.e., elementary, middle school, secondary, college, and mathematics or science).

Data Analysis

Data were analyzed by determining which of Paine's categories of orientation toward diversity best described the participants' views. Both researchers coded a small subset of the data in order to develop operational definitions for Paine's categories with respect to gender issues. We then compared our operational definitions and agreed on criteria to use in our coding. Both researchers, to ensure reliability, coded all of the data. In cases where there was a discrepancy between our codes, we discussed the individual case and agreed on a code.

Results

The data are presented for the total population of preservice and inservice teachers. Then results are broken down into various subcategories (i.e., gender, preservice/inservice, and teaching level) where the data suggest differences within the population.

In general, the results of this study closely parallel the results of Paine's study of preservice teachers' orientations to diversity. As in Paine's study, the majority of our participants have an individual or categorical difference perspective on gender. However, some of our respondents could not be classified according to Paine's scheme.

Lack of Awareness or Negative Awareness

Approximately 15% of the students (33 out of 225) surveyed could not be categorized according to Paine's scheme. They were either unaware of gender issues or actively denied the existence of gender equity issues in the classroom. The category label we developed for these types of responses was *lack of awareness or negative awareness.* Those who were unaware of gender issues noted that they had not considered the topic before and did not complete the survey. Students who showed negative awareness gave responses such as:

> *There really is no need to be concerned with gender, just the quality of the instructor and their teaching practices.*
>
> *Personally, I believe it is an issue that is irrelevant to successful education,*
>
> *I do not have a problem with feeling suppressed or discriminated against in my science classes. I do not see a problem [because I] have not experienced this in my classes.*

Male students were more likely than female students to fall into the category of lack of awareness or negative awareness were. Thirty-seven percent of the males (16 out of 43) in the sample were categorized as lacking awareness or having a negative awareness, compared to 9 percent of the females (17 out of 180) in the sample. This pattern was consistent from undergraduate to graduate students and across level of teaching. Interestingly, however, no undergraduate early childhood education majors - male or female - were classified as lacking awareness or having negative awareness of gender issues.

Individual Difference Perspective

Approximately two-thirds (140 out of 225) of the responses were classified as reflecting an individual difference perspective. This percentage was consistent across undergraduate and graduate students and across levels of teaching. These results were also relatively consistent across gender. Sixty-seven percent (122 out of 180) of the female students had an individual difference perspective. When females were broken down into categories by degree (undergraduate, graduate) and teaching level (elementary, middle school, secondary) the percentage classified as having an individual difference perspective ranged from 67 percent to 71 percent. There was more variation among male students. Overall, 37 percent of male students (16 out of 43) reflected an individual difference perspective. When males were subcategorized by degree and teaching level, the percentage classified as having an individual difference perspective ranged from 25 percent to 80 percent.

Students' written responses reflected different views of the implications of students' individual differences for teaching. Some of the students believed that each student's learning style and individual needs should be considered as they planned for and implemented instruction. For example, a male graduate student in mathematics education wrote:

> *I think considering students' learning styles and preparing activities emphasizing each one from time to time would help.*

One female preservice elementary teacher wrote:

> *[A gender equitable teacher should] try to look at the ability and comprehension of each child, or lack thereof, and work on instructional strategies from that point.*

These students saw each child as an individual and considered gender to be irrelevant to instructional decision-making. They made comments such as: *A teacher does whatever it takes to help all children learn based on their needs, not on their gender.*

Other preservice teachers reflecting an individual difference perspective indicated that they would respond to students' individual differences by treating all students equally or the same. In this way, they could avoid favoring or discriminating against certain groups of students. These preservice teachers seemed to believe that by ignoring gender, their classrooms would be equitable. For example, one female preservice secondary mathematics teacher wrote:

> *A gender equitable teacher/classroom would not look at the gender of an individual student . . . . All students should be treated equally.*

The survey responses revealed different interpretations of what it means to treat all students equally. One female preservice middle school teacher suggested that treating all students equally entail the use of examples or instructional materials that *will not be geared to one sex or the other.* Other preservice teachers believed that to treat all students equally a teacher must have the same expectations for all students. For example, a female preservice secondary mathematics teacher said:

> *A gender equitable teacher is one who challenges all students and encourages them regardless of gender. This teacher also has the same expectations of all students regardless of gender."*

A female preservice middle school teacher said:

> *[I will ensure gender equitable instruction by] treating everyone fairly and assume that everyone has equal ability.*

A number of the other responses indicated that equal treatment involves calling on all students equally. As indicated in these comments, these preservice teachers often used terms such as *equal*, *the same*, or *fair* to describe a gender equitable teacher.

When these preservice teachers were asked what strategies they would employ in their own classrooms to ensure that their students were receiving gender equitable instruction, they tended to suggest strategies such as alternating calling on boys and girls and using tally systems to ensure that both genders were being called on equally. Other suggestions included giving all students the same assignments, assigning equal numbers of boys and girls to groups, and rotating

roles within the groups so that all students have opportunities to lead and to give support. By implementing these strategies, the preservice teachers hoped to *allow different learning methods to develop* as students respond individually to equal educational input.

Categorical Difference Perspective

Approximately 20 percent (48 out of 225) of the preservice teachers' responses reflected a categorical orientation toward gender. This percentage was consistent across undergraduate students as a whole and across both male and female undergraduate students. Among female graduate students, however, only 7 percent (2 of 28) held a categorical view of gender. Twenty percent (3 out of 15) male graduate students reflected a categorical view.

Students with a categorical difference perspective saw gender as defining how students perform and react to mathematics instruction. One female preservice elementary teacher said that a gender equitable teacher is one who can *discuss the differences between girls and boys and recognize them.* Not only must a gender equitable teacher recognize gender differences, but also as one female preservice secondary mathematics teacher wrote, he or she must be *sensitive to the needs of both male and female students.* Some preservice teachers indicated both an awareness of and sensitivity to gender differences. For example, one male preservice middle school teacher said:

> *I believe I am keenly aware of the historical problems and ongoing inequitable treatment. I have for some time tried to encourage people to engage in activities outside those expected.*

A female preservice elementary teacher said that a gender equitable teacher is one who *informs children that they can do anything that the opposite gender can do.* Yet another female preservice elementary teacher said that a gender equitable teacher *acknowledges that females are capable of achievements in math and science,* and ensures that *females are given an appropriate amount of time/attention in the classroom.*

When these preservice teachers were asked what they would do in their own classrooms to ensure that their students were receiving gender equitable instruction, they tended to suggest strategies that debunked gender stereotypes. For example, a female preservice middle school teacher said:

> *Try to destroy [the] stereotype that only men can do math and science. Encourage females (and males) to understand and pursue mathematical or scientific fields.*

A female preservice secondary mathematics teacher suggested that teachers *present material that stresses the achievements made by both men and women.* Other preservice teachers suggested using literature and guest speakers to portray women in typically masculine roles. One female preservice elementary teacher noted the importance of avoiding word problems about baseball or dolls. The strategies suggested by these preservice teachers focus on trying to remove the barriers to women's participation in mathematics- or science-related courses and careers.

Contextual Difference Perspective and Pedagogical Difference Perspective

No students were classified as holding a contextual difference perspective about gender. None of the responses reflected an appreciation for the social construction of gender differences or the role that social interaction plays in defining and interpreting gender.

Only one student was classified as having a pedagogical difference view of gender. The student was a female graduate student in secondary mathematics education. Her responses on the survey indicated an awareness that gender differences have pedagogical implications for teaching and learning. This participant tied her understanding of gender to her role as a teacher and how she might make changes in her classroom to respond to gender differences. She indicated that she would use grouping techniques, questioning techniques, and assessment techniques to deal with gender differences.

Satisfaction with Education about Gender Issues

Forty percent (90 out of 225) of students indicated that they were satisfied with the instruction they received in their courses about gender equity. Most students offered no additional comments on this question. However, eight students who indicated that they were satisfied with the instruction they received offered comments that suggest they saw the instruction as unimportant. Students noted that although gender equity had not been covered extensively in their classes, they thought they were prepared to deal with gender issues in their classrooms. One said that it was a matter of *common sense,*

and another indicated that it was *just something to keep in mind.* Two students said that gender issues should not be discussed any more in classes so as not to *go overboard* and cause everyone to *walk on eggshells* and be *politically correct.*

Twenty-two percent (49 out of 225) of students indicated that they were not satisfied with the instruction they had received about gender equity. The biggest complaint was that students had been made aware of gender differences but they did not have any concrete strategies to employ in the classroom to deal with inequities. This finding is consistent Campbell and Sanders' (1997) finding that college methods instructors tend to focus their gender equity instruction on problems (i.e., stereotyping, interaction patterns, underrepresentation of women) rather than on strategies for dealing with the problems. Students in our study specifically suggested more articles, handouts, and roles playing as ways of helping them understand how to address equity issues in their classrooms. Other students noted that gender equity was addressed in only one or two courses and not throughout their entire teacher education program. Still other students said that equity issues had been addressed as they pertain to racial diversity but not gender issues.

Twenty-nine percent (65 out of 225) of students said that gender issues had not been addressed in any of their classes in their teacher education program. Some students were just beginning their teacher education course work, so this may not be surprising. But other students were taking their last course before student teaching and had not been exposed to gender equity issues. This is the only area in which there was a substantial difference between undergraduate and graduate students. Only 12 percent (5 out of 43) of graduate students said that gender issues had not been addressed in their teacher education courses. One possible explanation for this finding is that graduate courses often involve students in conducting individual research projects and presenting them to the class. Thus, some graduate students may have had an opportunity to learn about gender issues from their peers as opposed to gender equity being a deliberate part of the course syllabus.

Twenty students either did not respond to this question or gave answers that did not reflect their level of satisfaction with the instruction they received.

Implications for Teacher Education

The data suggest that many of the teachers in this study may unintentionally diminish the educational opportunities of female students because they do not know any better, as Campbell and Sanders (1997) warn. It is important for teacher education programs to address gender equity issues (as well as broader multicultural issues) in a systematic manner. Preservice teachers need opportunities to examine their views of gender equity and to read literature that presents other views. Preservice teachers need to be helped to reflect on their own experiences as students and to examine the effects that social and cultural norms have had on their learning and on the development of their ideas about schooling. Sharing experiences and views with other students helps preservice teachers become aware of other perspectives on equity and how gender can be confounded by issues related to race, class, and religion.

Reading literature related to gender equity issues is one way to enhance students' understanding of these matters. However, simply reading the literature is probably not sufficient to effect change in students' views. Reading must be coupled with discussion and reflection in which students have an opportunity to analyze and question what they have read. Comparing and contrasting what they have read with their own experiences as students and with any experiences they may have had during field experiences is essential.

Because most of the participants in this study were unaware of specific strategies they might employ in their own classrooms, preservice teachers need to learn about and try various instructional strategies that have been shown to be conducive to creating an equitable classroom environment. Strategies for involving a variety of students in a lesson, meeting the learning styles of various students, organizing a classroom, assessing the appropriateness of instructional materials, and monitoring one's own interactions should be discussed and modeled.

An important component of teacher education experiences should be the analysis of and reflection upon classroom practice. Students can reflect on classroom practice by recording teacher-student and student-student interactions while observing a cooperating teacher or peer. Students can also record on videotape or audiotape themselves and look for examples of equitable or inequitable teaching practice. By reflecting on classroom practices, preservice teachers may be able to identify gender equity issues and strategies that are most salient in their own teaching.

Directions for Future Research

Additional research on preservice and inservice teachers' perceptions of gender equity is needed to help teacher educators make informed decisions about how to address this topic in their classes. Studies might look in detail at how current and future teachers' ideas about gender equity have been shaped by their life experiences and how their ideas are reinforced or changed by instruction. Another avenue for research is to examine how students process instruction on gender equity issues. What types of activities are useful in convincing students of the existence of gender issues? What types of activities move students forward in their thinking about these issues, and which activities further entrench students in their current ways of thinking? How might field experiences be used to expand students' views of gender equity? Research that helps teacher educators better understand their students' thinking and learning in the area of gender issues would be very timely.

Conclusion

This study suggests that preservice and inservice teachers are generally unaware of the complexities surrounding gender-equitable instruction. They tend to locate the source and solution of equity problems in their students rather than in the social context of the classroom or the pedagogy. This finding suggests that students enrolled in teacher education courses need opportunities to examine gender-equitable teaching from various dimensions (e.g., individual, pedagogical, contextual). Otherwise, they may continue to rely on a one-dimensional view of gender equity. By promoting a multidimensional view of gender-equitable teaching, teacher educators may help to prepare preservice and inservice teachers to deal with the complexities surrounding gender issues in mathematics and science teaching.

Notes

1-The principal investigator of InGEAR is Carolyn Thorsen of the Center for Education Integrating Science, Mathematics, and Computing at the Georgia Institute of Technology. Additional information about InGEAR can be found on the World Wide Web at http://www.ceismc.gatech.edu/ceismc/programs/ingear/gear.htm.

2–The toolkit can be found on the World Wide Web at: http://www.coe.uga.edu/ingear.

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Abstract (in Swedish)

Avsikten med den nu presenterade studien var att identifiera blivande lärares perspektiv på jämlikhet mellan pojkar och flickor och att utforska hur de hanterar den information de får om olika aspekter på könsfrågor. Datainsamlingen organiserades genom ett skriftligt frågeformulär som distribuerades till ca 225 blivande lärare vilka studerade metodkurser i matematik och naturvetenskap på universitetet. För analysen av datamaterialet användes Paines (1990) kategorier: individuella differenser, kategoriska differenser, kontextuella differenser och pedagogiska differenser. Resultatet antyder att de flesta blivande lärare har sin egen uppfattning om jämlikhet som en individuell differens och att de därför strävar efter att behandla alla så lika som möjligt, pojke som flicka. Vissa av de blivande lärarna i studien hade en kategorisk syn på könsskillnader, dvs en stereotyp uppfattning om att flickor respektive pojkar alltid är på ett visst sätt. En liten grupp av de blivande lärarna ansåg att könsfrågor saknar all relevans inom utbildningssektorn.

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