

Effects of Single Gender Classes in an Urban Middle School

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Purpose and Overview

The study examines school differences accompanying the change to single gender classes in an urban middle school. Of the approximately 900 students, about 49% are African-American, with 51% white or other. The fact that 85% of students are on free/reduced lunch indicates that students are primarily of low socioeconomic status. For the last several years, newspaper reports place the school near the bottom of the county list in achievement test scores. Last year, the book, *Reading, Writing, and Talking Gender in Literacy Learning* captured the attention of the school's principal. The book describes how, with verbal interactions and classroom management styles, teachers can send very different messages to girl and boy students (Guzzetti, et al., 2002). The principal then began to research other literature about gender issues in education. Findings supported single gender classes as a feasible component of a school improvement plan, and her faculty voted unanimously to proceed in this new direction.

The study employs both quantitative and qualitative methods of analysis. The paper will focus on the analysis and interpretation of the teacher interview and classroom observations. Reports of survey results will be mentioned and considered as they relate to findings of the interviews and observations.

Theoretical/Practical Grounding: Review of Literature

Interest in single-sex education in public schools is relatively recent, and over the past decade, middle schools around the U.S. have experimented with single-sex classes. Educators have observed that, especially at the middle school level, boys and girls in class together are more concerned about physical appearance than about what is being taught. (Perry, 1996) Edward Hand Middle School in Lancaster, Pennsylvania adopted a single gender school model and grouped students homogeneously by sex for major subjects. Positive effects, such as academic

growth, academic self-concept, and behavior, were found for both males and females (Smith, 1999). A Paducah, Kentucky middle school conducted a 9-week pilot program of single gender classes in 6th and 7th grades. (McCleery, 2002) Results reported higher test scores and improved behavior. When Marsteller Middle School in Manassas, Virginia implemented a single gender plan, teachers also reported better behavior and fewer discipline problems(Perry, 1996) Although boys were louder and more active, their classes were also more productive than when coeducational(Perry, 1996).

Doe Creek Middle School, just outside Indianapolis, is also experimenting with single gender classes (McCleery, 2002). Educators and researchers there speculate that this change will allow teachers to focus on the different learning styles of boys and girls. Boys are more activity oriented and find it difficult to focus long on concepts. Boys and girls also prefer different types of books to read. Boys prefer action and adventure stories, whereas girls prefer to read about emotional experiences and interpersonal involvement (McCleery, 2002).

The research literature includes more studies about girls' learning in a single-sex environment than it includes for boys. One study reported girls to be more focused and to participate in class more actively (Perry, 1996). From Myrtle Middle School, Irvington, NJ, girls and teachers of girls also report positive attitudes about class environment (Richardson, 1995). The girls remain on-task more often and enjoy discussions. "You get to talk about things you wouldn't talk about with boys in the room. Lots of girls are doing better and trying harder." An ERIC Digest report (Haag, 2000) gathered results from other studies. Findings showed that, in general, girls in single-sex environment had higher scores in the attitudinal variables of self-efficacy, locus of control, and academic self-concept.

Many studies about gender issues in education focus on female students in the mathematics and science subject areas. Research conducted by the American Association of University Women (1992) reported that, before 6th grade, girls did not perform differently in mathematics and science classes. However, beginning in middle school, girls show less interest and fall behind in standardized test scores in mathematics. In several studies, girls showed stronger preference for mathematics than they had shown in a co-educational environment (Haag, 2000). Streitmatter

(1997) reported that middle school girls were more likely to respond to questions and to ask questions in a single gender mathematics class. Another study of 18 females concluded that, in middle school, girls could be more successful and better served in a non-threatening, single-sex mathematics environment (Stutler, 1997). In a study of a middle school with a high minority enrollment, all-female mathematics classes promoted higher achievement, a more positive attitude, and stronger relationships among students and teachers (Baker, 2002).

There is less available research about the effects of single gender education for boys, and among the studies found, more negative effects were reported. In Myrtle Middle School in New Jersey, teachers found teaching boys more difficult. A female teacher remarked, “You have to be really strong when you have the boys.” A male teacher expressed it this way: “You have to lay down the law... Lots of these kids don’t have a male role model at home.” (Richardson, 1995). A recent study (Galley, 2002) also indicates that boys can be negatively affected by a preponderance of female teachers (Galley, 2002). In a 1998 study (Hudley), researchers measured academic attitudes in classrooms that were made up of all African-American males, including the teacher. Researchers reported positive effects in the relationship between students and the teacher, as well as student academic attitudes and student academic confidence.

In her ERIC Digest report, *K-12 Single-sex Education: What Does the Research Say?*, Pamela Haag (2000), delineates several common themes. First of all, findings were consistent about benefits to attitudinal variables such as self-concept and academic focus. Secondly, effects may be based on school type and subject matter. For public middle schools, most particularly those in an urban setting, there are reports of successful uses of single gender classes. (Perry 1996; Richardson, 1995; Smith, 1999; & Baker, 2002). Single gender classes in mathematics and science have shown positive results, especially for girls (Stutler, 1997; Baker 2002; & Strietmeyer, 1997). Thirdly, Haag points out that just doing something different may be a factor. Is this “something different” a phenomenon that is reproducible in a coeducational setting, or is, perhaps, the rationale for single gender classes more subtle, more personal, or more emotional? In interviewing and observing teachers and students in this urban middle school, researchers will probe deeply into tunnels of inquiry suggested by previous research and also into that

“something different” tunnel of inquiry. In all cases, researchers hope to glimpse “light at the other end.”

Research Questions

1. What are the effects of single gender classes on the constructs of academic self-concept, mathematics self-efficacy, and general self-efficacy?
2. What are the effects of the single gender classes on classroom environments, learning, and attitudes in particular classes?

Methods

This study employs both quantitative and qualitative methodologies. Quantitative survey instruments provide researchers with base-line data of student perceptions of classroom climates, as well as academic attitudes through the first two years of the single gender class experiment at this school. Students will respond to these same questions in May of 2003. After these two surveys of students are completed and analyzed, researchers will report findings to the school principal and faculty. For the school year 2003-2004, researchers will review survey instruments and make adjustments suggested by previous findings. In an attempt to gain further information about school attitudes and beliefs, students will again be surveyed after the first term of the 2003- 2004 school year. The following lists describe the survey instruments used in the study as well as the teacher and student interview protocols

Survey Instruments

1. Academic Self-Concept Scale (Reynolds, 1987) adapted for middle school students
2. Mathematics Self-Efficacy Scale (Betz&Hackett,1983) This instrument assesses student beliefs about how well he/she can do everyday math problems and how well she/he can do in mathematics courses and topics.
3. Multidimensional Scales of Perceived Self-Efficacy (Bandura, 1990) adapted for middle school. Students rate themselves on how well they can do certain things and control certain behaviors.

4. Subject-Specific Classroom Environment Scale (unstandardized instrument) The research literature contains many studies finding gender differences in particular school subjects (math and science for girls/ language arts for boys). Same or similar questions will be asked for the four subject areas: mathematics; science; language arts; social studies.

Teacher Interview Protocol

1. What changes in school environment have you observed this year? Address the areas of student behavior, classroom environment, academic attitudes, and learning.
2. What changes in interest and learning in your particular subject area are you observing?
3. Tell me about other aspects of school life you feel may be related to single gender classes.

Student Interview Protocol

Do you like the move to single gender classes here at Southern, why or why not?

Do you ask more questions?

How does it compare with last year?

Does the class seem more or less friendly?

Do you get along with your teacher; what about the other students?

Do you participate more or less in class discussion?

Do you work in groups?

Tell me about projects or activities that you liked.

MATH QUESTIONS:

Do you ever use models like, blocks, tiles, counting disks, or dice?

Do you use calculators much? What do you use them for?

Do you ever use graphing calculators?

LANGUAGE ARTS QUESTIONS:

Do you like to read? If, so, what do you like to read?

Tell me about some of the class discussions you have in your class.

Interpretation of Teacher Interviews and Observations

Qualitative data include field notes, classroom observations, student work, as well as teacher and student interviews. The current analysis does not include student interviews or student work.

Researchers interviewed 6 teachers and observed several classrooms. The six teachers consisted of one teacher of boys and one teacher of girls, in each of the grades 6, 7, and 8. Study results (Baker, 2002) from another urban middle school, served as a source for a theoretical framework and a basis of comparison for the current study. The middle school in the Baker study experimented with single-sex science and mathematics classes at an urban, low SES middle school. Similarities between the two schools, such as minority population, SES, school climate, urban environment, age group, and team structure, provide a rationale for comparing these two schools. The Baker study was also the most recent one found in the literature. Baker categorizes data into the three broad categories of learning, affect, and interaction, and discussion of the current study will follow within the same framework. For comparison purposes, findings from the Baker study (2002) will be included along with findings of the current study throughout the discussion.

Learning Considerations

In the previous study (Baker, 2002), boys did not help each other and cooperate in the same way girls did. Girls communicated verbally with each other, helping each other to understand. Boys did not communicate with each other as well in groups and in many instances, worked more successfully alone. Boys also left many tasks unfinished.

In the current study, teachers of girls indicated that girls worked together well in groups, and two teachers of girls reported that the girls worked better in the all-girl groups than they had in the coed groups. “They try harder to figure out the math”, one teacher said. Another math teacher reported that group work in her all-girls class was effective and that they helped each other to learn. She also reported that her girl students this year displayed more prerequisite, subject matter knowledge. In contrast to the previous study, at least one teacher of boys reported that the boys were supportive of each other. She described an incident of a student who gave a correct response or had a classroom success, and the other boys cheered for him. At first, she wasn’t quite sure whether she should consider this a disruption. However, she soon discerned that the boys were being genuine in their expressions of encouragement and camaraderie. Teachers on all three grade levels confirmed that boys were much less likely to finish tasks than girls. The boys’ work was also found to be messier. The majority of teachers reported that in previous

years, when they taught co-educational classes, the top students in the class were always girls. Perhaps this is related to the fact that boys are less likely to finish their work and when they do so, the finished product may be messier and less complete, thus earning a lower grade. In the current study, several teachers of boys indicated that, in the single gender classes, their boy students were producing better work and were now allowed to “shine”. Whereas, before, the girls were always viewed as the best students, now the boys were called on to take the lead. In both studies, there are instances where opportunity to learn differs in all-girl and all-boy classrooms. In the previous study (Baker, 2002), learning opportunities for girls in mathematics and science increased because teachers were able to cover more material and reach greater depth, had fewer discipline problems, and gave fewer instructions to the girls. This study found that more disruption and off-task behavior contributed negatively to the learning environment in the boys’ classrooms. Girls’ opportunities to learn were increased also because they felt more able to express their views and answer questions in mathematics and science classes. Boys’ opportunities to learn mathematics and science were only increased when the discussion was connected to their own lives and interests.

Boys’ opportunities to learn were diminished in both studies by their demonstrated lack of maturity and focus. In the current study, teachers reported boys as unorganized. They left their books, pencils, and paper in other classrooms and at home. The boys also needed explicit directions and needed them more than once. One teacher expressed the view that in coed classes the girls were able to give follow-up instructions to the boys, thus decreasing the amount of time spent on instructions and increasing the amount of time that could be allotted to learning. This implies that boys may have had increased opportunity to learn in coed classes, and both studies confirm this finding. In the current study, teachers of the 7th and 8th grade boys reported fewer of these distractions than did teachers for 6th grade boys. To engage boys, an 8th grade teacher in the current study used their avid interest in basketball. In another boys mathematics class, students collected data among themselves about favorite sports, favorite athletes, favorite teams, and favorite video games and displayed results on a circle graph.

Curriculum and pedagogy are two interconnected categories that warrant consideration. In the Baker study (2002), boys in science class had difficulty with activities which involved low

structure and high cognitive demands. Activities of this type also required group planning, decision making, and problem solving and may have been heavily dependent on communication skills and ability to focus rather than cognitive abilities. In mathematics class, boys demonstrated preference for repetitive problems and for working alone. Positive responses in mathematics class also related to the amount of physical activity and the use of technology. Boys were more responsive to work involving animals (Baker, 2002), perhaps because it was an area of interest.

In the urban middle school of this study, observations confirmed these findings. In a mathematics class, boys generally remained on task when working on a series of practice problems. The boys also liked tasks that required movement and activity. They responded well to an activity in which they were supposed to twist interlocking circles to model a particular fractional part and then to stand and hold up their circles to display the correct shading. They also responded positively to a group project that involved measuring, cutting, and drawing. It worked much better for the boys to do measuring and cutting at their desks. It was difficult for the boys to remain on task as they moved from their desks to work in groups of four to make a large poster. In another observation, boys responded well to the drawing/ tracing of feet from different species of birds confirmed boys' interest in animals.

An interesting suggestion in the current study developed from the fact that teachers on all three grade levels described the quality of the boys' work as being different. Although a boy's work might not be neat and thorough like a girl's, teachers commented positively about the clarity of the writing, the creativity of their ideas expressed, and the directness in reaching their points. Boys are also willing to take intellectual risks in forming their thoughts and perceptions. Since in the Baker study (2002), the single-sex classes were only in mathematics and science, these observations about boy's writing and thinking were not present. One teacher also reported that, although she had very few readers in her classes of boys, those who did read, selected books from a wider range of subject areas than did the girls. Researchers plan to follow these leads in the student interviews and by collecting samples of work from students.

Affective Considerations

Although affective considerations present in the data will be considered more thoroughly after students are interviewed, the affective attitudes of empowerment for girls and competition for boys will be briefly considered. In both studies, girl's feelings of empowerment appeared in mathematics classes. A classroom observation revealed a teacher of girls using the combination of hard work and empowerment to motivate the students. They were encouraged to make the effort, given the strong belief that they could excel, but that it was their responsibility to do it. Another teacher of girls reported better skills and more confidence than she had observed in her coeducational classes. Competition among boys produced attitudes and beliefs that positively influenced performance. One teacher created a competition and a reward for the class with the highest percent of students turning in homework. In another class, boys who earned a high term average and received approval from other teachers were allowed to go on a field trip designed with their interests in mind.

Interactions

The topic of interactions in the single-sex classes includes interactions among both students and teachers. In the Baker study (2002), the boys broke more rules than the girls. Boys were noisier than girls. They also threw things, slammed books, and fidgeted. The boys' environments were more hostile and included vandalism and bullying (Baker, 2002). Teachers in the current study reported that boys broke and threw parts of pencils at each other. Teachers of girls expressed relief to be rid of that nuisance present in their coed classes in previous years. One teacher of boys spoke of their annoying pastime of tapping pencils on their desks.

Whereas, unlike the Baker study, teachers reported physical fights between girls in the halls and also reported hostile verbal arguments within the classroom. In both schools, teachers tolerate more disciplinary infractions from the girls. This may be because the girls were not as obvious or intrusive about breaking the rules. A teacher of girls remarked that she had problems with girls who spoke out and disrupted class but that these were not the type of problems deemed worthy of detention, office referral, or suspension by school officials. A teacher of boys complained that the girls were not made to follow the same rules as his boys were following, making it more difficult to enforce the school rules for the boys sharing the same halls and building.

In the Baker study (2002), the boys of the two case studies had female teachers, and these teachers were more uneasy about teaching boys than they were girls. Findings of this the current study disagree with this conclusion, and teacher preferences were more mixed. Of the female teacher interviewed, one clearly preferred boys over girls or coed, one preferred coed over girls or boys, and one preferred girls over coed or boys. Among the teachers interviewed, those who felt comfortable teaching boys provided a highly structured and rule oriented classroom environment. Discipline is consistent and school rules such as dress code and standards of classroom behavior were strictly enforced. Both rewards and punishments are given consistently and appropriately.

Conclusions

The Baker study (2002) reported that the school faculty and leaders did not perceive a clear learning benefit for the single gender classes in science and mathematics since achievement gains were not significant. Due to the lack of achievement gains, as well as the preferences of the teachers, the single gender class experiment was discontinued after a three-year period.

Although research strongly suggests gender differences, in neither study were changes in curriculum or pedagogy made to accommodate learning differences between boys and girls. Both studies indicate that boys are harder to discipline and engage. For girls it is harder to change attitudes and beliefs and to overcome negative peer and cultural influences about the learning of science and mathematics.

Teachers of the previous study confused the concept of equity and equality. Equality implies that curriculum and pedagogy should be the same for boys and for girls. The National Council for the Teachers of Mathematics (NCTM, 2000) in Principles and Standards describes its Equity Principle as “high expectations and strong support for all students”. The strong support of both boys and girls in middle school may mean different strategies to meet different educational needs. The schools of both studies entered into the experiment without much advanced preparation. Generalizing from settings in private schools, middle class schools, and high schools are not that helpful (Baker, 2002). In the current study, teachers who reflected on the maturity of boys and created structured environments complete with strict dress codes, competition, and consistency appeared to have more success. Improvements in the attitudes of

girls about mathematics and science are necessary but not sufficient to increase the number of girls who choose careers in science and mathematics. In addition to feeling good about one's self a high level of mastery produced by hard work and high expectations is also needed.

Implications

The main implications of both studies direct researchers toward the need for more knowledge about how to teach adolescent boys and girls separately to produce successful and equitable outcomes. In closing, consider the previously stated view of Haag (2000) based on her meta-analysis of research on the single gender issue. She alludes to the possibility of "something different" about single-sex education, which may or may not be something that can be reproduced in a coeducational context. Please allow researchers in the current study to suggest two "something different" possibilities. Perhaps for girls, it should be the emphasis on high expectations, a high level of content knowledge, and a strong self-confident attitude that content mastery at a high level is possible. For boys, that "something" may be the development of latent gifts for writing, the encouragement of more reading, and for the free expression of novel and "risky" ideas, while taking into account developmental issues for adolescent boys.

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