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# The Impact of Single Gender Elementary School on Mathematics Classes in an Urban School

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## Abstract

In an urban school district, one school being reconstituted due to five years of low scores on high stakes testing decided to radically reorganize. The format selected was to restructure the elementary building as a coeducational school with single gender classrooms. The population of the building was heterogeneous but each classroom was homogeneous. The faculty committed additional time and effort to the reconstitution and attended summer conferences and supported book groups focused on single gender classes. The acceptance by the families of the students was very encouraging. The rejection by specific groups of students was difficult to analyze. The resultant scores on the high-stakes testing were greatly encouraging especially with the younger grade levels. At this level of success, the new concept school will continue for another school year.

## Introduction

Urban education faces multiple issues in the attempt to gain higher levels of student achievement. The single gender classroom is one approach that is earning more attention as districts strive to engage all students to raise achievement levels. While there is no definitive research evidence for or against single gender classes, the current research does suggest that single gender classes work for some student populations, in some academic classes (Mael, Alonso, Gibson, Rogers, & Smith, 2005). Billger (2006) noted that African American and low-income students benefit from single gender classes. This case study examines the first-year implementation of single gender mathematics classes in one urban school district. This study examined two research questions: (1) how did single gender mathematics classes impact student achievement on mathematics high-stakes state

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tests; and (2) what were the preferences of teachers, students, and parents after a year of implementation regarding single gender classes?

The United States Department of Education legalized single-sex education in the *No Child Left Behind Act* (NCLB) (sections 5131(a)(23) and 5131(c)). Public schools were allowed to offer single-sex classes with three requirements: there had to be a rationale, coeducational alternatives must be located in a geographically accessible location, every two years a review was to be conducted that examined if the inequity that caused the separation of the genders was still legitimate (Federal Register: October 25, 2006).

This study examined one elementary school in an urban school district, identified in this paper as the Invention Public Schools (IPS). One route IPS selected to help all students achieve at higher levels was the implementation of single gender classes. The deputy superintendent initiated the single gender class concept for the district. With the support of the central administration, she approached principals asking for volunteers to take part in this experiment that she believed would raise student achievement. This case study examined the Independence Elementary School (IES) as it implemented single gender classes within a coeducational building population. The grades within IES were kindergarten through grade 8. The school was scheduled to be reconstituted, which meant that the building had not succeeded academically for five years and reconstitution was required by the state. In the IPS district, reconstitution could be accomplished in one of two methods: transferring all the faculty members of the building to other buildings in the district and bringing in teachers new to the building; or to reorganize the building radically by using a conceptual framework very different from the existing one. In this case, the faculty did not want to be transferred to other buildings; the teachers had long-term commitments to students in the building and the school community. The principal presented the single gender model to the faculty as a restructuring framework and offered to help those who did not agree with the model to find other buildings in which to teach. Thus, the principal had an entire faculty of teachers who wanted to learn and understand the model of single gender classes.

The faculty wrote their new mission statement for their school after examining the implementation of single gender classes through research and conference meetings facilitated by the Odyssey Group and the work of Leonard Sax and James Dobbins:

The mission of the single-gender education is to provide learning environments that will bring out the best in each gender and will provide opportunities for success that may not be available in a co-ed setting.

Implementing their research, the faculty designated grades kindergarten through grade two as self-contained but single gender classes. It was determined that grades three through seven would be departmentalized by content. As the school year began in August 2005, all mathematics classes were single gender classes.

The restructuring work of the school was favorable to the case study research format for two mathematics coaches in the building. As part of the creation of a new school climate and implementers of the single gender program, the researchers sought to learn two areas of impact from single gender classes: (1) the impact of single gender classes on student achievement on mathematics high-stakes state tests; and (2) the preferences of teachers, students, and parents after one year of implementation regarding single gender classes.

The history of the IES administrators and faculty decisions made to achieve a school with single gender classes are needed to clarify what procedures took place and the involvement of the researchers prior to their research.

### *Planning Decisions*

The principal allowed the faculty to examine the building logistics. In addition to decisions about which grades were to be self-contained and which would be content-based, the faculty decided which classes were to be placed into building wings, the main portion of the building, and what proximity each gender would have by building location. Should the grade levels have single gender classes next to one another — male classes adjacent to female classes? Should the lunch period be time for the groups to mingle? These questions were not trivial to the success of the program. It was decided that the genders would remain separated and assigned to different wings of the building. Teacher assignments were a major concern. The decision was made to allow teachers to make their own choices as to which gender they would teach. The teachers who volunteered for the female classes were all women. The male and female teachers volunteered to teach male students. The mathematics coaches identified the female teachers of male students as more outgoing in their personalities and comfortable in the world of men. The departmentalized teachers taught their content in single gender classes but had to teach both genders.

Procedures were developed defining when each gender was to take physical education, art, and music classes since all of these classes were also designated as single gender. The faculty determined that the only shared gender time would be at the student-run Gender Meetings and Leadership Club that met to discuss and solve building problems.

### *Parental Choice*

Once the building procedures were set and the faculty assignments established, then the parents were offered the choice of enrolling their children in this school or moving to another school within the IPS system. Enrollment in the school was voluntary. Parents had to physically come to the building on a specified date to enroll their children. After the enrollment period, the final student population result was that the school was filled to capacity with a waiting list of male applicants.

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### *In-house Teacher Professional Development*

To help the faculty make the transition to single gender classes and to keep up with research on the topic, the faculty formed a single gender book study. The first book they examined was *Why Gender Matters* by Leonard Sax (2005) and *Boys and Girls Learn Differently* by Michael Gurian (2007). The faculty met monthly to discuss the books as the books related to the events within the building. These resources helped the faculty to anticipate and adjust their teaching and approaches to meet the needs of the students throughout the school year. With the joint decisions of the building faculty and administration set, and parents' selection of the IES for their children to attend, the school year proceeded.

### Literature Review

Stereotyping by gender has been part of education since the creation of the classroom. In the time of Plato, only males were educated, trained to think. Overlooking half the school population is not an option for schools today. For students in the 21st century, opportunities to learn must be equalized for both genders. One method to address equality in the classroom was to offer single gender classes. The U.S. Department of Education in November 2006 extended its rules for allowing single gender classes beyond the limited cases of gym classes and sex education. If a school decided that single gender classes could improve achievement to meet the needs of individual students, it now had the department's sanction to conduct single gender classes. The caveat was that those students who attended these classes must do so on a voluntary basis. School systems seized this opportunity (Federal Register: October 25, 2006). According to the National Association for Single Sex Public Education (NASSPE), single gender classes were offered in more than 253 public schools within the United States with 51 schools being entirely single gender. Some of the major cities that employed single gender classes included Albany, N.Y.; Cleveland, Ohio; Dallas, Texas; Detroit, Mich.; Gary, Ind.; Philadelphia, Penn.; and Nashville, Tenn. An unusually large number of these schools were in the South. Whereas, in 1995, only three public schools offered single gender classes in the country (Weil, 2008; *Houston Chronicle*, 2007).

Once the IES faculty committed to the single-sex concept, and in their preparation for the building reconstitution, the faculty turned to the work of Leonard Sax, executive director of the NASSPE. After reading his work, many of the faculty attended an NASSPE conference in Chicago in 2005, which began the faculty members' research into the benefits and problems of creating classes of one gender.

The IES faculty found they needed an overview of single gender educational research to create the optimal structure for their school within the short time span between close of school one year and start of the next year in their year-round school-year calendar.

After becoming acquainted with some of the educational gender research, the faculty decided to focus on gender differences in cognitive abilities that examined perceptual and motor skills, differences in memory, visual-spatial abilities, and quantitative abilities.

### ***Perceptual and Motor Skills***

Perceptual and motor skills revealed that each gender had its own strengths. Females could detect pure tones in one frequency with greater skill than males (Halpern, 2000). Categorizing, identifying, and remembering odors were female strengths (Lehrner, 1993). Perceptual tasks performed within a limited timeframe found that females were more successful than males when matching objects, scanning arrays, and copying forms and with work requiring fine motor skills (Halpern, 2000). Males had strengths in detecting movement in a visual field (Gouchie & Kimura, 1991). Motor tasks that required aiming at a moving target and throwing objects were male strengths (Nicholson & Kimura, 1996; O'Boyle, Hoff & Gill, 1995). Differences in memory skills found a definite advantage for the females. Females had better post presentation short-term memory, slightly larger working memory storage, and better memory for words, spatial locations, and recognition memory. To date, no research has found any male strength in the area of memory (Jensen, 1998; Stumpf & Jackson, 1994).

### ***Verbal Ability***

For many years, verbal ability was part of standardized testing, which lent itself to longitudinal studies. Martin and Hoover (1987) examined the Iowa Test of Basic Skills over time and found that females outscored males in the areas of grammar, language usage, and reading comprehension.

### ***Visual-Spatial Abilities***

In the area of visual-spatial abilities, males did have the advantage. According to Halpern (2000), when comparisons for spatial perception, mental rotation, and spatiotemporal abilities were conducted, males had the stronger skills. Being able to generate and maintain a spatial image, males were not accurate but were more likely to use this skill to solve problems. Three other male visual-spatial strengths included accuracy of traveled distances (Holding & Holding, 1989), greater accuracy and speed mastering a route from a two-dimensional map (Galea & Kimua, 1993), and mastering computer-simulated mazes (Astur, Ortiz & Sutherland, 1998). However, testing revealed that spatial visualization appeared to be a female strength. When navigating through space, Lawton (1996) found that males utilized orientation strategies such as knowledge of direction and dead reckoning. In the same situations, females employed route strategy that used the identification signs and landmarks to identify travel in space.

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### *Biological Basis for Differences*

A great concern for the IES faculty was the biological basis for differences in cognitive abilities that might surface in a single gender classroom. Johnson, Farnworth, Pinkston, Bigler, and Blatter in 1994 found that at birth females had slightly thicker corpus callosum making the bridge between brain hemispheres larger in females. This evidence suggested that language skills started at an earlier age for females due to this stronger cross-brain connection. From positron emission tomography, researchers found that within the brain, females tended to organize their hemispheres into focal areas. Whereas, males tended to diffusely organize within brain hemispheres.

### *Psychological and Social Differences*

Psychological and social differences between the genders were a concern for the faculty. The IES faculty found that aggression was expressed differently by each gender. Females applied relational aggression where males were very physical in their aggression. When seeking the opposite behavior of aggression, establishing friendships and intimacy, routes each gender took differed. Females formed friendships by disclosing inner psychological states, sharing emotions (Sharbany, Gershoni, & Hoffman, 1981). Male intimacy has been discouraged by society, thus they establish friendships using alternative methods such as physical contests for superiority (McNelles & Connolly, 1999). The American Psychiatric Association noted in 1994 that the treatment rate for males to females diagnosed as having attention deficit hyperactivity disorder (ADHD) was at a ratio of three to one. This would have a large impact on how to structure physical activities, gym time, recess, and cooperative learning activities.

It was commonly accepted that learning profiles differ between males and females. The Kolb (Smith & Kolb, 1986) model described learners as accommodators — those who learn from new experiences in the concrete and experiential; convergers — those who learn by thinking abstractly while learning through active experimentation; divergers — those who learn from reflections on their observations about concrete experiences; or assimilators — those who conceptualize new experiences abstractly while reflecting upon their observations. Within the Kolb model, it was found that females were distributed evenly across the four groups. Males were found to be 48 percent assimilators, 24 percent convergers, and 20 percent accommodators; none, in this sample, being identified as divergent thinkers (Sadker & Silber, 2007). Piaget's identification of field dependence was another point of differentiation between males and females. The majority of females were field dependent where males were field independent (Author, 1996). Zhang and Sachs (1997) found that males preferred to focus on the big picture and evaluate rules when mentally self-governing to a stronger degree than females in similar situations. The IES faculty collected an abundance of

information about the intellectual and physical differences between and among the genders through their research. The next step was to actualize these differences into their urban classroom. While this study examined the impact of single gender classes in the mathematics classrooms, the researchers acknowledge that it is beyond the scope of this paper to examine all aspects needed for full implementation of single gender schools.

## **Methodology**

This case study tracked the work of an elementary school administrator and faculty in an urban elementary school that was reconstituted by the school district due to poor performances on the state achievement testing. Two IES mathematics coaches each conducted a study dealing with single gender classrooms. The coaches each had different interests that they selected to pursue. One sought to learn the impact of single gender classes on high-stakes testing, the other coach wanted to know the impact on acceptance of single gender classes by the stakeholders. The math coaches were participants in the work of the school and did the data collections and analyses. The first research question that focused on test scores required back records from the IPS logs of district information with pertinent mathematics scores of the IES students. Obtaining the yearly results was done when the data was reported to the building. The question of stakeholder buy-in to the single gender concept was the second research question completed by the second math coach. He created a survey and sought the input of the following stakeholder groups: 22 teachers in the building, 33 seventh-grade students, and 23 seventh-grade parents of the elementary school regarding their perceptions of single gender classes (See Appendices A, B, C). Data was collected during the end of the first quarter of the 2007–08 school year. Tracking this organizational change which Bogdan and Biklen (2003) identified as “Historical Organizational Case Study” was revealed by interviews, surveys, and documentation using the state achievement tests. The state conducted reliability and validity tests on the testing instruments and used the testing results to evaluate school district performance. The mathematics achievement tests were conducted in grades three through six. Prior scores for grade five were not available because 2006 was the first year that a mathematics achievement test was administered to grade five students.

## ***Participants and Setting***

The setting of this study was a large, urban school system in southwest Ohio. At the time of this research, the district was the sixth poorest school district in the United States. Manufacturing industries were the primary employers, but as those industries struggled to survive, so too did the school district. IPS was identified in the Academic Emergency level for five years identified by the state school report card. While IPS struggled with issues facing most urban school systems in the United States, charter schools sprang up in numbers so great that today no other state in the country has had the number of charter schools as there were in this city. There were 35 charter schools in the city with more than

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6,500 students attending them. (Elliot, 2008). This large loss of students from the public system caused funding to become a dramatic issue for the district.

The student population of IES was 385 students. The ethnic representation of the building was 98 percent African American and 2 percent Hispanic students. Among the district's 25 elementary school buildings, the students at IES came from the poorest families in this urban district.

### *Data Collections*

The data gathered for research question one — how did single gender mathematics classes impact student achievement on mathematics high-stakes state tests? — came from the Ohio Department of Education achievement test score results issued by the state.

The second research question data responded to: what were the preferences of teachers, students, and parents after a year of implementation regarding single gender classes? The data came from surveys and conversations with the teachers. The surveys required yes or no answers about single gender class preferences.

One coach wanted to know informal teacher perceptions of the IES implementation of single gender classes. She used informal conversations during classes and lunch periods to discuss the pros and cons of the new school organization. She did not use a protocol, but allowed the teachers to initiate any ideas they held about single gender classes. She recorded the themes of the conversations in a journal.

### *Data Analysis*

The state mathematics achievement test scores were reported to the school district by the state education department. Each test was identified with a number to provide anonymity for the test takers. The scores were compiled and percentages of passing scores were compared by grade and gender for two school years — one set of scores prior to reorganization and one set of scores after the building was organized by gender. The survey responses were analyzed by totaling the response preferences and reporting them in percentages of *yes* preferences and *no* preferences by the respondents of the participating subgroups. While the researcher kept records of survey submissions, anonymity was ensured by the use of unique identification numbers for each survey, which prevented one individual from submitting more than one survey. The main ideas of the teacher/mathematics coach conversations were recorded after the conversation in a journal and sorted into topic areas.

Since this was the first year of the single gender mathematics class implementation for IES, percentages of state achievement test improvements or declines and stakeholder preferences were appropriate reporting formats for this study. The teacher/mathematics coaches' conversations allowed the researchers insights into teacher interpretation of the new school organization and additional observations that were not included in the survey instruments. These data collection processes and analysis methods can be used as baseline information to track the growth of the school as it maintains this curriculum format.

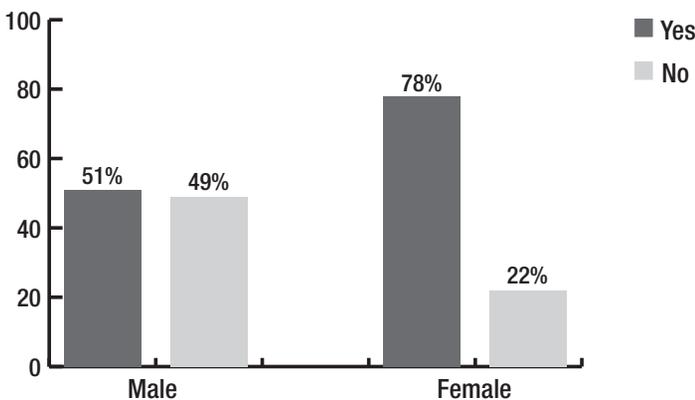
## Results

After one year of implementation of single gender classes, the research question regarding preference surveys produced definite opinions focused on how IES employed the single gender concept. When asked if the single gender classroom made a positive impact on academic achievement, the 22 teachers responded with 72 percent *agreed* with the statement. Parents were surveyed asking if the single gender classrooms had a positive effect on their child's academic performance. Of the male students' parents, 46 percent *agreed* it was positive, 38 percent believed it was *not positive*, and 16 percent had *no opinion*. The parents of female students had similar responses: 54 percent saw *positive* results, 32 percent saw *nothing positive* in the results, and 14 percent had *no opinion*. There was an opportunity to identify negative elements of the single gender concept implementation in the survey, but no comments were entered by the parents who completed the survey. The survey of the students revealed that males were split on the impact of single gender classes on their academics with 51 percent indicating *no impact* to 49 percent that *it made a difference* to them. The females noted a dramatic difference: 78 percent noted this did have *an impact* on their learning while 22 percent believed that it *did not help* them achieve academically. The males added that they missed having females in their classes.

The results of the parent surveys produced the resultant data that 53 percent preferred single gender classes with 47 percent preferring coeducational classes. The teachers held lower preferences with 43 percent preferring single gender classes. The teachers that preferred coeducational classes totaled 31 percent, and 13 percent checked that they were unsure of which mode that they preferred. The final 13 percent did not respond to the question.

**Figure 1**

***Student Survey: Has being in a single gender classroom made a positive difference in learning?***



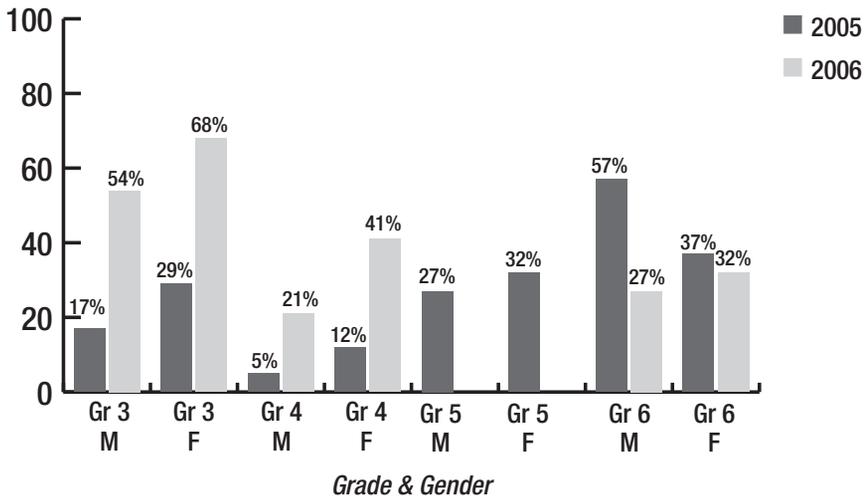
With the qualitative impressions of the school being noted, the impact on student achievement was examined. The quantitative results of the Ohio Achievement tests, the

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high-stakes annual testing done throughout Ohio created by the Ohio Department of Education, produced a wide variation in results. The largest changes occurred in the younger students. The older students, who were disgruntled with the separation of the genders, did not produce the percentage of positive change that the younger students did. In the third grade, male scores rose 36.5 percentage points, female scores rose 40 percentage points.

*Figure 2*

*Achievement Test Results: Percentages of students passing the high stakes testing per grade level. No testing was done in grade five during the 2005 academic year.*



The conversations carried out by one mathematics coach revealed a variety of topics not covered in the survey instrument. Many conversations revealed teacher comfort levels with single gender classes. During informal discussions with the teachers, reports of levels of comfort teaching single gender classes were revealed. The teachers realized that some who thought their skills would be used best by teaching females recognized that they were far more effective using their teaching methods and strategies with male students. Several teachers became aware that their teaching styles matched one gender better than the other, and many were surprised that it was not the gender they consciously selected to teach, as revealed in the book discussion groups. The faculty identified the book groups within the building as adding to the professional atmosphere for all faculty as well as adding new and helpful information to their body of knowledge about the strengths and needs of each gender when in an academic environment. The book groups kept faculty conversations centered on the elements needed to conduct successful single gender schools.

The teachers' discussions identified that the building began to have more professional development in-house that addressed all academic content needs. The IES faculty

book studies corroborated their observations that male students were more receptive to mathematical concepts in the afternoon, whereas girls did much better with their mathematics when instruction occurred in the morning hours. The mathematics faculty found that when presenting new mathematical content, female students needed to use more language when explaining concepts and when presenting their work. The faculty learned that female students needed an increase in the modeling and repetition of modeling mathematical concepts. Male students preferred to put their hands into working with the manipulatives to learn the new concept, to be actively engaged. To increase the mathematics vocabulary of male students, since males did not learn best by hearing or just reading words, the teachers made up games where the males had to physically move word strips made of poster board and spell out the vocabulary using blocks with letters printed on them. Pedagogical changes were made to meet the needs of specific gender classes.

The mathematics faculty observed in their classes that time-on-task was very different for each gender. The girls would sit and work on problems for extended periods of time using the whole designated time for mathematics class, which in the IPS district was 60 minutes. The faculty found that male students could put their full concentration on their mathematics for no more than 20 minutes. After that, the males needed to physically move around, stretch out. The teachers learned that the male students continued working on their mathematics after 20 minutes as long as they were permitted to be in different physical positions. The teachers adapted the proscribed lesson presentation method for the male students by incorporating time shifting and physical movement. The mathematics coach noted that the 60-minute mathematics class looked very different depending upon which gender was in the mathematics room.

Another teacher observation recorded by the mathematics coach focused on student behavior. There were fewer reported classroom disruptions in the lower grades compared to prior years, while the reports of misbehavior in grades five and six rose. The fifth and sixth graders in previous years had numerous behavioral problems. The new school organization did not improve the behavior problems of these students. Teachers were not sure if the new gender separation spurred these students to believe if they behaved poorly that the school would revert to coeducational classes or if this was just a continuation of prior bad behavior.

Parents were registering their children in such large numbers for IES that there was a waiting list for male students. The parental interest spurred parental involvement in the school community. Parent volunteering increased within the building. Parents were present as room monitors and attended more school programs such as Family Math night with its family and faculty interactions. The Family Math night packed the building with families working on mathematical problems with their children. The number of parents

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who attended the parental outreach mathematics workshops that taught parents how to involve their children in mathematical games increased. At these sessions, parents were given materials to keep and use at home with their children when they attended these workshops. Parents witnessed the commitment of the faculty and administration to the success of their children, and the parents came out to support those efforts.

### Discussion

Challenges facing IES were at multiple levels for the students and the faculty in the first year of single gender classes. The students had split opinions regarding single gender classes (See Figure 1). The upper-grade students who attended the school in the past when the building had heterogenous classes were neither enthused nor very cooperative helping the building transfer to single gender classrooms. This was evident in an upper-grades student perceptions survey that asked if the separation of genders helped the students' achievement and the student preference questions where 100 percent of the male students favored coeducation and 81 percent of the female students favored coeducational classes. While the males were almost evenly divided in their views of single gender classes being positive or negative on their academics, the female students were heavily supportive of this type of segregation by gender.

The IPS district invested in single gender public schools at the elementary level at the IES. The state high-stakes tests produced evidence that this approach increased the mathematics achievement scores of the students in single gender classes as long as those single gender classes began when the child entered school. The opinion survey of students showed that once students experienced gender-mixed classes, the separation could become a distracting issue to the educational process. The IES faculty was still adjusting to the division of students by gender after this first year of implementation. The IES faculty supported the single gender concept throughout the school year and was encouraged when the test results identified improvement in mathematics.

This grand educational experiment involved all the stakeholders who have pivotal roles in the education of children. Single gender classes worked for this elementary school. Next year, the whole building population will be moved into a section of another building while the present elementary school building is to be demolished and rebuilt. How effective single gender classes will be in a temporary building that is conducting heterogeneous classes will be another opportunity to revisit the strengths and issues of single gender education.

Future studies are encouraged that should make deeper examinations of the data collections and the preferences found in this research. Questions arise over the predispositions of the mathematics coaches doing this research and their personal biases toward a preferred outcome. Educational leadership groups should examine the ownership issues that this principal allowed the faculty to assume. The decision-making

process that the principal employed at IES might be successful in another setting, but the principal's process needs to be documented. The faculty ownership for making changes in a building organization needs to be examined. Aspects of the faculty background, years of teaching experience, and teaching capabilities would impact any reproduction of this change process. The school faculty is encouraged to examine, in greater detail, the aspects of pedagogical presentation modes, classroom timing, and classroom learning activities as they pertain to gender-based classes in their building. An examination of how successful this change process would be in a rural or suburban setting is called for before claiming that single gender classes are the path to improving student testing scores. It would help to have more urban districts attempting the single gender concept in a variety of forms. How successful would a single gender building be vs. this coeducational building with single gender classes? Which environment is sustainable over the 12 years of public education? These are questions that should be addressed in future examinations of single gender schooling. The IES faculty had the right mix of dedicated professional educators who worked in harmony to make school a place of mathematical learning.

**Appendix A**

***Parent Survey***

Please complete the survey on single gender education.

1. Do you prefer coeducational classes or single gender classes?  
 Coeducational     Single gender
2. How long has your child been a student in single gender classes?  
 Year(s)
3. Do you think single gender classes have a positive impact on your child's learning/academic achievement?  
 Yes                       No
4. Are you a supporter of a single gender classes?  
 Yes                       No
5. List advantages and/or disadvantages of single gender classes:  

*Advantages*
*Disadvantages*

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**Appendix B**

***Student Survey***

Please answer the following questions. Place a check mark (✓) in the blanks where appropriate. Use the lines to write any responses.

6. Do you understand what single gender means?  
 Yes                       No
7. How long have you been a student in single gender classes?  
 Year(s)

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8. Do you like being in single gender classes?

\_\_\_Yes                      \_\_\_No

9. What do you like about being in a single gender class?

10. What do you dislike about being in a single gender class?

## Appendix C

### *Teacher Survey*

Please answer the following questions.

1. How many years have you been teaching?

2. What grade level and gender do you teach?

3. What is your current certification or licensure?

4. Do you prefer coeducational or single gender classes?

5. Do you feel that single gender education is effective?

6. What are the advantages of single gender classes?

7. What are the disadvantages of single gender classes?

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Do schools shortchange boys? Could single-gender classes or schools make a difference? Some California educators think so. We thought maybe this is something that could work in a public school setting," Kristi Kahl, coordinator of the Long Beach California Unified School District's middle school reform, told the Los Angeles Times ("Same-Sex Classes to be Offered at Long Beach Middle School"; May 9, 1999). "It is really hard to say how you can attribute [improvements] to gender separation, how much you can attribute to instruction, and how much you can attribute to parent commitment. The responses observers noted in those elementary-school classrooms included the following: Boys called out eight times as often as girls did. Teachers ignored the "raise your hand" rule. School Effectiveness and School Improvement. Google Scholar. Heckman, J. 2006. "Can Single-Sex Classes in Co-educational Schools Enhance the Learning Experiences of Girls and/or Boys? An Exploration of Pupils' Perceptions." *British Educational Research Journal* 28:37-48. Crossref Google Scholar. 1996. "The Effects of Single-Sex and Mixed-Sex Mathematics Classes within a Coeducational School: A Reanalysis and Comment." *Australian Journal of Education* 4:147-62. Crossref Google Scholar. Morse, S. 1998.