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ABSTRACT

A project was conducted to create a gender-equitable classroom that increased the engagement of all students in the industrial technology class. The targeted students were the eighth graders in a suburban middle school in a growing metropolitan area. The problem of female students' falling self-esteem, loss of confidence, rigid adherence to gender stereotypes, and reduced interest in challenging classes was documented through research on the national level and at the research site through surveys, behavior checklists, and reflections. Analysis of data showed that students lacked interest in the class because they felt it was not relevant, they did not feel they were fairly treated in the class, and they adhered to gender stereotypes. A review of course content showed out-of-date materials, sexist attitudes, and a lack of emphasis on relevance to students. A review of solution strategies suggested through research as well as an analysis of the problem setting resulted in the selection of the following interventions: gender equity education for the instructor, implementation of a gender-equitable pedagogy, and instructional strategies to increase confidence, skill, and relevance in the subject area. Post-intervention data indicated an increase in student engagement and a decrease in student off-task behaviors. Students' comfort levels increased during the class and students found relevance during the intervention. (Appendixes include the pre- and post-intervention surveys, a behavior checklist tally sheet, and a permission slip for students to participate in the study. Contains 22 references.) (KC)

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Gender Bias in Industrial Technology at the Middle School Level

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An Action Research Project Submitted to the Graduate Faculty of the School of Education in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Teaching and Leadership

Saint Xavier University & Skylight Professional Development
Field-Based Masters Program
Chicago, Illinois
May, 1999

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Dean, School of Education

Dedication

To my family, who supported me through this project and gave me the confidence to believe I could do it.
To Alesha and Ryan, I want you to know that anything is possible if you show up.
To Amanda, for always believing in me.

ABSTRACT

This report describes a process used for the creation of a gender equitable classroom that increased the engagement of all students in the industrial technology class. The targeted students were the eighth grade in a suburban middle school in a growing metropolitan area. The problem of female students' falling self esteem, loss of confidence, rigid adherence to gender stereotypes and reduced interest in challenging classes is well documented through research on the national level and was documented at the research site through surveys, behavior checklists and reflections.

Analysis of problem cause data showed students have a lack of interest in the class because they felt it is not relevant, they do not feel they are fairly treated in the class and they adhere to antiquated gender stereotypes. Review of curricula content showed out of date materials, sexist attitudes which perseverate the gender stereotypes and a lack of emphasis on relevance to students existed.

A review of solution strategies suggested through research as well as an analysis of the problem setting resulted in the selection of the following interventions: gender equity education for the instructor, implementation of a gender equitable pedagogy, and instructional strategies to increase confidence, skill and relevance in the subject area.

Post intervention data indicated an increase in student engagement and a decrease in student off task behaviors. Data revealed that students' comfort levels during the class increased and students found relevance during the intervention.

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CHAPTER 1

PROBLEM STATEMENT AND CONTEXT

General Statement of Problem

In the targeted eighth grade industrial technology class there is a measurable difference in engagement specific to gender. Evidence of this problem includes a student survey, teacher observations, student reflections and anecdotal records from teacher journal entries.

Immediate Problem Context

Classroom

This action research project takes place in an industrial technology classroom. The classroom and school are located in a midwestern suburban area. The classroom consists of 2 student work rooms. One work room is a lab area, housing wood working and plastics equipment. The other work room is a classroom, with student desks and 13 Apple II e computers. There is also a paint room, dark room and storage room connected to the industrial technology area.

Industrial technology is one-fourth of the Careers Program at the school. The careers program offers all students not enrolled in band or in the special education resource program an exploratory view of the world of work. The band is limited to 180 students.

The special education resource program is limited to 15 students. The careers program includes nine weeks each of Family and Consumer Science, Music, Art, and Industrial Technology. Students in the careers program encompass a diverse mix of the ability, ethnic and socioeconomic groups represented in the school.

The industrial technology curriculum is designed to give students a wide variety of experiences. The eighth grade curriculum offers students an opportunity to develop a better understanding of careers in transportation, manufacturing and communication through hands-on projects and experimentation.

School

The school is located in a growing residential neighborhood. Until recently, the school was bordered on three sides by open fields. Now houses are being built on the three open sides of the school grounds.

The building was completed in 1977 as an open concept facility. The floor plan originally laid out an academic area, an administrative area, a music area, a careers area, and a gym. The only major change to the structure since its completion is the addition of walls in the academic area resulting in a traditional classroom design.

The School Report Card, 1997 reported total school enrollment as six hundred thirty-five: 209 sixth graders, 208 seventh graders, and 218 eighth graders. The ethnic make-up was 62.4% White, 24.7% Black, 7.2% Hispanic, 5.5% Asian/ Pacific Islander, and 0.2% Native American. There were no students enrolled with limited English proficiency. The percentage of low income students was 17.3%. The attendance rate was 95.5%. Student mobility was 13.5%, and chronic truancy was 0.6%.

The school staff is composed of fifty-five full-time employees: a principal, an assistant principal, a dean, forty teachers, seven aides, three secretaries, a cafeteria manager and a custodian. There is a supporting staff of part time employees that includes: a speech technician, a psychologist, a social worker, a nurse, a librarian and a cafeteria staff of eight women. The school has no counselors (Middle School Report Card 1997).

During a typical day, students have five 45 minute class periods. These consist of an elective (either band, special education resource, or one of the four sections of careers), math, physical education (six weeks of health is incorporated in the PE curriculum), science, and social studies. Students also have one 90 minute block of language arts.

The school offers a wide range of programs in an attempt to accommodate all learners. There is an honor program to enrich the curriculum for students identified as gifted. There is a Tender Loving Care (TLC) program to allow students identified as slow learners reach their potential through teaching additional study skills and organizational skills. The school also houses the Mildly/ Moderately Mentally Impaired (MMI) programs for half of the district.

To round out the program, the school offers a variety of after school academic clubs as well as a diverse after school sports program. The sports program is made up of both intramural and competition level sports including baseball, softball, boys' and girls' basketball, girls' volleyball, and boys' wrestling. After school academic clubs include Student Council, National Junior Honor Society, Yearbook, Art Club and Chorus (Middle School Brochure, 1997).

District

The school is located in a unit district. The unit district encompasses both the community surrounding the school and a neighboring town. It is the eleventh largest district in the state.

The district is comprised of nine elementary schools, four middle schools, two high schools, and an alternative school. The alternative school is the newest school. It opened in 1995 to service at risk students in eighth through tenth grades.

The number of students enrolled in the school district is 12,131. The district has an ethnically diverse population consisting of 64% White, 21% Black, 10% Hispanic, and 5% Asian/ Pacific Islander. Only 1.2% of the students enrolled are designated limited English proficient. Many socioeconomic groups are represented in the district. Twenty percent (20%) are labeled as low-income. The student mobility rate is 9%. The district reports that it spent $5,946 per student with a total of $52,366,786 spent during the 1996-1997 school year.

The number of teachers the district employs is reported as 602, and 72% are female. The ethnic breakdown is reported to be 95% White, 3% Black, 1% Hispanic, and 1% Asian/ Pacific Islander. Teachers have an average experience of 19 years with 69% holding a master's degree or higher. The reported starting teacher salary is $25,615, with the average salary reported at $45,058. The average administrator's salary is $71,636 (Middle School Report Card 1997).

Community

The village in which the school is located is situated between two major expressways on the outer edge of a growing metropolitan area. The 1995 census was published with the village having 95% of available housing occupied. There were also projections of 3,500 new homes being built in the next three to five years. Home prices range from $95,000 to $300,000 with the average being $122,700. Rental property is also available in the village. There are 2,400 rental units on record in the village hall. The average rent is recorded at $700 per month

The village population, as determined by the 1995 census, is 47,691 people. The community's ethnic make-up is recorded as 67% White, 17% Black, 8% Hispanic, 6% Asian/

Pacific Islander, and 2% specified other race. The average number of residents per household is three and the average household income is $61,200 (State Department of Commerce, 1996).

The village was once known as a "bedroom community". However, with the industrial base having grown 3,000% in the last ten years, this is no longer the case. The local government is working to continue to stimulate growth in this area (City Chamber of Commerce 1996).

The community has a nationally recognized park district, an award winning library and a strong religious community. All of these give the youth of the village many opportunities for success and a wide variety of experiences.

Regional and National Context of Problem

In the classroom, the goal of educators is to engage learners. We strive to facilitate learning regardless of gender. Though public education has gone through many changes, the goal of teachers remains the same: to create opportunities for students to succeed.

Education is an "island of equity" according to a Department of Education spokeswoman during the Bush administration (Hannan, 1995, p. 104). It has been over 20 years since Congress passed Title IX making sexual bias unlawful in education. Has sexual bias gone away? In an attempt to make our classrooms gender neutral, we have moved gender bias onto a back burner. Gender bias is so subtle; it is currently termed "the hidden bias" (Wellhousen, 1996, p.36).

In 1990, the American Association of University Women asked 3,000 boys and girls ranging in age from 9 to 15 how they felt about themselves. The study showed a drop in self-esteem between elementary and middle school for both boys and girls. Girls faired far worse though. The drop in self esteem for girls, however increased geometrically between elementary and high school, with a decrease from 60% indicating they were happy, to a low for girls of 29% in high school (Hannan, 1995, p 104).

Adolescence, a word that can still cause anxiety for many, is a time of emotional trials and physical tribulations. It is also the time in many students' lives when their path is chosen.

> "As their confidence fails, girls opt out of challenging academic courses, particularly math and science...because these courses require qualities they are steadily losing as they go from middle to high school--confidence, trust in ability, tolerance of frustration. As girls replace their "I can do it" with "I'm no good at it," they become lost at sea, losing sight of their academic goals" (Tschumy, 1995, p. 59).

At this time girls shy away from anything that puts them in the spot light, and boys begin to dominate the classroom (Tschumy, 1995, p. 58). Boys are given more teacher time because they assert themselves and teachers have, so they think, no choice but to deal with them. "Research shows that, from elementary school on, girls 'receive less active instruction, both in the quantity and the quality of teacher time and attention" (Sadker and Sadker, 1994 p. 54).

In order to create a bias free classroom, teachers could begin by acknowledging that bias is in their classroom. To be gender neutral has not proven to be an effective method of addressing gender bias. Educators might do better to address the differences between girls and boys. Teachers have the ability to give girls the tools for success. If they do not take the opportunity, it limits everyone.

CHAPTER 2

PROBLEM DOCUMENTATION

Problem Evidence

In order to document the problem of engagement specific to gender in the industrial technology class, anecdotal records consisting of a student survey (Appendix A), teacher observations recorded on a behavior check sheet (Appendix B), teacher reflections and student reflections were collected over a 2 week period.

Of the 20 students in the class at the beginning of the quarter, 19 were involved in this process over the 2 week period. A survey form for student opinions was developed by the researcher to aid in this process. A summary of the survey results are presented in Table 1. The survey consisted of thirty-one questions. The questions fall into five categories. The results have been combined to show attitude, opinion and trend. Table 1 is intended to be a representation of the survey results, not a direct question to question correlation.

When surveyed, 93% of the females and 85 % of the males felt the teacher was fair. However 25% of the girls and 16% of the boys felt that boys received more teacher attention. When asked who was "better" in industrial technology, 35% of girls and 54% of boys felt that boys were "better" in industrial technology.

To define "better", the researcher asked questions concerning academic ability and performance. Comments given in this section of the survey were summarized in one student's comment: "boys call out more answers and know more about it, so they are better".

Table 1

Pre Intervention Survey Results September 1998

Question category	Girls	Boys
Think boys are better in the class	35%	54%
Feel boys get more teacher attention	25%	16%
Dislike answering questions in class	90%	22%
The Teacher is here to help me	72%	61%
Feel the teacher is fair	93%	85%

When asked if they liked answering questions in class, nine out of the ten girls surveyed said, no, they do not want to answer questions in front of the class. Reasons for discomfort in talking in front of the class varied from "I think the questions are dumb" to "I don't want to get it wrong and look dumb," the latter being the more popular response given.

When boys were asked if they liked answering questions in front of the class, they felt comfortable 78% of the time. Reasons given for their high comfort level when speaking in class varied from "To find out if I am right" to "It's fun to answer questions".

The student behavior check list (Appendix B) also shows that girls are more frequently engaged in off task behaviors. They are more likely to be out of their seat than their male counterparts in the class. Female students were recorded off task 53% of the time on the behavior check list. In contrast, only 36% of the males in the class were recorded off task on the behavior check sheet.

Table 2

Results of Behavior Check List September 1998

Behaviors	Girls	Boys
Wandering	26%	22%
Asking to leave the room	15%	7%
Talking to non group members	12%	7%

Female students were more than twice as likely to ask to leave the room. Destinations were typically the rest room or the nurse's office. Female students were also one and one half times more likely to be engaged in talking to non-group members. Females, who were engaged in talking to other non-group members, were typically talking to other females.

Reading student reflections, the researcher found that many female students define industrial technology as "hard and boring". They do not like the projects and feel the materials are hard to work with. One student wrote, "didn't do something, really boring."

Female students' discomfort in industrial technology may result from a lack of prior knowledge in the area. An example of prior knowledge would be an at home experience working with tools. Research has shown that a lack of prior knowledge leaves students lost and unable to connect to what is being presented (Morgan and Richardson, 1997, p88). Female students' insufficient prior knowledge could also cause an inability to connect the content area to themselves.

The findings are contradictory: the teacher is both fair, while at the same time, gives more attention to the boys. This contradiction leads me to question the students' definition of fair.

Using the definition of fair as synonymous with equal, female students may not feel they should receive the help because their male counterparts do not require the same kind of assistance. Female students might also be unwilling to call attention to themselves by asking for assistance; or female students may just expect less teacher time.

Probable Causes

In adolescence, girls are trained to be what the culture wants them to be (Pipher, 1996, cassette recording). Females are taught early on in life that being quiet and complying is how they are expected to behave. Requiring females to get involved in traditionally male projects goes against what they have been socialized to believe is appropriate. Adolescence is the time when society puts the greatest pressure on children to synthesize themselves to fit to the cultural norms.

Research of teachers has shown that teachers more often accept answers males call out, ask more in depth questions of males and are more likely to ask males to expand their answers (Matthews, et. al., 1998, p.54). "Male students control classroom discussion;...They receive more praise, but they also receive more constructive criticism"(Hannan, 1995, p. 103). This combination of practices allows males more active teaching as well as more active learning. Female students receive less active teach time (Mincer, 1994, p. 24) so females learn to expect less active instruction from the teacher (Sadker and Sadker, 1994, p. 54).

Teachers can also reduce students' expectations of themselves by short circuiting the learning process (Sadker and Sadker, 1995, p. 80). Short circuiting a students' learning is to simply do it for them. This teaches two things, "you can't do it" and learned helplessness.

Learned helplessness trains students not to try; "if I wait someone will do it for me". Teachers are similarly more likely to give male students extended directions than female students. Short circuiting females and giving males extended direction teaches females and males that males are more capable.

In adolescence, female students are far less likely to take risks. They focus on males for self esteem (Sadker and Sadker, 1994, p. 85). Industrial technology is an area where many students have little previous experience making it a far more risky environment than their other subjects. Lack of previous experience is a particular problem for female students when they are taught their gender roles by their parents who believe tools are for boys.

"We live in a look obsessed, media-saturated, 'girl poisoning' culture. Despite the advances of feminism escalating levels of sexism and violence...stifles their creative spirit...destroys their self-esteem" (Pipher, 1996, cassette recording). Growing up in such an antagonistic environment as described by Pipher reduces what females feel is possible for themselves. Succeeding in a traditionally labeled male class requires females to use characteristics they seem to be losing rapidly in middle school. Those characteristics are confidence, trust in their ability, and tolerance of frustration (Tshumy, 1995, p. 59).

During adolescence, females lose confidence in themselves and their abilities. Adolescence causes a drop in self esteem that causes a loss in confidence and interest in school work (Sadker and Sadker, 1994, p. 79). Female students become unwilling to draw attention to themselves in any way (Tshumy, 1995, p.58). Succeeding in class calls great attention to oneself because you are called on to answer questions and participate.

Females are not represented equally in the field of technology and science. "Women have trouble breaking in..."(Raffalli, 1994 pg. 26). Being under represented in these fields continues

to give the impression that they are male fields. Gender stereotypes are continuing to be portrayed in the media as well in schools. The message females receive from places like Bill Nye the Science Guy is "[It] is not women's work and no interesting women could be [it]"(Rop, 1998 pg. 58).

Both male and female adolescents maintain their gender bias regarding what is appropriate gender behavior unless they are actively taught these stereotypes are inappropriate guides for behavior (Wellhousen, 1996, p.37). This rigid adherence to gender stereotypes reduces what female students think is possible for them to achieve. Without the ability to believe success is possible, girls opt out of the challenge.

CHAPTER 3

SOLUTION STRATEGY

Literature Review

The goal of increased engagement specific to gender by attempting to create a gender neutral environment has proven unsuccessful. Today the literature supports a gender equitable learning environment to increase the engagement of the female students. Research on how to achieve a gender equitable classroom focuses on different elements of public education. The three that will be discussed here include changes in the structure of schools/district, parent's role and involvement in the female student's education and how the teacher effects change in the learning environment.

Addressing engagement specific to gender at a district level, Beck (1995, p.13) suggests a comprehensive look at district policies. Policies include hiring practices, salary scales and curriculum and textbook content to ensure gender equity in all areas. Beck also promotes a school policy that analyzes enrollment data to determine participation in all content areas. Further, Beck supports a policy to ensure that when gender disparity is found, districts analyze results to find solutions that better create and maintain equity.

One method of maintaining equity would be equity training for teachers. Teacher equity training is also supported by Zaher (1996, p. 29). Zaher discovered that the attitude of school

officials and teachers played a large role in the success of female students. In view of the enormous impact faculties have on the lives of their students, Zaher (1996, p. 29) states "[teacher] courses devoted to this subject [sexism] are unequivocally crucial."

Curriculum changes, to create gender equity, at the school level are supported by Burdick (1997, p. 34). Females are under represented in curriculum, textbooks and, as reported by Davis (1999, p. 533), in literature. The curriculum, described by Burdick, is interdisciplinary with research based projects in a noncompetitive atmosphere lending itself to the female learning style.

Parent involvement is another method of increasing the engagement of female students. Empowering parents is, described by Hammrich (1997, p. 23), keeping parents actively engaged in students' learning to persevering females' enthusiasm. To support female students Hammrich encouraged parents to become involved by offering family programs, after school programs and field trips. Collaboration between parent and schools must be the focus for this intervention to be successful.

Parents are the first teachers of their children and Pipher (1996) addresses ways parents can continue to encourage their children and keep them succeeding in school. Pipher illustrates that parents can give students role models of women in nontraditional roles, become involved in their school, use non-biased language, and listen to their students. Pipher asserts that teachers and schools can help parents with this by creating opportunities for parents to become involved.

Curriculum changes such as those advocated by Burdick are also addressed by Rop (1998, p. 60), only on a classroom scale. Rop suggests that to create a gender equitable teaching program, the use of research in the classroom in addition to the text, relating the lesson to the real world, "looking at the big picture first" and constructing interdisciplinary units that show the

connections in other areas are important. The use of alternative assessment can aid in creating an equitable program as well.

To have a successful classroom/teacher intervention, "creating a gender equitable classroom the assumption that it is for girls only and that if girls improve boys lose", should be addressed (Bailey, 1996 p, 75). Baily describes a gender equity program as, "about enriching classrooms, widening opportunities, and expanding choices for all students" (1996, p.76). How males and females look at the world around them must also be incorporated into an equitable teaching style (Edwards, 1997, p. 33). "Females look right through to the social function of technology while males focus on the technology itself" (Brunner, 1997, p. 48). Brunner (1997) suggests a technology class incorporate assignments that reflect the interest of both males and females.

In the book "Failing at Fairness", Sadker and Sadker (1994) describe the gender equitable classroom as a place where the way girls and boys learn is taken into account, and the learning is geared to accommodate the different learning styles. Changes, which the Sadkers report as successful in increasing gender equity, are increased wait time, calling on boys and girls equally, being cognizant of the rules and enforcing them equally, the use of cooperative groups, homogeneously grouping students by gender for cooperative work groups, and creating an environment where all students feel safe to take risks in learning.

A specific list of "Do's and Don'ts" is given by Wellhousen (1996, p. 37-38) following the ideas laid out by Sadker. The specific steps to creating a gender equitable classroom, as described by Wellhousen, include equal time for girls and boys and equal response time. This entails increasing wait time and letting both females and males have equal time to complete their thought without teacher interruption. Wellhousen further suggests giving both girls and boys the

same opportunities, challenges, rules and expectations. The teacher should not assign jobs based on gender, and should give praise based on ability not appearance. Teachers should give feedback that is constructive without regard for gender. Teachers should give both boys and girls an opportunity to expand their answers and should give feed back that is useful, not just acknowledge the response with "OK".

Classroom interventions that directly addressed the issue of gender equity was the topic of a study by Matthews et. al. (1998, p. 54). When bias came up in the classroom, the researchers had students look at the problem and discuss the fairness of the situation. They also used role play and multi-media presentations to show examples of bias. They utilized behavior modeling and a specially designed CD-ROM to teach students how to deal fairly with each other.

Interventions

The interventions chosen were those the researcher could control directly in the classroom and those that would directly impact the students' classroom experience. The objective was to create an environment that was bias free, safe for the students to risk and that would incorporate each genders natural learning tendencies. The use of increased wait time, the introduction of cooperative base groups homogeneously grouped by gender, the use of alternative assessment and the implantation of problem solving taught directly would be used to create a gender equitable environment.

Problem solving would be taught directly to increase the female students' confidence in their ability to master the content. Research into how female and male students learn best will be studied by the researcher so an equitable teaching style can be incorporated into the classroom.

Project Objective and Processes

As a result of the gender equitable teaching style, the use of problem solving and the increased instructional emphasis on cooperative learning during the period of September, 1998 to November, 1998, the targeted eighth grade class will show an overall decrease in off task behavior and an increase in engagement as measured by behavior check lists, teacher observation, and end of class survey.

1. Implement gender equitable teaching style as described by Sadker and Sadker and Wellhousen.
2. Select and teach problem solving skills using cooperative learning.
3. Integrate cooperative learning and problem solving into the curriculum area.

Project Action Plan

Process Statement One

WHO: One eighth grade class with 25-35 students, base groups, 3-4 students in each group, homogeneously grouped by gender with these groups remaining constant throughout the class.

WHY: To establish a cooperative, responsible classroom with clear and consistent limits and consequences, to minimize competition and maximize cooperation.

WHAT: Establish classroom rules, routines and procedures

- Determine classroom rules before school begins.
- Determine classroom routines and procedures before school begins.

- Explicitly teach and practice classroom rules the first few days of class.
- Explicitly teach and practice classroom procedure the first two weeks of class.
- Evaluate knowledge and mastery of classroom rules, routines and procedures.
- Send a parent letter (Appendix C) home for parents signature.

Establish learning environment

- Arrange classroom furniture conducive to cooperative learning.
- Arrange classroom furniture to facilitate mobility of student and teacher.
- Create and display visual aids of both genders with gender equitable language.
- Organize materials and supplies so they are easily reachable.

Teaching style

- Develop an understanding of gender equitable teaching.
- Increase wait time when calling on students.
- Develop fair ways to call on students and assign jobs.
- Consistently enforce classroom rules, procedures, and routines.

WHEN: Daily for the first two weeks of the class then once weekly during the class for 15-40 minutes from the months of September, 1998 to November, 1998.

WHERE: In the eighth grade industrial technology class located in a middle school.

Process Statement Two:

WHO: One eighth grade class with 25-35 students, base groups, 3-4 students in each group, homogeneously grouped by gender with these groups remaining constant throughout the class.

WHY: To improve comfort level, to increase belief of abilities and to reduce learned helplessness.

WHAT: To teach by direct instruction, with group interaction and group processing for evaluation.

Skills taught will be:

- The steps for "Problem Solving".
- Roles for cooperative groups.
- Appropriate comments and encouragement when working in groups.
- Appropriate ways to handle conflict in the group.

WHEN: Daily for the first two weeks of the class then once weekly during the class for 15-40 minutes from the months of September, 1998 to November, 1998.

WHERE: In the eighth grade industrial technology class located in a middle school.

Process Statement Three

WHO: One eighth grade class with 25-35 students, task groups, 2-3 students in each group, randomly selected heterogeneously grouped changing by projects.

WHY: To provide a more gender equitable learning environment and to increase confidence and abilities in the content area.

WHAT: The eighth grade class will apply the learned skills in the context of their industrial technology projects. The process used to apply these skills will be team building, graphic organizers, rubrics, pair share and projects.

WHEN: The task groups will meet after the first two weeks of class for four days per week for 15-40 minutes per class period, during the months of September, 1998 to November, 1998.

WHERE: In the eighth grade industrial technology class located in a middle school.

Methods of Assessment

In order to assess the effectiveness of the intervention, student surveys will be completed and compared to surveys at the beginning of the class. Student reflections will be compiled and compared to those at the beginning of the class. A teacher observation check sheet will be kept to record the occurrence of off task behaviors. Teacher reflections will also be kept and a daily record of the interventions.

CHAPTER 4

PROJECT RESULTS

Historical Description of the Intervention

The objective of this project was to reduce the difference in engagement specific to gender and to increase engagement of all learners. The implementation of a gender equitable teaching style, direct instruction in problem solving and cooperative learning groups were selected to effect the desired changes.

The implementation of a gender equitable teaching style included the use of increased wait time, non-bias language, classroom rules that were fair and fairly enforced and a cognizant distribution of jobs and who is being called on. The Teacher/Researcher also read extensively pertaining to gender equity and the learning styles of females and males to become cognizant of how the facilitator affects the learners.

When the intervention began there were nineteen students enrolled in the class. All students in the targeted class participated in the action research project. However, at the end of the intervention, the class had grown to thirty students. Eleven students were added during the intervention. The eleven additional students participated in the interventions and completed a post intervention survey (Appendix A). The eleven students placed in the class during the intervention were not added to the research data.

Classroom rules were developed before the class began, taught directly and reviewed on a regular basis. The learning environment was changed to accommodate cooperative groups and teacher/researcher mobility.

The use of base groups, homogeneously grouped by gender, to teach social skills for working in a cooperative setting occurred during the first two weeks of class. The expected behaviors for cooperative groups were reviewed and modeled regularly due to the continual additions to the class.

At approximately the fifth week, new base groups were formed. Students were homogeneously grouped by gender to have direct instruction in problem solving. This was to be done earlier in the intervention and in the original base groups. The addition of nine students by this point in the intervention made the original base groups difficult to maintain. The continual addition of students also increased the amount of time each project took to finish. This made the original time table difficult to follow.

Students worked in randomly selected, heterogeneous task groups to complete three projects in the content area. Students were assigned roles in the task groups by the Teacher/Researcher or were given the freedom to assign their own roles.

Students completed a post intervention survey at the end of the intervention. Students were also required to keep a daily reflection log. The reflection logs were collected by the teacher/researcher on a daily bases. The logs were read by the teacher/researcher and then used as a review for clarification during the next class.

To evaluate student learning, the teacher/researcher used the reflection logs, students' self assessment, rubrics and completed projects. All students completed the three projects assigned during the intervention. Student self assessment and self reflection gave an insight into how students felt and questions they still had.

The teacher/researcher kept a daily log during the intervention. The teacher/researcher recorded observations of student behavior. The teacher/researcher also recorded thoughts and feelings about how the intervention was progressing.

Presentation and Analysis of Results

Assessment of the intervention effectiveness pertaining to increasing the engagement of students specific to gender employed comparison of a pre and post intervention survey and comparison of student reflection logs during the intervention. Survey comparison is presented in Table 3.

Table 3.

Post Intervention Survey Comparison November 1998

	September	November	September	November
Question category	Girls	Girls	Boys	Boys
Think boys are better in the class	35%	35%	54%	29%
Feel boys get more teacher attention	25%	17%	16%	11%
Dislike answering questions in class	90%	80%	22%	25%
The Teacher is here to help me	72%	61%	61%	76%
Feel the teacher is fair	93%	87%	85%	85%

Comparison of pre and post intervention surveys show little statistical change in most categories. The category "think boys are better in the class" however shows a significant drop in percentage. There was a 25% point drop in the number of boys who feel they are better in industrial technology then the girls. Boys who changed their answer, selected both genders were good at industrial technology.

I feel this drop in boys feeling they are "better" in the class is consequential. It represents boys who are more likely to accept females input and less likely to take over a project. One step toward increasing females' confidence in themselves is to change what is expected of them by their peers. Females, in their reflections, revealed they felt more comfortable in the class. This increased the amount they were willing to participate in the projects.

The comments on the survey were more striking than the statistical data. Though the percentage of change was only 10% for females in the category Dislikes answering in class, the student comment was expressive "because I know the teacher won't say no that's wrong. she [sic] accepts your answer and helps you elaborate on it". Increasing the comfort level of one student is significant.

Student reflections were also compared throughout the intervention. Both male and female reflections grew from "dumb and hard" and "don't see why we got to do this" to "we got our minds working" and "I felt ideas were very good from my group". This indicates that students were involved and participating in the learning process.

Students off task behavior was assessed with a behavior check sheet. This was done at the beginning and the end of the intervention and compared. The results are reported in Table 4.

Table 4

Behavior Check List Comparison November 1998

	September	November	September	November
Behaviors	Girls	Girls	Boys	Boys
Wandering	26%	11%	22%	12%
Asking to leave the room	15%	10%	7%	6%
Talking to non group members	12%	8%	7%	5%

There was a decrease in all off task behaviors that were monitored during the intervention. Both males and females off task behaviors were reduced during the intervention. The greatest decrease was in the area of "wandering". Wandering for females decreased 15% points during the intervention. Though wandering for males only decreased by 10%, comments such as "it was a cool class and I thought we accomplished something", lead me to believe with more time it would be reduced further.

The two other categories of off task behavior that were monitored, "asking to leave the room" and "talking to non-group members", also decreased for both males and females. Although percentage of decrease was not large, the greatest being 5% and the smallest being 1% of change, the fact all areas did decrease indicates the intervention was making an impact. Homogeneously grouping by gender could have decreased the number of female students "talking to non group members" to a greater degree than recorded on the behavior check sheet. The behavior check sheet was recorded during the heterogeneously grouped task groups the last week of the intervention.

Conclusion and Recommendation

Based on the presentation and analysis of the data on off task behaviors, students showed an improvement in their participation in the class. Homogeneously grouping by gender and using direct instruction in problem solving appears to have increased the participation level of all students. Direct instruction in problem solving appears to have transferred to other projects, giving students the confidence to test their ideas without the need for teacher intervention. Increased participation could also be attributed to an increased confidence in abilities. This resulted from direct instruction in problem areas. Though not directly addressed in the data, the occasional use of student reflections to answer question and review concepts seemed to have had an effect on student comfort level in the class.

The purpose of the student pre and post surveys was to present a picture of the students level of comfort in the class and with the teacher. The survey was also designed to gage the level of bias the students felt in the class from the teacher and from their fellow students. The surveys did not yield much useful statistical data, They did, however, give students a forum for insightful reflections. These comments offered a much clearer picture of the students' classroom experience.

The cognizant recognition of gender bias and the differences in learning styles of females and males did achieve a positive affect on the target class. The intervention being only nine weeks long and having a continual influx of students, however, made the evidence sparse. To increase the effectiveness of the intervention the time it is given could be extended. To reduce the number of intervention items could also help give a clearer picture of which intervention is successful. The three interventions, changing the teaching style to be gender equitable, direct instruction in problem solving and cooperative learning groups created difficulties when trying

to determine which variables were successful. All three intervention items, direct instruction in problem solving, cooperative learning groups and a change in teaching style, are by themselves catalysts for positive change in the classroom.

Placing the focus on a gender equitable teaching style and cooperative learning groups, both homogeneously grouped by gender and heterogeneously grouped, to accommodate a female's learning style, would be my recommendation for future investigation. It is my opinion that without both, a change in teaching style and accommodation of learning style, the endeavor would not reach the target population. If the goal of education is to create opportunities for success, we should give consideration to what methods create success for both genders. Empowering females to find their voice through cooperative learning also creates an environment where males can be successful.

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Appendices

Appendix A

Pre Intervention and Post Intervention Survey

I am a Boy Girl

Questions	Never	Sometimes	Often	Always
Ms. Ryan calls on boys more then girls.				
Ms. Ryan gives boys more freedom than girls.				
I can call out an answer and Ms. Ryan will accept my answer.				
If I call out an answer Ms. Ryan asks me to raise my hand.				
When Ms. Ryan tells me I did well I know I did good work.				
When Ms. Ryan tells me I did well I know I did pretty or neat work.				
Ms Ryan calls on girls more than boys.				
I feel comfortable at school.				
If someone makes a sexist remark Ms. Ryan stops it right away.				
Girls are asked to stop talking more than boys.				
Boys get to answer more questions than girls.				
I feel safe in Industrial Tech. class.				
If I ask Ms Ryan for help she does it for me.				
If I ask Ms Ryan for help she gives me good suggestions I can use.				
In Ms Ryan's class there is only one right answer to a question.				
When I answer a question I feel I'm safe and don't worry about being wrong.				
Ms Ryan favors boys more than girls.				
Ms Ryan favors girls more than boys.				
If a job needs to get done Ms Ryan will assign a boy to do it.				
If a job needs to get done Ms Ryan will assign a girl to do it.				
I feel my Industrial Tech text book is written fairly.				
I feel Ms Ryan recognizes me as a person.				

Ms Ryan is fair. Yes No Give an example

Who contributes the most to the class? Circle answer. Boys Girls Explain

Are girls or boys the best in your classes at school? Math?

Science?

Language Arts?

Social Studies?

Family and Consumer Science?

Industrial Technology?

Do you like to answer questions in class? Yes No Why?

Comments:

Appendix B

Behavior Check List Tally Sheet

Date _____

Behavior Observed	Girl	Boy
Talking to non group members		
"Wandering" Includes: out of seat with no purpose, sharpening pencil more than once, getting one supply at a time, et		
Asking to leave the room		

Appendix C
Saint Xavier University
Consent to Participate in a Research Study
"Gender Equity in Education Today"

Dear Parents,

I am enrolled in Saint Xavier University in order to receive my Masters Degree in Education. One of the requirements is that I do a research project to investigate teaching. This is done to provide evidence of transfer and show that the teaching methods I have been learning about in the classroom are effective for me in my teaching. The topic I have chosen is gender equity. I am a female in a traditionally male field. I feel that I can best benefit your child by directly addressing this issue.

The focus of the study is to determine whether addressing the difference in learning styles between girls and boys and gender bias as a whole is more effective than trying to create a gender neutral environment. It is my goal to improve student engagement in industrial technology by the use of cooperative learning and direct instruction of problem solving skills. These interventions are part of the normal teaching which takes place here at Jane Addams. In addition to this, students will be given a survey and asked to be open an honest about their educational experience. The survey results will be recorded as part of the project out comes.

The study will take place from September 1998 to January 1999. The study is completely voluntary and will not effect the students' participation in the class or their grade if you chose not to have them participate. There are no risks involved for your child. The study will address that boys and girls are different and in doing so hopefully give both groups a more comfortable and rewarding educational experience.

The study is completely confidential and anonymity is essential for the success of the project. No names will be used and the school itself will not be identified except to say it is a suburban middle school in a metropolitan area. There is no cost involved with the project and students will receive no compensation for participation in the project other than to gain an enriching educational experience.

Please feel free to contact me at Jane Addams (630)-759-7200 any time if you have questions concerning the project. Parent involvement is vital to the educational process and you are welcome and invited to join in your child's classroom adventures. I am looking forward to a very productive year here at Jane Addams.

I want to thank you for allowing your child to share in my growth as a teacher and for allowing me to participate in your child's growth as a student. Please sign and return the lower portion of this letter as soon as possible.

Kathryn E. Ryan

.....

I give permission for my child _____ to participate in the project. I give consent for results to be included in the study.

I choose not to have my child _____ participate and understand their information will not be recorded but that they will participate fully in the educational processes.

DATE _____ SIGNATURE _____

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Organization/Address: Saint Xavier University 3700 W. 103rd Street Chicago, IL 60655 Attn: Lynn Bush	Telephone: 773-298-3159	FAX: 773-779-3851
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