# BARRIERS TO FEMALE PARTICIPATION IN TECHNOLOGY EDUCATION AT MILLENNIUM HIGH

By

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# ABSTRACT

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BARRIERS TO FEMALE PARTICIPATION IN TECHNOLOGY

EDUCATION AT MILLENNIUM HIGH

Technology Education Dr. Kenneth Welty July, 2000 70

A.P.A. Style

The purpose for this study was to determine if gender inequity exists in technology education and report those inequities by identifying the top three negative perceptions that females have about technology education, the differences in negative perceptions between males and females, and to what extent those negative perceptions influenced/impacted female enrollment in technology courses an Millennium High School.

In order to determine if there were barriers to female participation in technology education the researcher developed and administrated a survey instrument. The survey instrument was designed to determine the extent to which the barriers uncovered during the review of literature exist at Millennium High School.

The findings of this study were based on the review of literature and on the reported results of the survey that was administrated by the researcher at Millennium High School. Based on these findings the researcher formulated the following recommendations:

- Design a series of gender equity in-services
- Create a gender-neutral learning atmosphere
- Increase the amount of instruction that students receive on the use of equipment
- Increase the comfort level around the machines
- A simple coat of fresh paint on the walls and new ceiling tile
- Make sure that there are several gender-neutral projects
- Institute a gender exclusive technology education course.

## Acknowledgements

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I would also like to thank Jean, my wife, Denise, and Valerie my daughters. They have seen me at my worst and have supported me in this endeavor despite my shortcomings.

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# CHAPTER I

## Introduction

### Context of the problem

The purpose of this study was to discover if barriers exist that prohibit female enrollment in technology education in a rural high school. This rural high school, who's actual identity will remain undisclosed for a number of reasons, will be called Millennium High School for the remainder of this paper. With a population of approximately 1100 students Millennium High School has had to rethink its technology education mission. What was once a sleepy farming and small manufacturing area has become vibrant and diversified due to the influx of new industries and technology. Millennium High School's graduates are no longer drawn to working down on the farm and are looking for an education that will give them an edge in today's market place. That edge must come in the form of technology courses that have been adapted to embrace all members of the community, including our female students.

The core technology courses: woodworking, construction, metal shop, welding, graphic arts, and drafting do not actively recruit, nor do they encourage female enrolment. Therefore, it is necessary for the core technology courses to work together in order to build an all inclusive technology program. However, this leads to a bigger question, should technology educators be actively recruiting female students into their classes? The answer is a resounding yes, some technology teachers are teaching students how to solve problems and how to develop a study, and how to evaluate the results in systematic fashion skills that are desperately needed in today's fast changing

technological world that our young people are expected to compete in (Bjorkquist, D. and Zuga, K. 1998)

Millennium High School's record of attracting female students, into technology education, fairs no better than other parts of the nation. According to the superintendent of the school district the average technology class attracts roughly 3.5 percent of the female population at Millennium High School. Therein lies the problem; the community is demanding that all students have a basic understanding of technology yet this high school is not reaching 96.5 percent of its female population. One way to overcome gender bias in technology courses is to get away from the male orientated project. Do not insist that all students build cars and buildings (Flower, J. 1998). The skills taught in woodworking, metalworking, and construction, graphic arts and drafting are necessary for students to compete for employment positions in the 21st century (Johnson, R. 1997).

Does Millennium High School need to expose all students to woodworking, metalworking, construction, drafting and graphic arts? Once again the answer is yes. Having the ability to create a technical design in order to solve a problem results in the increased chance of skill development (Zuga, K.1989).

As we enter into the new millennium teaching methods will change. Clearly the jobs of today require new skills, new terminology, new tools, as well as a flexible mind. The jobs of tomorrow will require no less. Scholars are recommending that we implement personal curriculum. Some will oppose this change; however, technology education has changed in the past and will continue to change in the future. Millennium High School's technology courses must be designed to facilitate the individual student's needs as well the needs of all students that have been neglected in the past. "More than any other

institution or entity, the American high school is entrusted with the task of preparing all of our young citizens for the future" (Carter, K. 1998). Therefore, this study was conducted to identify if there were barriers at Millennium High School, which impede female participation in technology education.

## Statement of the problem

The problem for this study is to determine what are the top three barriers (as reported by survey) that effect the enrolment of female students in the technology education classes at Millennium High.

## Statement of the purpose

The purpose for this study was to determine if gender inequity exists in technology education and report those inequities by identifying the top three negative perceptions that females have about technology education, the differences in negative perceptions between males and females, and to what extent those negative perceptions influenced/impacted female enrollment in technology education courses at Millennium High School. Recommendations were made to begin to eliminate these perceived barriers that preclude female participation in technology education courses at Millennium High School that were consistent with the findings of the study.

## Research questions

1. What are the top three negative perceptions that female students have about technology education as a result of their participation in technology?
2. Are there differences in the negative perceptions about technology education between males and females who participated in technology education?

**3.** To what extent did the negative perceptions have about technology education influence/impact female enrollment in other technology education courses at Millennium High?

## Significance of the study

This study is of importance to because it will discover why female students are not enrolling in technology education courses.

1. It will create an understanding of what biases are prevalent in technology courses.
2. It will discover why the female population is not enrolling in technology education courses.
3. It will recommend changes that are needed to increase female participation in technology programs.

## Limitations of the study

1. The environment is a small rural school.
2. Due to the lack of female participation in technology education no attempt was made to sample the population of Millennium High School. Instead the emphasis was placed on gathering perceptions from the largest number of females as possible. Therefore, the results of this study should not be generalized to a larger population.

3. This action research study was designed for Millennium High School to determine if there were barriers to female participation in technology education courses.
4. Due to the sensitive nature of the survey the questions on the survey were subject to approval by the board of education and its legal representatives.

## Basic assumptions

1. That technology instructors are not actively discouraging female students from enrolling/participating in technology courses.
2. That counselors are not overtly discouraging female students from enrolling in technology courses.

## Definition of Terms

PATT-USA: Pupils' attitude toward technology - PATT-USA Report Findings.

Technology: tech-nol-o-gy (tek-nol'-e-ji) n . 1. The application of knowledge, tools, and skills to solve practical problems and extend human capabilities

Technological Literacy: tech-nol-o-gi-cal lit-e-ra-cy (tek-nol'-laj-I-kel lit-e-re-si) n. An understanding of technology and its dynamics, the opportunities it offers, its impact on products and processes, markets, organizational structures and people.

# CHAPTER II

## Review of Literature

### Introduction

The purpose for this study was to determine if gender inequity exists in technology education and report those inequities by identifying the top three negative perceptions that females have about technology education, the differences in negative perceptions between males and females, and to what extent those negative perceptions influenced/impacted female enrollment in technology courses an Millennium High School.

There is a need for accountability in our public schools. The demand for employees that are able to succeed in the technical workplace will only increase in the future. The public sector is demanding that our schools train technically literate students. However, not all our students are receiving the type of education that they need to succeed in the workplace of tomorrow.

There has been several studies that indicate that gender bias, in the technology education area, has been a sever problem in the past. There is evidence, that even though gender bias in technology education has been exposed; the technology education area has been slow to respond to the needs of female students (Silverman, S.,: Pritchard, A.,1993). Area manufactures have been making statements to the press that today's schools are not effectively teaching our students. It is hard to dispel this statement when we are not meeting the needs of female students, which make up roughly 51% of the population, the same opportunities as male students. Therefore, technology education needs to eliminate all barriers to female participation.

With all of the demands on the school systems, the needs of female students may have been overlooked. Slightly more than one-half of high school graduates go on to college and the rest need some training for the fields that require skilled workers. The young people of today are entering a world of work unlike anything educators have experienced.

This review of literature will provide information as to the persistence of gender inequity in technology education in the United States for the past 50 years. The information will point out the inequities that women have faced in the job market, as well as in their education. The information will also show that the mass media of the 50's may be responsible for some of the gender inequities that women face today.

## Gender inequity mass media

(Guttentag and Bray 1976). Suggest that for decades most American women stayed at home raising their children. Any American who owned a television set in the 1950s and 1960s would recognize the "typical" American family portrayed on such programs as "Father Knows Best," "Leave it to Beaver," "The Adventures of Ozzie and Harriet," and "The Donna Reed Show." These early television featured a father worked in an office while the mother stayed home cooking, cleaning and raising two or three children. While shows did not by accurately mirror the all American home it did reflect the values and ideals of a majority of women in the country at that time.

## Gender inequity in society

Sex role stereotyping has been a subtly accepted fact for years in American society the authors suggested that even though gender identity might be made early and be irreversible, the content of sex roles and the child's definitions of masculinity and femininity were influenced by external feedback. The lack of participation/enrollment of female students in math and technology classes reveal the bias which appears throughout society, is often something that begins in the home, and continues throughout schooling, and employment (Rowe, M., 1990; Knupfer, N., 1997)

The stereotypical role of women has changed over the last 30 years. Initially, social change during the late 1960s and early 1970s, coupled with financial necessity, allowed women to gain a foothold in the business world, redefining their role to include paid employment as a norm rather than an exception. These trends would persist for the remainder of this century.

## Gender inequity in the workforce

Between 1985 and 2000, white males, who made up the dominant segment of the labor market, will comprise only 15% of net additions to the U. S. workforce. The majority of new entrants will be women and non-white minorities. By the year 2000, about 47% of the workforce will be comprised of women, while 61% of all American women will be employed (Johnston & Packer, 1987). Despite their growing visibility in the workplace, women continue to be concentrated, in nearly the same proportion today as in the 1960s, in "traditionally female" occupations such as clerical work, nursing, teaching, food service, library work, retail sales, and domestic work (Nash, 1991). The president of a

technology company answered questions regarding why his company did not have many women in the top positions in his company by saying that women have never been on the board of directors in his company and that they are not acceptable candidates because they are not reliable. “Well they get pregnant and they leave.” When told that the women might come back quickly to jobs that reward them, the executive said that women could not be trusted. “Because they do not fit in and it would not be appropriate to discuss important business with them” (Larson, E., 1996; Knupfer, N., 1997)

According to the (U. S. Department of Labor 1990a), women represented 80% of all administrative support workers (including clerical) in 1989, but only about 9% of all precision production, craft, and repair workers. Women constituted 68% of all retail and personal services, but less than 40% of all executives, managers, and administrators. Statistics indicate that the situation is changing, but very slowly. Only 9% of workingwomen are in jobs considered nontraditional for their gender (Stenberg & Tuchscherer, 1992).

## Gender Inequity in salary

Most workingwomen are still heavily concentrated in low-paying jobs. The average woman earned about 70 cents for every dollar earned by the average man when 1989 median weekly earnings of full-time wage and salary workers were compared (U. S. Department of Labor, 1990a). Forty-three percent of women workers are currently in jobs that pay below poverty level wages compared to only 27% of men. Women's earnings are slowly climbing when compared with men's earnings (U. S. Department of Labor, 1990b). In 1991, according to the U. S. Labor Department's Bureau of Labor Statistics, the ratio of women's-to-men's earnings reached an unprecedented 75%. This may be

caused by the increase of women in the workforce. Another factor may be that women's educational investment and occupational choices are becoming similar to men's (U. S. Department of Labor, 1990b).

## Gender inequity in technology education

Technology education is in a unique position to educate women on the various technological occupations available to them because of its link between school and work. School districts that have made the change from industrial arts to technology education have not only had to deal with reluctant instructors, but also have found it necessary to change the attitude of guidance counselors and teachers in the academic areas. They have revised the structure of choices students make to include more emphasis on career readiness, which may include vocational subjects like technology education. Yet, in the state of Connecticut only 17% of the female high school population was enrolled in any of technology education courses (Silverman, S., ; Pritchard, A., 1993) While our society encourages boys to get messy, wrestle, and explore unknown territory, girls get subtle messages to keep their hands clean, play with dolls, obey the rules and often discouraged from taking science and math in school (Kantrowitz, B,. 1996; Rowe, M., 1990; Knupfer, N,. 1997). Females are under represented in all aspects of technology education. Boys and girls are equally interested in technology until the 5$^{th}$ grade (Kantrowitz, B., 1996). By high school, there is a clear gender bias in their attitudes toward technology.

There are a number of factors, which make it less likely for all students to choose to take technology education in high school. While these factors may affect boys as well as

girls, they can have a cumulative effect on girls who are already facing stereotypes about technology as a male-dominated field.

Most vocational occupations remain strongly gender segregated. Vocational education reflects the gender inequities in our society. Most areas of vocational education are gender-typed and nontraditional for one gender or the other. Vocational programs, cosmetology, business, health occupations, and home economics have traditionally been the domain of women; auto mechanics, industrial arts, and agriculture have been perceived as belonging to men. In fact, in the seven traditional vocational education program areas, six tend to be heavily gender-typed and nontraditional for one gender or the other (Burge & Culver, 1990). (Bitters & Foxwell 1990) reported that only 13.1% of female students nationwide were enrolled in vocational programs nontraditional for their gender. Given the importance of vocational education it seems that technology education at the high school level is not doing an adequate job of introducing the female population to all occupations. As (Burge & Culver, 1990) concluded, the willingness of vocational educators to be innovative in recruitment and retention activities can make a difference in women's lives. (Wrightsman and Keaux, 1981) pointed out that perceptions and attitudes have been assumed to guide people to adopt different vocational and life roles. In turn, educators' perceptions and attitudes may have significant effects on students' behavior (Harvey & Klein, 1985; Spender & Sarah, 1980).Pottker and Fishel (1977) criticized sex bias of American schools as follows: The irony is that children are told that school achievement will bring future life success, which is not true for girls. The persistent problem of gender inequity begins in early childhood, promoted the toy and fashion industries, encroaches into the minds of teachers who separate boys from girls. Girls

learn to succeed in school having developed the characteristics that are necessary for successful careers in school, but once out of school, girls are limited by society's bias from attaining positions for which they are qualified.

But most girls never realize to what extent they are restricted and discriminated against because the school has done such an effective job in culling them out. The schools, acting as agents for the existing social order, contribute to the maintenance of a society where sex rather than ability determines the limits of a person's accomplishments. The perpetration of this system in American schools is clearly not only unjust to girls and women, but it also perpetuates a great loss of American talent (p.19).

## Results of PATT-UAS

Richard A. Boser and Michael K. Daugherty Associate Professors in Industrial Technology at Illinois State University, Normal, IL. and James D. Palmer a Technology Education Teacher at Granby High School in Norfolk, VA. Conducted a PATT. USA questionnaire to identify if gender bias exists in technology education. Teachers from the four schools were contacted to solicit their participation. The sample group included 155 seventh grade students who were enrolled in a middle school technology education program. The analysis suggested that female and male students perceived some aspects of technology differently. Female students consistently perceived technology to be less interesting than did male students. Surprisingly, in this study, females more than males perceived technology to be an activity for both boys and girls. With the exception of industrial arts, the instructional approach used did not cause this bias to improve over the duration of the nine-week period. Although all students perceived technology as less

difficult as they experienced the technological learning activities, female students believed technology to be a more difficult subject than did males. The t-test group procedure on the post-test scores was used to examine differences attributed to gender within each of the instructional approaches. Significant differences were found on three sub-scales in the industrial arts approach, females responded more negatively on the Technology Is Difficult sub-scale, which indicated that girls thought technology was more difficult to use and understand than did boys. In the modular approach, significant differences occurred on two sub-scales. Females scored higher than males on the Concept Of Technology sub-scale, indicating that girls in this approach had a better understanding of technology than did boys. The significant difference on the Technology As An Activity For Boys And Girls sub-scale implied that girls, more than boys, believed that gender did not affect the study of technology.

## Summary of literature review

Clearly there is gender inequity in technology education and education is the key to eliminate the inequity. Everyone must be educated about technology education. Steps must be taken to increase the exposure at the grade school as well as the middle school level. Increased awareness about technology education may bring about the demise of the stereotypical image that technology is for males only. “Educational initiatives on the “new technology education” and its appropriateness for female students should be targeted to the following groups: technology teachers, other teachers, school administrators, guidance counselors, parents, students (K-12), technology professors university students and the general public (Flowers, 1996. p18).”

The underlying current in the literature is that females are using technology less than males, and that something is acting to keep females out of technology and that that something needs to be addressed in the not so distant future if females are to enjoy the benefits of the technological workplace. Girls can achieve equally as well as boys in technology education. Girls need to be given the same encouragement that boys receive when entering into technology education courses. Parents, principals, counselors, as well as technology educators must do more to address these matters and take a more active role in ensuring that girls are afforded an equal opportunity to enter into the technological workplace. Furthermore, school boards should make a consorted effort to offer technology education opportunities that are not gender biased and actively pursue issues of gender equity.

# CHAPTERIII

# Methodology

## Introduction

The purpose of this paper is to determine if gender inequity has effected the perceptions of female students at Millennium High School. To identify the three most prevalent negative perceptions and there causes. It should be noted that there was no attempt to sample the population of Millennium High School's students due to the lack of female participation in technology education; therefore there should be no attempt to generalize the information contained in this study beyond Millennium High School.

## Source of information

The information for this paper came from a Literature Review and a survey. The researcher conducted a literary search wherein the researcher reported the findings of the literature. The literature review made extensive use of the U.W.-Milwaukee ERIC database. Several keywords were used to limit the search, (gender bias, gender inequity, gender bias in technology education.) Also used were several technology journals (U.W.-Stout has a very large collection of technology journals). The Internet proved to be a limited resource, it has a small selection of on-line, or E-journals and very few pertain to technology education. The final source of information for this study was a survey.

The survey was given to the entire population of Millennium High approximately 1050 students. The self-selecting survey was given sometime in the fifth marking period, after the students have signed up for classes for the 2000-2001 school year to ensure that the instrument does not interfere with, or influence the students' course choices.

## Data collection

The researcher developed an instrument that measured the negative perceptions of the male and female population as to what they perceive are negative factors that influence their not enrolling in technology courses at Millennium High School during the 1999-2000 school year. Due to the lack of participation of female students in technology education the emphasis was placed on gathering perceptions from the largest number of females possible. 1050 surveys were distributed, via homerooms, 336 female students and 365 male students, or 67% of the student body responded to the survey. Had the data collection been conducted through a sample there would not have been a sample of sufficient size to allow the study to be undertaken.

## Data analysis

Upon receiving the completed surveys the data was computed to identify the top three negative perceptions that females have about technology education courses at Millennium High School. Also identified were differences in what males and females perceive as negative factors in technology education and finally reported that negative perceptions impact males differently than females in technology education.

# CHAPTER VI

## Results of survey

### Introduction

The purpose for this study was to determine if gender inequity exists in technology education and report those inequities by identifying the top three negative perceptions that females have about technology education, the differences in negative perceptions between males and females, and to what extent those negative perceptions influenced/impacted female enrollment in technology courses an Millennium High School.

The survey was conducted during the second semester after fall registration was completed. This was done to prevent any bias that may or may not be in the measuring instrument from influencing students' decisions about enrolling in classes for the fall term. The surveys were filled out during the homeroom period so it would not interfere with classes. There were 1050 students enrolled at Millennium High at the time this survey was given, 336 female students and 365 male students, or (67%) of the total student body responded to the survey (see table 1). Also of interest is the grade point average of the students that responded to the survey. The students reported higher than national average this is a testament to the emphasis on the academic excellence that is a lager part at Millennium High School (see table 2). Students were informed that their participation was strictly voluntary.

Demographics

Table 1

| Grade level | | | | |
|---|---|---|---|---|
| Gender | n Male<br>365 (35 %) | | | |
| Grade Level | n Freshman<br>48 (13 %) | n Sophomore<br>102 (28 %) | n Junior<br>126 (35 %) | n Senior<br>84 (23 %) |
| Gender | n Female<br>336 (32 %) | | | |
| Grade Level | n Freshman<br>66 ( 19.6 %) | n Sophomore<br>99 ( 27%) | n Junior<br>120 ( 36%) | n Senior<br>51 (14%) |

**Table 2**

| Grade point average | | | | | | | |
|---|---|---|---|---|---|---|---|
| Male | | | | | | | |
| Grade Point | n 4.0 or above | n 3.99-3.75 | n 3.74-3.00 | n 2.99-2.75 | n 2.74-2.00 | n 1.99-1.00 | n below 1.00 |
| | 1 (0 %) | 30 (8 %) | 138(39%) | 45(12 %) | 57(16 %) | 36(10%) | 12(3%) |
| Female | | | | | | | |
| Grade Point | n 4.0 or above | n 3.99-3.75 | n 3.74-3.00 | n 2.99-2.75 | n 2.74-2.00 | n 1.99-1.00 | n below 1.00 |
| | 12(3.5%) | 57(17%) | 117(35%) | 51(15%) | 45(13%) | 18(5.3%) | ( %) |

The response to the survey question have you taken any technology education courses with in your educational experience shows a great disparity between male who have taken a technology education course and females who have taken a technology course. 78% of males reported that they had taken a technology education course while 66% of female respondents replied that they had taken a technology education course (see table 30. Also shown is the response to was your technology education course required reveled that 32% of boys reported that their first technology experience was required and 51% of the girl respondents reported that their first technology experience was required (see table 4).

Table 3

| **Demographics:** Technology education courses | n Yes | n No |
|---|---|---|
| Boys | 285 (78 %) | 80 (22 %) |
| Girls | 225(66%) | 111(44%) |

## Table 4

| **Demographics:** Was required | n Yes | n No |
|---|---|---|
| First Technology Education Experience | | |
| Boys | 92 (32 %) | 193 (68 %) |
| Girls | 114 (51%) | 111 (49%) |

Dealing with the issue of when students were first exposure to technology education. Respondents reported in which grade level they received their first technology education. What is interesting with the responses to this question if the fact that the majority of both male and female students were first exposed to technology education during their high school years. Not in middle school as the literature suggested. This could be due to budget constraints that have been imposed over the past few years in the Millennium High School district (see table 5).

## Table 5

| **Demographics:** Grade level | n Grade | n Middle | n High |
|---|---|---|---|
| First experience | | | |
| Boys | 70 (26 %) | 64 (22 %) | 160 (56 %) |
| Girls | 18 ( 8 %) | 92 (41%) | 114 (51%) |

Negative perceptions in technology education

The first research question that this study addressed was what kinds of negative perceptions do female students have about technology education as a result of their participation in technology education? Of the respondents that stated that their first technology education course was a required course (100 %)of the female respondents stated that they enjoyed their technology experience and (98 %) when they were first exposed to technology in the grade schools. This is consistent with literature that states that the perception of technology education between boys and girls is the same in the early years of their education and as they continue through their education they start to perceive technology differently. This difference becomes more pronounced over time in the way females regard technology education. It is also consistent with the literature in that there is less gender bias in the lower grades, which could be largely attributed to the absence of male instructors in the grade schools. Of those respondents that stated that their first technology education course was required in middle school (92 %) of the female respondents enjoyed their technology education course whereas, (97 %) of the male respondent enjoyed their technology education course. While this number is high the point to focus on is the (8 %) that stated that they had a negative experience in their first technology experience. This is also consistent with the current literature. That literature states that as females progress through their education they are exposed to more bias, which in turn generates more negative perceptions. By the time the female student enter high school technology education courses (25 %) of the female respondents and (3 %) of the male respondents stated that they had a negative experience in their first technology experience (see table 6).

## Table 6

| **Negative Perception:** Did you enjoy experience | n Yes | n No |
|---|---|---|
| First Technology Education Experience | | |
| Boys | 273 (96 %) | 12 (4 %) |
| Girls | 189 (84%) | 36 (16%) |

In keeping with the negative perceptions held by males and females about technology the research questions dealing with what were items the students perceived to be negative the table shows that (41 %) of the female respondents stated that they felt a dirty room caused them to have a negative perception during their first technology education course. (25 %) of the male respondents reported that they felt a dirty room gave them a negative perception about technology education courses (see table 7).

The number of females that reported that they that they did not feel comfortable working with the machines in their first technology education course (41 %) was larger than the researcher expected. A large number (25 %) of the male students also reported that they did not feel comfortable (see table 8).

Table 7

| **Negative Perception:** Dirty Room | n |
|---|---|
| First Technology Education Experience | |
| Boys | 3 (25 %) |
| Girls | 15 (41 %) |

Table 8

| **Negative Perception:** Comfort level | n |
|---|---|
| First Technology Education Experience | |
| Boys | 3 (1 %) |
| Girls | 12 (11 %) |

Non-interesting projects was the fourth negative perception reported by female respondents, (50 %) of the females respondents reported that in their first technology experience they perceived that the projects were uninteresting and (0 %) of the male students reported that they perceived their technology education course's projects non-interesting (see table 9).

The response to the survey question that I did not feel I fit in shows that (42 %) of the female respondents felt that the were not made to feel that they fit in their first technology education course. (0 %) of males reported that they did not feel that they fit in their technology education course (see table 10). The table shows that (75%) of the female respondents perceived that the instructor did not spend enough time explaining what they were doing during their first technology experience. This perception is the number negative perception reported by the female respondents. (0%) of the male respondents reported that they felt that they needed more explanation during their first experience. This was the number one negative perception reported by the female respondents (see table 11).

Table 9

| **Negative Perception:** Non-interesting projects | n |
|---|---|
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 18 (50 %) |

Table 10

| **Negative Perception:** Didn't fit in | n |
|---|---|
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 15 (42 %) |

Table 11

| **Negative Perception:** Lack of explanation | n |
|---|---|
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 27 (75 %) |

The negative perception that the instructor did not show the student how to use the equipment properly shows that (67 %) of the female respondents perceived that the instructor should have taken more time explaining how to use the equipment. (0 %) of the male respondents reported that they needed more instruction (see table 12). This was the second most reported negative perception reported by the female despondence. By taking the time to explain how to properly use the machines and equipment in technology education courses the instructors could increase the comfort level of the female technology students.

The negative perception of female who students perceive that the instructor spent more time doing what the boys wanted to do shows that (27 %) females reported that in their first technology education class they perceived that the instructor spent more time doing what the boys wanted to do. (0 %) of the males reported that the instructor spent more time with the girls (see table 13).

The question did you enroll in future technology education courses shows that (35 %) of the female respondents elected to enroll in another technology education course whereas, (65 %) of the females respondents did not enroll. (88 %) of the male respondents elected to enroll in another technology education course and (22 %) did not enroll (see table 14).

Table 12

| **Negative Perception:** Didn't take time to show how to use equipment | n |
|---|---|
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 24 (67 %) |

Table 13

| **Negative Perception:** Time spent | n |
|---|---|
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 10 (27 %) |

Table 14

| **Negative Perception:** Enrolled in subsequent courses | n Yes | n No |
|---|---|---|
| Subsequent Technology education experiences | | |
| Boys | 250 (88 %) | 58 (22 %) |
| Girls | 66 (35 %) | 123 (65 %) |

Subsequent Technology Education Experience

Almost three quarters of the female respondents that enrolled in a subsequent technology education course enjoyed their experience (see table 15) and (23 %) of the female respondents stated that they did not have an enjoyable experience (see table 15). A majority of the male respondents that enrolled in a subsequent technology education course enjoyed their experience (see table 15) and (4 %) of the male respondents did not have an enjoyable experience (see table 15).

Table 15

| **Negative Perception:** Enjoyed subsequent classes | n Yes | n No |
|---|---|---|
| Subsequent Technology Education Experience | | |
| Boys | 237 (95 %) | 10 (4 %) |
| Girls | 51 (72 %) | 15 (23 %) |

The first research question that this study addressed was what kinds of negative perceptions do students have about technology education as a result of their participation in technology education? The table shows that the negative perception of the dirty technology education room is still relevant in the subsequent courses that the female respondents enrolled in (14 %); however, it shows that it becomes less relevant for the male respondent (10 %) (see table 16).

Table 17 shows that the negative perception of the non-interesting projects is more relevant in the subsequent courses for male respondents (30 %) than for female respondents (9 %).

The negative perception of not fitting in is still relevant in the subsequent courses that the female respondents enrolled in (14 %) and proves to be a non-factor in the male respondent's decision-making process (see table 18).

Table 16

| **Negative Perception:** Dirty room | n |
|---|---|
| Subsequent Technology Education Experience | |
| Boys | 1 (10 %) |
| Girls | 9 (14 %) |

Table 17

| **Negative Perception:** Non-interesting projects | n |
|---|---|
| Subsequent Technology Education Experience | |
| Boys | 3 (30 %) |
| Girls | 6 (9 %) |

Table 18

| **Negative Perception:** Did not fit in | n |
|---|---|
| Subsequent Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 9 (14 %) |

Female respondents feel that they are not getting enough instruction in the use of the machines and equipment in the subsequent courses that they enrolled in. (14 %) ; whereas (0%) of the male respondents felt that they needed more instruction on the use of the machines and equipment in their subsequent technology education course (see table 19).

Table 19

| **Negative Perception:** Use of equipment | n |
|---|---|
| Subsequent Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 9 (14 %) |

Differences in negative perception between males and females

The second research question that this study addressed was the differences of negative perceptions between male and female students in their technology education courses. Out of the 1150 students who attend Millennium High 780 students responded to the survey. The sample was broken down into 336 female students and 364 male students. (84%) of the female students that responded to the survey stated that they enjoyed their technology education experience; whereas, (95%) of the males respondents reported that they enjoyed their technology education course. Furthermore, when reporting on their subsequent technology education course (84%) of the females enjoyed their experience (23%) of the female respondents did not enjoy their technology education course. On the other hand (95%) of the males respondents reported that they enjoyed their first technology education course with (4%) stating that they did not enjoy their first technology education course. The rate of enjoyment did not increase or decrease with subsequent experiences for the male respondents (see table 20).

There is a clear difference in negative perceptions about a dirty room (41 %) of the female students stated that they felt negatively about a dirty room during their first technology education experience; whereas, (6 %) female students that responded to the survey stated that they felt negatively about a dirty room during their subsequent technology education experiences. (25%) of the male respondents reported a dirty room gave them a negative first technology experience; whereas, (6%) of the male students reported that a dirty room gave them a negative perception about technology education experience (see table 21).

Table 20

| **Differences in Negative Perception:** Did you enjoy | nYes | nNo |
|---|---|---|
| First Technology Education Experience | | |
| Boys | 273 (95 %) | 12 (4 %) |
| Girls | 189 (84 %) | 36 (16 %) |
| Subsequent Technology education experiences | | |
| Boys | 237 (95 %) | 10 (5 %) |
| Girls | 51(77 %) | 15(23 %) |

Table 21

| **Differences in Negative Perception:** Dirty room | n |
|---|---|
| First Technology Education Experience | |
| Boys | 3 (25 %) |
| Girls | 15 (41 %) |
| Subsequent Technology education experiences | |
| Boys | 1 (0 %) |
| Girls | 9 (6 %) |

The differences of negative perceptions between males and females in regards to their comfort level around the technology education machines or equipment between male and female students in their technology education courses shows that (1%) of the male respondents stated that they did not feel comfortable around the machines or equipment during their first technology education experience; whereas, (11%) of the female respondents stated that they did not feel comfortable around the machines or equipment during their first technology education experience. The table also shows that for subsequent technology education courses the comfort level around the machines or equipment is identical for male and female respondents (0%) (see table 22).

There is clearly a difference in the perceptions of male students when (0 %) males felt that the projects were not interesting during their first technology education experiences whereas, (50 %) of the female respondents stated that the projects were not interesting during their first technology education course. Somewhat surprisingly the table shows that the male respondent (30 %) thought that the projects that were assigned during their subsequent technology education courses were non-interesting and (4 %) of the female respondents felt that the projects were non-interesting (see table 23).

Table 22

| **Differences in Negative Perception:** | |
|---|---|
| Comfort around machines | n |
| First Technology Education Experience | |
| Boys | 3 (1 %) |
| Girls | 12 (11 %) |
| Subsequent Technology education experiences | |
| Boys | 0 (0 %) |
| Girls | 0 (0 %) |

Table 23

| **Differences in Negative Perception:** Non-interesting projects | n |
|---|---|
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 18 (50 %) |
| Subsequent Technology education experiences | |
| Boys | 3 (30 %) |
| Girls | 6 (4 %) |

The differences in negative perceptions between male and female students in their technology education courses when it comes to fitting in. Table 24 shows that there is a very large negative perception of fitting in the female respondents (41 %) for their first technology education experience with (6 %) of the female respondents stating that they felt that they did not fit in during their subsequent technology education courses. The feeling of not fitting in is nonexistent in the male respondents (0 %) (see table 24).

Female respondents had a negative perception about the amount of time that technology instructor spent explaining what they were required to do (75 %) of the female respondents stated that they perceived that the instructor did not take enough time to explain what they were required to do for their project during their first technology education experience and (0%) for their subsequent technology experiences. Males that enrolled in their first or in a subsequent technology education course stated that the amount of explanation time was not a negative perception (see table 25).

Table 24

| **Differences in Negative Perception:** | |
|---|---|
| Did not fit in | n Yes |
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 15 (41 %) |
| Subsequent Technology education experiences | |
| Boys | 0 (0 %) |
| Girls | 9 (6 %) |

Table 25

| **Differences in Negative Perception:** | |
|---|---|
| Time to explain | n |
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 27 (75%) |
| Subsequent Technology education experiences | |
| Boys | 0 (0 %) |
| Girls | 0 (0 %) |

The table shows that the female respondents had a negative perception about the amount of time that technology instructor demonstrated how to properly use the machines and equipment (66 %). A small number of the female respondents stated that during their subsequent technology education experience they felt that the technology education instructor could have spent more time explaining how to properly use the machines and equipment in the technology education classroom. For the male respondents time was not a negative perception.

Approximately one quarter of the female respondents reported that they felt that the technology instructor paid more attention to what the boys wanted to do during their first technology education experience with (0%) reporting that the amount of time that the instructor spent doing what the boys wanted to do was a negative perception. As expected the male respondents did not report that the instructor spent more time doing what the boys wanted to do in either their first technology education or their second technology education experiences.

Table 26

| **Differences in Negative Perception:** Equipment use | n |
|---|---|
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 24 (66 %) |
| Subsequent Technology education experiences | |
| Boys | 0 (0 %) |
| Girls | 9 (6 %) |

Table 27

| **Differences in Negative Perception:** Time spent boys | n |
|---|---|
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 10 (27 %) |
| Subsequent Technology education experiences | |
| Boys | 0 (0 %) |
| Girls | 0 (0 %) |

The negative perception that the instructor spent more time doing what the girls wanted to do was a non-issue (see table 28).

Table 29 shows that (48 %) of the female respondents did not receive any encouragement to enroll in technology education courses whereas, (27 %) of the male respondents reported that they did not receive any encouragement. Those respondents who reported that they received encouragement to enroll in technology education courses males reported that (47 %) were encouraged and (56 %) female respondents reported that they were encouraged to enroll (see table 29).

Of the female respondents that reported that they were encouraged to enroll in technology education courses the person that was reported as the person that did the encouraging was tied between their father (38 %) and their mother (38 %). For the male respondents the responses were father (44 %) followed by guidance counselor (26 %) and technology instructor. (26 %) What is most significant is that (7 %) of the female respondents reported guidance counselor encouraged them to enroll in technology education courses whereas, (26 %) of the male respondents reported guidance counselor encouraged them to enroll in technology education courses (see table 30).

Table 28

| **Differences in Negative Perception:** Time spent girls | n |
|---|---|
| First Technology Education Experience | |
| Boys | 0 (0 %) |
| Girls | 0 (0 %) |
| Subsequent Technology education experiences | |
| Boys | 0 (0 %) |
| Girls | 0 (0 %) |

Table 29

| **Differences in Negative Perception:** Encouraged to enroll | n Yes | n No |
|---|---|---|
| Boys | 170 (47 %) | 94 (27 %) |
| Girls | 126 (56 %) | 110 (48 %) |

Table 30

| **Differences in Negative Perception:** Who encouraged | n Father | n Mother | n Guidance | n Friend | n Instr |
|---|---|---|---|---|---|
| Boys | 74 (44 %) | 13 (8 %) | 45 (26 %) | 0 (0 %) | 44 (26 %) |
| Girls | 48 (38 %) | 48 (38 %) | 9 (7 %) | 24 (19 %) | 39 (31%) |

The question of whether or not students were discouraged from enrolling in technology education courses is a delicate question. Therefore, it must be stressed that these reported responses are only perceptions of the male and female students at Millennium High School. (0 %) of male students reported that they were discouraged from enrolling in technology education courses whereas, (24 %) of the female respondents reported that they have been discouraged from enrolling in technology education courses (see table 31).

The table shows that (10 %) of the female respondents perceived that they were discouraged by their guidance counselors from enrolling in technology education courses. (6%) of the female respondents reported that they perceived that their father discouraged them from enrolling and (7%) stated that they perceived that their friends discouraged them from enrolling in technology education courses (see table 32).

Table 31

| **Differences in Negative Perception:** Discouraged | n Yes |
|---|---|
| Boys | 0 (0 %)* |
| Girls | 30 ( 24 %) |

*8 senior male's surveys were thrown out and were not recorded. Three of these surveys reported that they were discouraged from enrolling in technology education courses. The other five were blank. The surveys were removed because of the manner that they were filled out.

Table 32

| **Differences in Negative Perception:** Who discouraged | n Father | n Mother | n Guidance | n Friend | n Instr |
|---|---|---|---|---|---|
| Boys | 0 (0 %) | 0 (0 %) | 0 (0 %) | 0 (0 %) | 0 (0 %) |
| Girls | 6 (5 %) | 0 (0 %) | 12 (10 %) | 9 (7 %) | 3 (2 %) |

Impacts of negative perceptions on female enrollment.

The final research question that this study addressed was the impacts that negative perceptions had on female enrollment in technology education courses at Millennium High. As reported (41 %) female students stated that they felt negatively about a dirty room during their first technology education experience and (6 %) female students stated that they felt negatively about a dirty room during their subsequent technology education experiences (see table 33).

(11 %) of the female respondents stated that they felt uncomfortable around machines during their first technology education experience and (6 %) of the female respondents stated that they felt uncomfortable around machines during their subsequent technology education experiences (see table 34).

Table 33

| **Female enrollment:** | |
|---|---|
| Dirty room | n |
| First Technology Education Experience | |
| | 15 (41 %) |
| Subsequent Technology education experiences | |
| | 9 (6 %) |

Table 34

| **Female enrollment:** | |
|---|---|
| Comfortable around machines | n |
| First Technology Education Experience | |
| Girls | 12 (11 %) |
| Subsequent Technology education experiences | |
| Girls | 9 (6 %) |

. The respondents to the survey reported that (41 %) of the female respondents stated that they felt negatively about fitting in during their first technology education experience and (6 %) of the female respondents stated that they felt negatively about a dirty room during their subsequent technology education experiences (see table 35).

Most of the female respondents stated that they felt negatively about the amount of time the technology education instructor spent explaining what they were required to do during their first technology education experience (see table 36).

A majority of the female respondents stated that they felt negatively about the amount of instruction they received from their technology education instructor on the use of the machines and equipment during their first technology education experience. (6 %) of the female respondents stated that they felt negatively about the amount of instruction they received from their technology education instructor on the use of the machines and equipment during their subsequent technology education experience (see Table 37).

Table 35

| **Female enrollment:** | |
|---|---|
| Did not fit in | n |
| First Technology Education Experience | |
| Girls | 15 (41 %) |
| Subsequent Technology education experiences | |
| Girls | 9 (6 %) |

Table 36

| **Female enrollment:** | |
|---|---|
| Time to explain | n |
| First Technology Education Experience | |
| Girls | 27 (75%) |
| Subsequent Technology education experiences | |
| Girls | 0 (0 %) |

Table 37

| **Female enrollment:** | |
|---|---|
| Equipment use | n |
| First Technology Education Experience | |
| Girls | 24 (66 %) |
| Subsequent Technology education experiences | |
| Girls | 9 (6 %) |

The female respondents stated that they felt negatively about the amount of time their technology education instructor spent doing what the boys wanted to do during their first technology education experience (27 %). However, (0 %) of the female respondents stated that they felt negatively about the amount of time their technology education instructor spent doing what the boys wanted to do during their subsequent technology education experience (see table 38).

Sixty five percent of the female respondents stated that they did not enroll in subsequent technology education courses after their first technology education experience (see table 39).

Table 40 reports the results of the question were you encouraged you to enroll in technology education courses (see table 40)

Table 38

| **Female enrollment:** | |
|---|---|
| Time spent boys | n |
| First Technology Education Experience | |
| Girls | 10 (27 %) |
| Subsequent Technology education experiences | |
| Girls | 0 (0 %) |

Table 39

| **Female enrollment:** | | |
|---|---|---|
| Enrolled in subsequent courses | n Yes | n No |
| Subsequent Technology education experiences | 66 (35 %) | 123 (65 %) |

Table 40

| **Female enrollment:** Encouraged to enroll | n Yes | n No |
|---|---|---|
| Girls | 126 (56 %) | 110 (48 %) |

The final research question that this study addressed was the impacts that negative perceptions had on female enrollment in technology education courses at Millennium High. The question of were you discouraged from enrolling in technology education courses shows that (24%) of the respondents perceived that they had been discouraged from enrolling in technology education courses (see table 41). (10 %) of the female respondents were discouraged by their guidance counselors, (5%) were discouraged by their fathers, (7%) were discouraged by their friends, and (2%) were discouraged by their technology education instructors from enrolling in technology education courses

Table 41

| **Female enrollment:** | |
|---|---|
| Discouraged | n |
| Girls | 30 ( 24 %) |

Table 42

| **Female enrollment:** | | | | | |
|---|---|---|---|---|---|
| Who discouraged | n Father | n Mother | n Guidance | n Friend | n Instr |
| Girls | 6 (5 %) | 0 (0 %) | 12 (10 %) | 9 (7 %) | 3 (2 %) |

# CHAPTER V

## Summary, Conclusion, and Recommendations

### Introduction

The purpose for this study was to determine if gender inequity exists in technology education at Millennium High School and report those inequities by identifying the top three negative perceptions that females have about technology education, the differences in negative perceptions between males and females, and to what extent those negative perceptions influenced/impacted female enrollment in technology courses an Millennium High School.

### Summary

During the course of this investigation it was revealed that gender inequities exist in mass media, society, the workforce, in the salaries paid, and in technology education. Also revealed was that these inequities are rooted deeply in the culture and the subconscious minds of humankind. It is not suggested that technology educators intentionally pursue policies of gender inequities, but that humankind has been conditioned into thinking that there are gender specific roles and that these roles are where males and females belong. What is suggested is that males and females have different negative perceptions about technology education.

The study shows that the negative perceptions held by the female students did enter into the decision process of whether they enrolled in technology education courses at Millennium High School. The negative perceptions reported by the female students at Millennium High School is consistent with the literature, in regards to technology education taking place in a dirty room; however, it is not consistent with the literature in

the order of importance. The literature suggested that female students rank the dirty room syndrome either first or second depending on when the literature was written. The female students at Millennium High School ranked the dirty room third. The first negative perception, as reported by the female students at Millennium High School, was that they perceived that the technology instructor did not take enough time to explain what they were required to do followed closely by the negative perception that the technology education instructor did not take enough time to explain how to use the machines and equipment.

## Findings

The purpose of this study was to identify the top three negative perceptions that female students have about technology education, whether there is a difference between the negative perceptions that males have about technology education and the negative perceptions that females have about technology education, and if the negative perceptions held by females influenced their decision to enroll or not to enroll in technology education courses at Millennium High School.

What are the top three negative perceptions that female students have about technology education as a result of their participation in technology?

- The number one negative perception that the female students reported to be a barrier to their having a successful technology education experience at Millennium High was that in their opinion the technology education instructor did not take enough time to explain what they were doing. (Table 10) This is consistent with the literature in so far as the amount of time the technology education instructor spends explaining and the

amount of time that females perceive that they need to fully understand what is required of them. However, this finding is not consistent with the literature as to its ranking. The amount of time explaining was most often ranked third or fourth in the literature not first as the female respondents reported to be the case at Millennium High

- The second negative perception that the female students at Millennium High reported as a barrier to their having a successful technology education experience was that the technology education instructor did not take enough time to show them how to properly use the machines and equipment. (Table 11) This too is consistent with the literature. Female technology education students enter into technology education classes with little past knowledge of how to operate and correctly use machines. For most females a technology education class is their first experience with machinery. Technology instructors need to build the confidence level of the student slowly female as well as male.
- The third negative perception that the female students reported as a barrier to their having a successful technology education experience was that they perceived the projects an non-interesting. (Table 8) This is also consistent with the literature. The technology education instructor needs to take into account the diversity of the students enrolled in the technology education course and plan the required projects with this diversity in mind. Requiring an urban female to build a log splitter in a technology education course is not relevant to the student's background nor would building the

splitter generate much excitement within the student. Perhaps the student would prefer an ornate metal security storm door. The concepts in creating the door are the same as welding a wedge to a hydraulic cylinder.

Are there differences in the negative perceptions about technology education between males and females who participated in technology education?

There are several differences in negative perceptions between males and females that responded to the survey. The female respondents stated that they did not enjoy their first technology education experience; whereas, of the male respondents stated that they did not enjoy their experience (Table 14).

Also the female respondents stated that they a dirty room gave them a negative perception about technology. When reporting on the same question no males reported that a dirty room gave them a negative perception about technology education. (Table 15) The largest differences in negative perceptions were in the form of time spent explaining what they were doing and how to do it. The female respondents stated that they needed more information and the males reported that they did not need any more information. (Tables 19, 20)

The final major difference in negative perceptions is the types of projects that the technology education instructor required. Half of the female respondents stated that they had no interest in the required projects, yet none of the males reported that they were not interested in the required projects during their first technology experience. An interesting response is that during their subsequent technology education experience it was the males that reported a higher negative perception than the females. (Table 17)

To what extent did the negative perceptions have about technology education influence/impact female enrollment in other technology education courses at Millennium High?

The impact that negative perceptions have on female enrollment is very clear. The negative perception that technology education is not for females shows up in the fourth question on the survey when (44 %) of the female respondents stated that they have never taken a technology education course (Table 2) and (65 %) of the responding females that had taken a technology education course did not enroll in subsequent technology education courses. (Table 13) When the confronted with guidance counselors that steer females away from technology education, (Table 35) friends that encourage females not to take technology education courses (Table 35) coupled with their own negative perceptions it is a wonder that there are any females enrolled in technology education courses (Table32).

## Conclusions:

The technology education profession is not alone in its struggle with gender stereotyping. Social conventions are difficult at best to undo. It was just a few decades ago that a male nurse or a female doctor was a rarity. It was unheard of to have a female firefighter or law enforcement officer. Today those positions and hundreds more are routinely being filled by female candidates. Females perceive technology differently than do males. Females perceive technology as a way to communicate; whereas, males see technology as a tool for creation. Whether used as a tool for communication or for creation technology is ever changing; therefore, it is of the utmost importance that the technology educators ensure that females have equal opportunities to explore what is being offered in the work place by giving them equal access to technology education. While Millennium High is doing better than the national average in attracting and retaining female students in the technology education field there is room for improvement. 13% of the females at Millennium High who enrolled in a technology education had a less than fulfilling experience. A third of the female population at Millennium High never even set foot in a technology education course. That's 46% of the female population at Millennium High who may have been turned away from a technological career. That is unacceptable. In order to ensure that every female, or for that matter every male, is prepared for the workplace the technology educator must provide a bias free environment that ensures success for all students. The lack of gender equity has given rise to new concerns. Finally, females have different perceptions of technology. Results from this study suggest that technology education programs may not be meeting the needs of female students. The profession should strive to develop

curriculum materials and activities that meet the interest and technological needs of all students. Gender inequity did not just appear in society, it is a learned process. What was learned can be unlearned, but it will not just go away. We cannot stick our collective heads in the sand anymore. Educators have a responsibility to insure that all students have an equal opportunity when pursuing their education, male, female Black, or white. Technology is gender neutral, it is up to the technology instructor to see that the classroom is gender neutral also.

## Recommendations

- Design a series of gender equity in-services to be given not only to the Millennium High staff, but also to the entire Millennium district. This would help identify gender bias habits that the staff has developed and would educate the staff on ways to implement the changes needed to begin the process of creating gender equity for Millennium High's female students.

- Create a gender-neutral learning atmosphere in the traditional (industrial arts) technology courses by conveying the top three negative perceptions (as reported by survey) of Millennium High's female population to the technology instructors.

    - Female students feel that they need more instruction in the use of machines and equipment. By increasing the amount of instruction that students receive on the use of equipment the instructor could begin to remove the perceived barriers that were discovered by the survey and increase the comfort level around the machines of the female students.

    - Dirt and clutter seem to be an underlying factor in the female respondents negative perception of technology education courses. Something as simple as a fresh coat of paint on the walls and new ceiling tile has proven to change the female perception on technology education courses.

    - Finally the technology education instructor should take care in the assigning of projects. Rather than assigning the class a project perhaps the instructor could have several projects for the students making sure that there are several gender-neutral projects for the students to choose from.

- Institute a gender exclusive technology education course. The literature as well as the survey reported that many females feel that they would be more comfortable in a classroom where they did not have to compete with males when being introduced to technology education.

It this first critical experience that can either be a positive experience, or more often than not, a negative experience. With change taking place in technology at an ever increasing pace, society should not be in the exclusion business, but rather it should be in the inclusion business. By instituting these recommendations Millennium High will begin the journey toward gender equity in its technology education classrooms.

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Appendix A

**Participation in this questionnaire is strictly voluntary**

Instructions:

Please fill in/check the answer that **best describes** your experiences and/or opinions in the spaces provided below. **Optional

1. Gender: Male_____ Female_____
2. Grade level Freshman____ Sophomore____ Junior____ Senior____
3. **Grade point average 4.0 or above____ 3.99-3.75____ 3.74-3.00____ 2.99-2.75____ 2.74- 2.00____ 1.99-1.00 ____ below 1.00_____
4. Have you taken any Technology Education Courses within your educational experiences?

   Yes___ No___
5. If you answered **Yes** where were you first exposed to technology education classes?

   Grade school (1-5) _____ Middle school (6-8) ____ High school (9-12) ___
6. Was your technology course a required course?

   Yes___ No___
7. Did you enjoy your experience in your first technology class?

   Yes___ No___
8. If you answered **Yes** to the above question skip ahead to question 9.

   If you answered **No** to the above question why did you not enjoy your experience in your technology education course? **Check all that apply**.

The room was dirty____

I did feel comfortable around the machines___

The projects were not interesting to me___

I did not feel that I fit in____

The instructor did not take the time to explain what we were doing___

The instructor did not take the time to show me how to do use the equipment that needed to be uses___

I felt that the instructor paid more attention to what the boys wanted to do___

I felt that the instructor paid more attention to what the girls wanted to do___

Other_____

_____

9. Did you enroll in future technology courses?

   Yes___ No___

10. Did you enjoy those technology courses?

    Yes___ No___

11. If you answered **Yes** to the above question skip ahead to question 12.

    If you answered No to the above question **why did you not enjoy** your experience in your technology education course? **Check all that apply**.

    The room was dirty____

    I did feel comfortable around the machines___

    The projects were not interesting to me___

    I did not feel that I fit in____

    The instructor did not take the time to explain what we were doing___

The instructor did not take the time to show me how to do use the equipment that needed to be uses___

I felt that the instructor paid more attention to what the boys wanted to do___

I felt that the instructor paid more attention to what the girls wanted to do___

Other_____

_____

12. Were you **encouraged to enroll** in technology education courses?

Yes___ No___

13. Who encouraged you to enroll in technology education courses?

Father____ Mother____ Guidance counselor ____ Friend___ Technology instructor____ Other_____

14. Have you ever been **discouraged from enrolling** in technology education courses?

Yes___ No___

15. Who discouraged you from enrolling in technology education courses?

Father____ Mother____ Guidance counselor ____ Friend___ Technology instructor____ Other_____

16. Would you like to see a gender exclusive technology education course begun at Central High School?

Yes___ No___

17. Would you enroll in a gender exclusive technology education course?

Yes___ No___

**Thank you for taking the time to fill out this questionnaire.**

## Appendix B

The data were collected indicated that statistically significant differences occurred on three of five attitude sub-scales: (a) General Interest in Technology (p = .001), (b) Technology As An Activity For Boys And Girls (p = .000), and (c) Technology Is Difficult (p = .014). These results are presented in Table 3.

Table 3

PATT-USA Sub-scales Attributable to Gender

| Sub-scales* | Mean Score Females n=127* | Mean Score Males n=152* | P-value |
|---|---|---|---|
| General Interest in Technology | 2.54 | 2.08 | .001 |
| Attitude Toward Technology | 2.55 | 2.65 | .192 |
| Technology As An Activity For Boys and Girls | 1.57 | 2.08 | .000 |
| Consequences of Technology | 2.14 | 2.16 | .899 |
| Technology is Difficult | 3.71 | 3.45 | .014 |
| Concept of Technology*** | 0.56 | 0.56 | .969 |

Univariate F-tests with (1,277) degrees of freedom.

Statistically significant differences in bold.

Total n=279, missing cases n=3.

*Combined pre- and posttest totals from all approaches.

**Lower mean on the 5-point scale indicates more positive attitude for subscale

***Higher mean indicates broader and more accurate concept of technology.

Scale range 0 to 1.0.