Moving Beyond Cultural Barriers: Successful Strategies of Female Technology Education Teachers

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Women are underrepresented in Science, Technology, Engineering, and Math fields of study and careers with a subset of STEM—Technology Education—possibly one of the least integrated fields for women as students and as professionals (Akmal, Oaks, & Barker, 2004; Braundy, 2004; Braundy, Petrina, Dalley & Paxton, 2000; Zuga, 1996; Zuga, 1999). What accounts for this situation and what are potential remedies? The purpose of this study was to learn about the ways in which female technology education teachers understand sources of influence on their career choices. The findings from this study are intended to provide insights into the participants' perspectives that might shed light on how to better encourage females to aspire to and enter technology education as a profession. The conclusions derived from this study may help to create a deeper understanding of how women move beyond cultural barriers and make "unexpected transitions" to become female technology education teachers. This qualitative study is based on interviews with ten female technology education teachers.

This study is significant because little change has been made towards increasing female participation in STEM fields despite millions of dollars spent to overcome the shortage of women in STEM studies and careers (Haynie, 2005, National Education Association (NEA), 2003a; National Education Association (NEA), 2003b; National Science Foundation (NSF), 2002; National Science Foundation (NSF), 2003a; National Science Foundation (NSF), 2003b).

More young women need to be encouraged to pursue STEM careers, but cultural deterrents (Kandaswamy, 2003) to female inclusion in these fields are very resilient. Young girls need female technology education and STEM role models to guide them into these non-traditional fields since gender role modeling directly supports intellectual and emotional growth (Grant & Ward, 1992; Kandaswamy, 2003). Therefore, "trailblazers" (Schlossberg, Waters., & Goodman, 1995) need to be encouraged to strike out and mark some possible paths so that more women may feel empowered to participate in these fields.

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A literature review identified three primary factors related to women participating in male dominated professions:

> Women were, and in some parts of the world still are, confined to hearth and home (Bassavage, 1996; Kandaswamy, 2003). However, for the past 250 years, American women and men have been working to advance gender equality (McCullough, (2001), Women's International Center (1997), Zuga, (1999).
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> Since its inception, America has turned the status quo upside down in governmental organization, technological advances, educational systems, and societal/cultural evolutions (McCullough, (2001), Women's International Center (1997), Zuga, (1999).
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> However, in spite of all these changes—including the women's liberation movement of the 1960s-1970s—girls and women are still not fully participating in male dominant STEM fields of study and work (Dick & Rallis,1991; NEA, 2003a, NEA, 2003b, NSF, 2002, NSF, 2003a, NSF, 2003b).

The gender inequity in these STEM fields confounds educators, researchers, and policy makers. A new paradigm, a change of focus, is essential; one that aims at something other than the efficacy of recruiting techniques (NSF, 2003) which succeed only marginally. New research is needed that investigates what "triggers" or pivotal events (Schlossberg et al., 1995) encourage women to become professionals in STEM careers. This investigation could use women's "ways of knowing" (Goodwin, 2000; Zuga, 1999) to identify different paths that girls and women can follow to gain better equity in high paying fields and help strengthen our country's future.

It has been documented that women who experienced STEM encouraging cultures—played with boys and "masculine" toys in their pre-school lives or looked up to same-gender role models in STEM related activities during their formative education—might be interested in pursuing technology related careers (Armstrong & Leder, 1999; Grant & Ward, 1992; Silverman & Pritchard 1996; Welty and Puck, 2001). Furthermore, research shows that there are many attempts to create recruiting programs to encourage girls and young women to consider studies and careers in STEM fields (NSF, 2002 & 2003a&b; Silverman & Pritchard, 1996; Welty & Puck, 2001) but these efforts seem to improve the situation only marginally. In this context, this study seeks to help identify pivotal points in young girls' lives: what are the causal events that "trigger" (Schlossberg et al., 1995) the commitment to the study of non-traditional subjects and eventual employment in related fields.

Conceptual Framework

The foundation for the conceptual framework is a construct derived from the work by Schlossberg (1984) and Schlossberg, Waters, & Goodman (1995) in combination with Kandaswamy (2003). While Schlossberg (1984) writes about transitions that adults go through in careers, relationships, and life changes, this study focuses on adult transitions as young women discuss how

they chose to enter a specific male-dominated field, while also considering how the concept of transitions can be applied to the transformation of young girls to women. First, and perhaps most importantly, girls, from birth to womanhood, live through a long series of transitions defined by Schlossberg (1984) as "any event, or non-event that results in change anticipated, unanticipated … [in] relationships, routines, assumptions, and roles" (p. 47). These transitions are shaped by what Schlossberg, Waters, & Goodman (1995, p. 27) call "the theory of the "Four Ss"… situation, self, support, and strategies." Schlossberg et al. (1995) define:

- "Situation" as the way a person uses her past experiences and abilities to deal with transitions and make adjustments due to the changes.
- "Self" as the way a person is helped or at a disadvantage due to her personal attributes or resources in facing change.
- "Support" as the many support systems that help a person undergoing change.
- "Strategies" as the way a person responds when facing change (p. 113).

While the work of Schlossberg and her colleagues focused specifically on adult transitions, Kandaswamy (2003) stated that both girls and women must make choices and transitions that are typically confined to culturally accepted roles—such as mother, nurse, teacher, and secretary— that result from a series of transitions throughout their lives and are reinforced by "social myths, conditioning, the media itself, deterrence, and the problem of 'balancing.'"

Following this line of inquiry, the participants were asked to identify those stimuli that caused their life transitions that culminated with their becoming technology education college students and then teaching professionals. The following section details the research questions that produced the data for this inquiry.

Methodological Approach

This study was guided by three main research questions:

1. What are common themes in the female technology educators' lives and educational experiences that can shed light on more efficacious ways to increase the numbers of females participating in STEM fields and technology education in particular?
2. What strategies did these female technology education teachers develop to overcome the gender barriers blocking their chosen careers?
3. What steps do the participants believe should be taken to attract more women to technology education studies and careers?

In order to answer these questions, ten female technology education teachers were interviewed as part of a qualitative study. This approach was selected because "qualitative studies are…an overall strategy" that aims at getting deep, rich, descriptive data (Rossman and Rallis, 2003). Further, Rossman and Rallis (2003, p. 104) write that qualitative studies often focus on

"psychological roots" when examining individuals. The participants' "roots" (p. 104) are at the center of this study with the interviews focused to examine how these women came to their choices in the midst of their transitions.

The ten women included participants who were initially identified through a local technology education association and then a purposive snowball sampling technique (Rossman & Rallis, 2003) was adapted as participants recommended additional female technology educators for inclusion in the study. Each of these women participated in two semi-structured interviews that were based on questions derived from the conceptual framework. The first interview focused on obtaining narrative data related to the three main research questions. The women subsequently kept a journal for fourteen days that focused on recollections of key transition points and sources of influence during their formative years. The second set of interviews followed-up on the preliminary analysis of the previously collected data. Finally, a focus group was conducted with three of the women as the basis for checking the data and findings to ensure authenticity and trustworthiness from the perspective of the participants.

The ten women ranged in age from twenty-five to fifty-six. They had taught technology education for a minimum of three years to a maximum of twenty-two years with a mean of fifteen years at the time of the study. Three were unmarried. All had earned at least a master's degree and four had earned either a Ph. D. or Ed. D. Eight participants were Caucasian, one was African American, and one was Chinese American. Participants were living and working in Connecticut, Massachusetts, North Carolina, Ohio, and Virginia. The participants were randomly assigned alphabetical aliases — no ethnic, socio-economic, or geographical connotations were connected with these names.

Results

The overall findings from this study suggest a complex model in which female technology educators make the transition into this male-dominated field as the result of the combined effects of support from others, situation specific contexts, and self-identified characteristics in conjunction with specific strategies that helped move them into their chosen careers. These concepts are represented in the Developmental Process Model in Figure 1. More specifically, our model, based on Schlossberg et al. (1995), attempts to illustrate the dynamic forces that prepared these women for their study and career choices. The "self" bubble depicted the participants as "tom boys" who were inquisitive, active, hands-on learners who did not feel that girls should be limited to "girlie" activities. The "situation" bubble showed that these females lived and learned in supportive, non-confining families, homes, and schools. The challenges were getting the type of experiences that these girls/young women craved while the benefits were those experiences in which they were allowed, even encouraged, to participate. The participants were aided and supported by fathers, grandfathers, and male technology education teachers in gaining experience and skills in these hands-on activities. Furthermore, the "support" bubble showed that teachers and professors as well as family members had influence in shaping

these women's futures. Only two members of the study had very supportive counselors (Brit said, "I never saw a counselor. I wouldn't recognize them if I saw their pictures." Five had similar experiences and all ten saw a need for better counseling. The "strategies" bubble symbolizes the intentional as well as coincidental ways the participants pursued their interests playing to their strengths. Several of the members of this study indicated that hands-on tool and material use were early interests and the term "technology" was slipped in as they became college students. The categories of support, situation, and self all influenced the strategies used by these women as they made transitions throughout their lives that led to their current roles as technology education teachers. Throughout these experiences and transitions, the participants described how they must continually balance their own sense of self, personal situations, and types of support in order to strategically make successful transitions into roles that are not traditionally supported for females in this society.

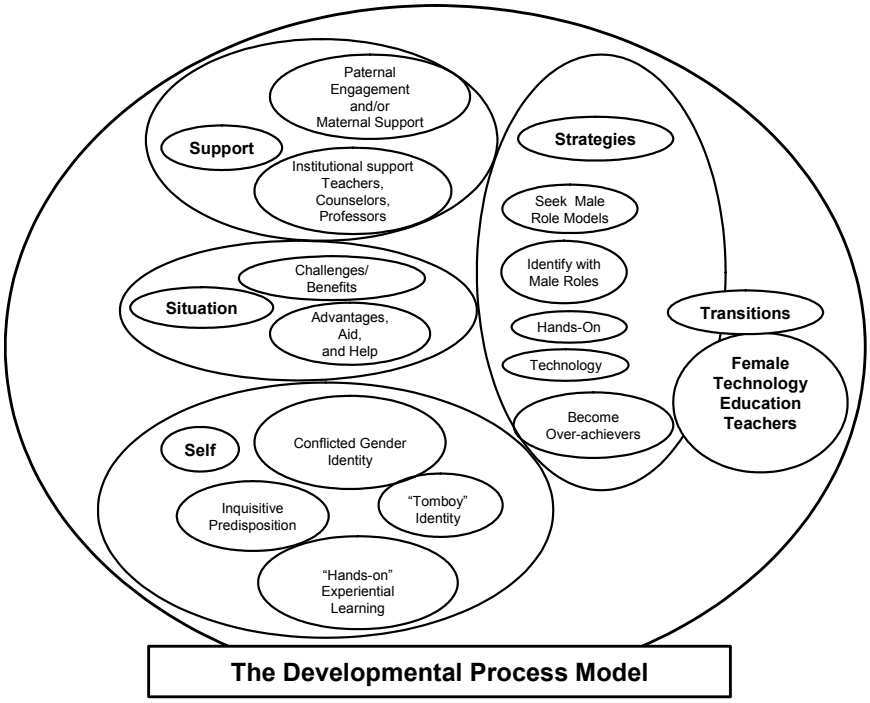

Figure 1. The Development Process Model for female technology educators

The "transitions" bubble represents the "non-event that results in change anticipated or unanticipated" (Schlossberg et al., 1995) that these participants felt concerning their choice of studies and careers. The participants all felt that

their choice of study and career was natural without a sudden "Aha!" moment. All responded that they had been supported in their professional pursuit by a technology education teacher in their educational career, whether it was in middle or high school, college, or starting over in a second career.

In response to the first research question, "What are common themes in the female technology educators' lives and educational experiences that can shed light on more efficacious ways to increase the numbers of females participating in STEM fields in general and technology education in particular?", several evolving themes were identified from the interviews and journals. As summarized in Figure 1, early childhood self-identity, choice of play, and interaction with playmates seemed to prepare these women for comfort in interacting in male dominated contexts and experiences. Not surprisingly, family support and parental encouragement seemed to play a big role in allowing these women to feel more at ease in using tools and machines that are considered male objects in American culture. The data from this study indicate that direct and indirect male role modeling involving tool and machine use, workshops, and home-improvement activities appeared to have engaged the girls who later became proficient in tool use themselves. The participants in this study noted that mothers often served support roles. While mothers might not actually use the tools and build projects with the girls, they either encouraged their daughters to explore all sorts of non-traditional activities, or allowed the girls to investigate activities and educational experiences that interested them.

Since these women were interested in "non-traditional" activities and "guy" pursuits early in their lives, they needed to develop strategies (Schlossberg, et al., 1995) that both mollified apprehensive loved ones concerning their safety and allowed themselves to feel comfortable in pursuing their chosen fields of study. These women reported that fathers, grandfathers, and other male role models made positive connections early in these women's lives. These father/daughter moments were early strategies to get to do "active, not passive" things, like hammering, using tools, and playing football.

These positive early childhood interactions with men set a pattern for the girls/young women/women. By identifying well with adult males, male cousins, and male siblings while enjoying the interaction with the same, these girls "felt comfortable with fluid gender roles" and were able to slip in and out of the male world. Even today, participants agreed with Brit that "it's just maybe not being pigeonholed into one particular group." As these girls entered middle school, a few in private schools but most in public, they were still positively engaged with male relatives after school, on weekends, and in the summer.

All of the participants mentioned male technology education teachers with whom they had a special connection. Other recurrent themes in the interview responses include the recollections that male technology education teachers, in middle school, high school, college, or as professional colleagues took many of these girls/young women/women into mentor-protégé relationships when the teachers recognized, supported, and rewarded the women's talents, skills, and abilities in technological activities and related fields of inquiry.

These male teachers "took them under [their] wing" to support their technology education interest. For some of the respondents, the "trigger" (Schlossberg et al., 1995) point was in middle school, others in high school, still others in college. One participant found guidance and support for her conversion from teaching English to technology education by a soon-to-retire teaching colleague, finally two participants were certified Civil Engineers who decided to move laterally into technology education to satisfy a need to give back to the next generation. Consciously or subconsciously, these women sought male role models who could guide and support their studies and interests as most of the participants' fathers or grandfathers had done in their early childhood and youth. Further, intervention by guidance counselors was crucial for two of the study's members when the girls' interests did not line up with the traditional home economics or art classes; the guidance counselors said "go for it" in automotive shop and architecture.

One theme that appears to be central in understanding women in technology related fields is that these women were comfortable (as several participants, Anna, Brit, and Jan, mentioned) "being fluid in their own gender roles." Several women noted that female technology education teachers have to be many things to many people. Sometimes they are "one-of-the-guys," but in other situations, these women model to their students how women are able to interact with modern technology. These teachers report that males often surround them in typical lab experiences and they feel comfortable in this situation. As Brit said: "I'm a bit of an anomaly still, the female in the technology education department, and so people will say, oh, how is it working with all those guys? I say, well that's the story of my life, that's the way it is. My classrooms are filled with boys, but I don't spend time dwelling on it." In a later interview, she reinforces this with, "It doesn't faze me to be in a room that is full of boys."

At other times, these women have to solve design and equipment issues such as importing a graphic design while modeling problem solving behaviors to encourage girls to go beyond the girls' stereotypical beliefs ("a girl doesn't do that computer hardware stuff" (Cat). These women have developed multiple ways to interact with information, materials, tools, and learning, as well as being a "jack-of-all-trades (sic)." Since technology education covers such a wide range of skills and understandings, technology education teachers may have up to five different "preps" (different subjects to be taught, i.e. manufacturing, communications, drafting/CADD, research and development, and pre-engineering). These women have to be both knowledgeable in these subjects and overcome sex-role stereotypes while teaching the subjects. Indeed, technology education has been criticized (Leadership Forum discussions at the ITEA conferences, 2006 & 2007) because it is so hard to "brand" technology education because it has so many different skill sets and avenues of expression and understanding. However, these women who were able to be hands-on technology education teachers during the day and then get dressed up to go out to dinner in the evening have the ability to be comfortable in their skins at any given time.

In response to the second research question, "What strategies did these female technology education teachers develop to overcome the gender barriers blocking their chosen careers?," all participants noted that they had to develop "strategies" (Schlossberg, et al., 1995) to be able to fulfill their need to pursue "non-traditional" activities and "guy" pursuits early in their lives. As the model depicts, these girls needed to develop systems of interaction with others that both appeased friends and relatives regarding their safety while they felt engaged and invigorated while playing, learning, and interacting with male peers and adults. Some of these women relied more on deliberate strategies, while others engaged in activities that were less consciously active, but in direct reaction to how their sense of self interacted with the situations and types of support they encountered while growing up.

The male role models who made positive connections early in these women's lives encouraged their female protégés to explore and find success in hands-on activities. These girls' earliest strategy to satisfy their innate drives to manipulate tools and materials while being active was to use the time spent with their fathers/grandfathers to be able to play the roles of dynamic, active people who could do things like tinkering with machines, using tools, and playing baseball and other "non-traditional" games and sports. These positive early childhood interactions with men set a pattern for the girls/young women/women. During the focus group discussion, Fiona said her "best memory of working with her Dad was roofing the summer camp…that was great!" Their early interactions with males gave these girls plenty of practice in being "comfortable with fluid gender roles" and were able to slip in and out of the male world. This slipping in and out of the gender role would become a lifelong strategy to help them to be, as Anna said, "comfortable being me." Even after the girls entered primary education, they found time (recess, after school, and on weekends and vacations) to keep playing, working, and mixing with young and older males.

As these young women entered middle school and high school, they found some kindred spirits with male technology education teachers with whom they had a special connection. The strategy of finding male technology education teachers permitted the girls to continue their pursuit of kinesthetic, active, and rewarding activities. Consciously or subconsciously, these women sought male role models who could guide and support their studies and interests as most of the participants' fathers or grandfathers had done in their early childhood and youth.

Another strategy to find success in the technology education field was to take on "male" roles in order to find success in these male dominated activities. Many of these women worked in business, construction, civil engineering, and cabinetmaking before transferring to technology education teaching. As Fiona said: "Most of my working career was predominantly with men. Even when I was doing part-time jobs in college…most of the time, it was with men. In business the majority of people that I worked with were men." These women's earlier jobs were hands-on and male oriented. The participants stated that these

earlier work experiences helped to prepare them to teach mostly male students in technology education courses.

Further strategies that helped these women develop a positive sense of self included their enjoyment of hands-on activities, which led to hobbies (Brit: "I fooled around with model planes…" which led to studies, which led to employment ("My shop teacher hired me to work construction in the summers…," explained Gina) and careers teaching technology education. These women developed more technological skills (in drafting, graphics/communications, engineering, and materials processing) as passage keys to move into "male oriented" careers.

One final universal strategy that participants used was to "over-achieve," to demonstrate that they were equal to anyone in the field. While several women remembered having a tough time in some part of their schooling, the minute they focused on technology education in college and then in their careers, they channeled their energies to succeed. This over-achieving was identified in several ways. One way of going "above and beyond' that the participants recognized was how long they stayed after school to offer extra help and to prepare the next day's, week's or units' learning experiences. Male teachers were perceived to be less willing to do extra preparation or spend extra time. Women technology educators were also seen (by Anna, Brit, Fiona and Jan) as more willing than male co-workers to work and participate in local and national technology education societies such as the Technology Student Association (TSA) and professional associations such as CTEA and ITEA. Finally, in this small study, this over-achieving strategy is exemplified by the fact that most of the teachers had earned at least a master's degree, several had multiple degrees, and four were pursuing or had earned tertiary degrees, indicating personal drive to achieve.

In response to the third research question — "What steps do the participants believe should be taken to attract more women to technology education studies and careers?" — participants made several suggestions for attracting more females into their chosen profession. First, several of the participants proposed that some type of technology class become mandatory for all students in high school. "Girls do great in Tech Ed (sic) in middle school. But once they go up to the high school, whether because of traditional gender role notions, or just because there are so many new electives, females do not get to experience Tech Ed at a more advanced level" said Eva. This is supported in the literature (Braundy et al., 2000; Monks & Van Boxtel, 1992; Silverman and Pritchard, 1993 & 1996; Wisconsin, 2000).

Two participants responded that "the hiring of new staff" who are more enlightened will create a safer and more welcoming environment for girls and young women. One female teacher noted that the gender ratio of her students had become more equitable every year since she began working at her school although "manufacturing classes still drew more male students."

The three study members who attended the focus group meeting wanted to add their unanimous belief that guidance counselors wield a great influence on

the course selection of girls/young women upon entering high school. This group of participants suggested that school counselors should be better informed regarding technology education and should be educated regarding the wide range of STEM activities and careers that are available for girls.

Another respondent touched on the budgetary issues and the lack of national support for Career and Technology Education in the national "No Child Left Behind" legislation. "I think that the most important issues facing technology education are opposing and avoiding cutbacks to our profession." Another concurs, "We need to actively lobby our local, state, and national legislators in order to ensure that our profession is not one budget cut away from elimination."

Yet another responded that the "way to strengthen our profession is to look to… reflect the diversity of [our student and community] populations in our own classrooms and enthusiastically mentor students and colleagues who show an interest in technology education or related careers." Further, she states that, "If we start bringing in guest speakers, resources, and materials that represent the different genders and cultures of our students they will be able to form better pictures in their minds about what they can do in technology education and more. Then, we need to encourage our students and colleagues to explore their options involving a technology education career. We need to offer more professional development opportunities for lateral entry professionals, scholarships for people interested in technology education, and a mentoring network that targets numerous populations."

Another's suggestions included: "…[W]e must ally ourselves with other teaching organizations, such as the Association for Educational Computing and Technology, the Association for Career and Technical Education, the National Science Teachers Association, the National Education Association, and the National Council of Teachers of Mathematics" in order to collaborate to educate the "whole student."

Implications

This study sheds new light on the extent to which cultural beliefs, institutional policy, and education, the media, and mentoring/role modeling bar or encourage girls/young women/women to pursue studies in technology education and perhaps other STEM fields. The study showed that these factors are important and they all contribute to the worldview of women that supports or constrains their career choices. The findings from this study indicate that girls need positive role models in life and in school. In early childhood/childhood, all but one of these participants had a very positive relationship with an adult male, either a father or a grandfather, who guided them through experiences that supported their interests in these activities. These positive experiences started at an early age and continued throughout their lives. The essential finding of this study seems contrary to much of the recent STEM related literature. A good deal of the literature (Braundy, et al., 1999; Grant & Ward, 1992; Kandaswamy, 2003; NSF, 2003) suggests that children develop self-image best through same-

gender role modeling. However, these respondents suggested that girls benefit from positive male role models who support the girls' explorations in hands-on, problem solving activities early in their youth and continuing throughout their youth, including their middle and high school experiences.

The Developmental Process Model explains that the building blocks to attract more girls/young women/women are derived from positive connections with others, development of confidence due to success and praise, and the bonding or connecting with adult role models who provide positive emotional ties. At the focus group meeting, Fiona said with a sigh, "What a relief…a load off women's shoulders to finally hear that men (sic) are part of role modeling for young women. All I've ever heard is that women need to draw more girls into Tech Ed." The Developmental Process Model suggests that everyone, especially males, need to connect to the next generation and guide our youth in a positive manner.

This study also found that these participants felt good about math and/or science early in their educational careers. Silverman and Pritchard (1996), who found that "beliefs about math and science were also an important factor in the decision of girls … to take advanced courses or pursue such subjects as careers," support this finding. This study indicates that to get more girls to consider STEM areas of study, including technology education, and possible careers in these fields, parents and teachers, especially fathers and male teachers, need to develop and display an inclusive belief system, knowledge of pedagogy, and familiarity with new techniques and technologies. The findings from this study point to a number of specific activities that would be helpful to prepare female students for a technological future. Recommendations include:

1. Provide information on diversity, accessibility, and learning styles (Gardner, 1993, 2000) to make families and faculty aware of the nature of girls' learning needs and, as Fiona said, provide "resources, and materials that represent the different genders' [interests so girls] will be able to form better pictures in their minds about what they can do in technology education."
2. Provide educational experiences to boys and men that express and impress how important positive, caring, role modeling is to all children's (*girls and boys*) [authors' emphasis] development. Most of this study's participants had positive relationships with their fathers, grandfathers, and male teachers. These women believe that they proceeded into these STEM related careers because their male role models and teachers encouraged and supported their quests.
3. Create opportunities for elementary teachers to become more familiar and comfortable with the use of math, technology, and science in the classroom, especially emphasizing that all human beings, not just males, can be successful in these areas. Manning & Manning (1991) wrote that American elementary schools create many students who are not comfortable with math and science because the women who teach elementary students have been "conditioned by society and their

teachers to dislike" science and math or to feel they cannot do science or math well. The literature (Sanders, 2005; Sadker and Sadker, 1994) suggests that young girls, who look to the teachers as role models, feel inadequate to pursue science, math, and related topics due to their teachers' implied message that these topics are not for females. Adding to the dilemma is the fact that over 80 % of elementary school teachers are women (NEA, 2003b).

4. Incorporate technology education and engineering principles early in the curriculum to expose girls and boys to real applications for math, science, and technology. The participants in this study indicated that they had positive or very positive experiences with fathers and grandfathers while using tools and technology in their early childhood experiences. However, more than 25 million children in America (Children's Defense Fund, 1998) are in single parent households with little or no connection to their fathers or other male relatives. Therefore the responsibility of the public school system to provide male modeling and support is increased.
5. Encourage more males to enter early childhood education so that positive male role models are available to young children in balance with the positive female role models that already exist. This balance could be considered a national emergency (see #4 above).

In terms of public policy, the findings from this study raise the question "What is the national commitment to improving the equity in technology education and STEM education?" Administrators and legislators should develop new ways of thinking about making STEM education and fields more relevant and interesting to girls and young women throughout their educational careers. First, math and science should be made more accessible for girls in all grades. Further inclusion of technology education and STEM in the primary school curriculum, meaning both the inclusion of better science and math learning experiences as well as technology education, is needed. Second, re-prioritizing financial resources to better assure inclusive pedagogy would help to provide materials, equipment, and technology needed to increase gender equity in STEM education. It is important to restructure budgets to include specific allocations for technology education pedagogy. A national effort in this regard would address one of the participant's (Anna) comments that "I think that the most important issues facing technology education are opposing and avoiding cutbacks to our profession." Another participant, Jan, concurs, "We need to actively lobby our local, state, and national legislators in order to ensure that our profession is not one budget cut away from elimination."

There are also implications for further research. This small qualitative case study is limited by the "chain" or "snowball" sampling technique simply because there is no clearinghouse of data on female technology education professionals. A quantitative study that could randomly sample a significant cross section of the female technology education teachers would have more

significance in strategic goal discussions in education and possibly have an impact on national educational policy formation. As a precursor for such a study, demographic information needs to be collected to describe teachers in regard to age, ethnicity, gender, and topics taught. This would provide a demographic baseline of the profession, with gender and ethnicity being particularly important.

Once a baseline study is completed then professionals in the field can begin to address the difficult questions about technology education. For example, do technology education teachers think about and respond differently to female students? Do instructional strategies change for female students so that they are encouraged or discouraged? The qualitative case study reported herein was conducted as a very small, focused, research project. Expanded research involving a larger number of participants that accurately represent a cross-section of female technology education teachers would give these results more generalizability.

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