AUSTRALIAN DESIGN AND TECHNOLOGY EDUCATION AT A 21ST CENTURY CROSSROADS

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Abstract

How do we create female inclusive participation within industrial design and technology in Australian school settings, with a curriculum which is consistent, relevant, innovative and cognitively challenging? We argue that the curriculum must be engaging and in step with international standards based on actual classroom practices, centred on deep learning, and allow for investigation in solving design problems. This paper investigates and discusses the design and technology curriculum in Australia, with a focus on Industrial Design, Engineering and Technology, supported by data on female enrolment trends in design and technology in Queensland and New South Wales.

Introduction

The identification, investigation and evaluation of the participation of girls and young women in multidisciplinary design and technology education is addressed in this paper. Through application of a feminist perspective with holistic strategies based on inclusivity, the goal is to maximize female participation rates in secondary and post-secondary environments within such multidisciplinary areas as Product Design, Industrial Design, Architecture, Engineering, Science and Heavy Crafts. We aim to develop a “creative culture” (Cox, 2005) that nurtures the performance of all students within secondary education.

Formulating the problem

In schools and education today, the participation and leadership of girls and young women in industrial technology remains very low. Females are still in the lower percentages of students to take up advanced placements within these domains (Weber, 2009, 2012). If Australia is to remain competitive in the 21st century in global markets, then creative and innovative fluency must stand in a symbiotic partnership with digital technology (Crockett, Jukes, & Churches, 2011).

The Australian design and technology curriculum remains out of step with our international counterparts, particularly Europe and America. This is the case in researching teaching, assessment, processes and pedagogy that is inclusive of creativity and innovative outcomes within the curriculum and specifically within technology programs. For too long we have lagged in actual practical application in creating outcomes that can adhere to the rapid technological change of the last 10 years. As attributed to Einstein: “**Creativity is seeing what everyone else has seen, and thinking what no one else has thought**” (Bercovitz, 2010). Harnessing students’ confidence to view the world in this way can ultimately contribute to our human creativity and also to our and their ultimate economic growth (Cox, 2005).

Though we have in recent years made progress towards understanding the key issues surrounding gender equity, it would be prudent to remind ourselves that females represent slightly more than half of our human resources and should be participating on an equal footing with males without the hindrance of stereotyping. Failure in proactively encouraging girls and young women into industrial technology has resulted in poor participation within these domains (Zuga, 1999). Moreover, females bring a different perspective to the design discipline as their contribution is based on a different way of thinking and a different approach to problem solving than that of males (Ingalhalikar et al., 2013; T. Lewis, 2013; Zuga, 1999). This largely male domain has produced a continuous deficit of girls and young women in primary subject areas such as design and technology education (Elkjaer, 1992).

While the complexity of the underrepresentation of females within secondary and post-secondary training and education is well recognized (Weber, 2009), it remains poorly understood by practitioners (Acker & Oatley, 1993).

Global Perspective

The changing demographics of the global economy has meant that young students today are finding themselves requiring some form of post secondary education such as vocational education and training (VET) or a like skill based training and/or tertiary education. Such training allows them to be able to participate more effectively in a 21st century social and economic environment that is either local or global in terrain.

Females represent half of our human resources and should be participating on an equal footing with males without the hindrance of stereotyping. Irina Bokova, Director General of UNESCO, has stated (Bokova, 2013):

> *Leave out women and girls and you weaken the fabric of society, you exclude 50 percent of your creative genius, 50 percent of your economic drivers.*

Lufkin et al. (2007) point out that “the world has become a global economy, with competitiveness and demands for high skilled labour.” China, India, Middle East, Brazil and Africa are moving towards enormous efforts in developing a multiskilled workforce to fill a need within a local and global terrain.

Our UK counterparts have invested millions of pounds on design and technology in the last decade in responding to the Cox Report (Cox, 2005) and its major recommendations. Similarly, the USA and the Netherlands have also moved towards promoting, assessing and developing an educational network that is competitive and inclusive of a 21st Century Classroom.

Australian Perspective

Australia and New Zealand, as well as other Western countries, have struggled to increase young girls and women’s participation in traditional male domains. Failing to promote and engage females in these domains has left some of our most valuable resources on the fringes of our economic terrain and does not allow them to develop to their full capacity in contributing to the Australian economy as equal citizens (Lufkin et al., 2007).

The fact remains that girls and young women are still significantly underrepresented within the elective subjects of industrial technology within the Australian context. Even though elective subjects have expanded, including for example Information Technology and AutoCAD, female students are very much under-represented within these domains.

The introduction and roll-out of the Australian National Curriculum: Technologies 2014-5 (ACARA, 2013) provides the terms of reference and guidelines for education and training in Australian schools for the future. This is intended to provide a foundation for creating a national long-term education system which maximises and contributes to our childrens’ position within future economic growth (Commonwealth of Australia, 2008).

In this context, the author advocates that, to increase participation in STEM education and careers, elective subjects such as industrial technology play an imperative part in giving female students the opportunity to participate at an early stage of their schooling. Industrial technology subjects give students an elementary exposure to processes, design, and creativity that can later be translated into career paths such as product design and industrial design.

Industrial technology elective subjects in middle school do act as feeder subjects to motivate students to consider further studies and career paths within product/industrial design, architecture, and engineering. However, females in pre-degree education (such as high school education) are still

predominantly enrolling in electives such as textiles, graphics, home economics, art and fashion. Current Australian secondary school education appears to clearly fail at implementing a holistic practice that supports inclusion and equity in design/industrial professions (Mayfield, 1997). The ability of students to have flexibility and varying perspective to problem solving is critical (Meltzoff, Kuhl, Movellan, & Sejnowski, 2009).

Gender inclusivity

The key objective of this paper is to understand the best ways of increasing participation in "Nontraditional for their Gender" areas, specifically in Industrial technologies, within the context of a feminist holistic perspective. How can collaborative educational classroom practices help teachers, career specialists and all interested parties to contribute to achieving equity and inclusivity of girls and young women in Industrial technologies in schools? While that the Australian National Curriculum for Technologies (ACARA, 2013) addresses issues of equality, this needs to be translated into a functional classroom setting with an inclusive curriculum irrespective of gender, and inclusive of non-typical students.

The primary purpose here is to emphasise the importance of, and means to increase, participation rates of girls and young women in multidisciplinary Production Design and Industrial Design.

Factors to improve gender inclusivity and participation include:

- Equal accessibility to and within industrial technology in secondary, industrial-based vocational and post secondary education, which is free of stereotyping on the basis of gender.
- Strategies and equal action plans to promote female participation within the domains.
- Integration of both academic and technology programs to redefine curricula and policies that are inclusive, and both feministic and holistic in nature.
- Policy and curriculum development with pedagogy needs to be designed in consultation with active female practitioners within the teaching of industrial technology.
- Aiming to incorporate full principles of equitable and systematic teaching practices within design and technology.
- Recognition of importance by policymakers of female participation within industrial technology, enabling learners to participate and engage as global citizens (Gough, 1999).
- Recognition by policy and curriculum writers that females bring benefits to our economic environments. To achieve this, there is a need to incorporate a feminist text relating to the philosophy and teaching of industrial technology (Zuga, 1999).
- Engagement using positive problem solving and positive language enhances and encourages the participation of all students and particularly female students (Fredericks, Blumenfeld, & Paris, 2004; Jolly, Campbell, & Perlman, 2004).

The overall aim is to raise female and non-typical student participation and attainment in a 21st century model and context.

Data analysis: Examining Year 12 results for New South Wales and Queensland

To provide some quantitative understanding of the levels of female participation in industrial technology subjects, we have analysed published statistics for the New South Wales Higher School Certificate (HSC) (NSW Board of Studies, 2013) and the Queensland Certificate of Education (QCE) (Queensland Studies Authority, 2013). We show only the results for these two states, since providing a national comparison suffers from the difficulty that subjects and subject groupings vary from state to state, and therefore state statistics are not directly comparable. The author will be presenting national statistics elsewhere.

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New South Wales Higher School Certificate (HSC) results

Statistics presented for NSW are for the period since 2001, since the subject code changed from Industrial Technology 2 unit (21860) to Industrial Technology 2 unit (15200) in 2001.

Figure 1 presents data on female enrolments as a percentage of total enrolments in Industrial Technology 2 unit (15200) over the period 2001-2013. These data show an increase from around 6% in 2001 to around 10% over the period 2008-2013, with a value of 11.2% in 2013. The values from 2006 to 2013 all hover around the 10% mark – it is not clear whether the 2013 value represents the start of an upward trend, or is simply a statistical variation.

In order to normalize for population growth, we have also compared the female enrolment with the total female HSC candidature for the year in question. Data on total HSC candidature are published only from 2006, with 2012 data not being available. Figure 2 presents data on Female Industrial Technology 2 unit (15200) enrolments as a percentage of total HSC female candidature for the period 2006-2013, but excluding 2012 where the relevant data is not available. The data show a small increase from around 1% in 2006 to 1.57% in 2013.

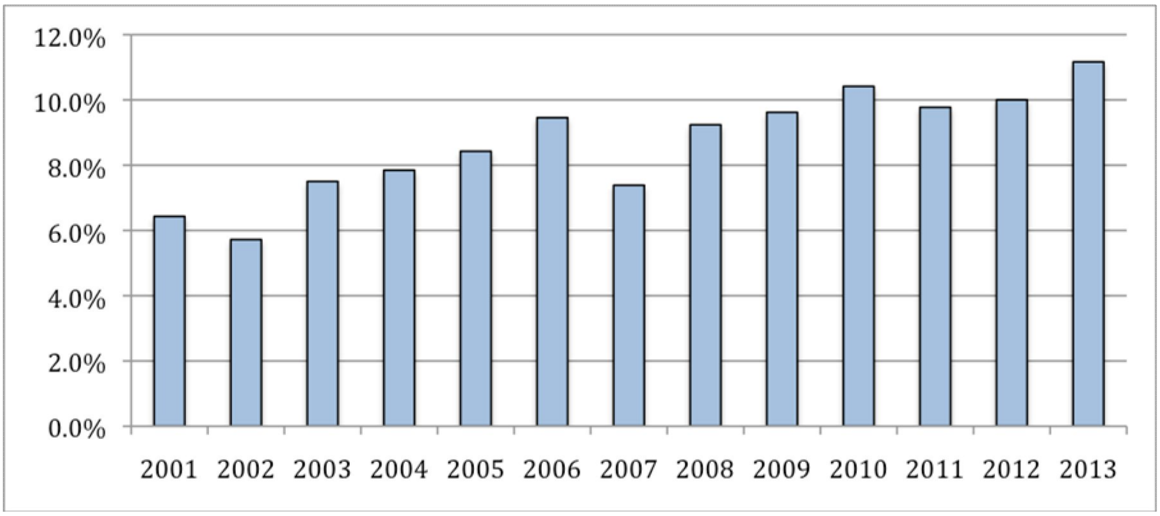

Figure 1. NSW: Female enrolments as a percentage of total enrolments in Industrial Technology 2 unit (15200) 2001-2013

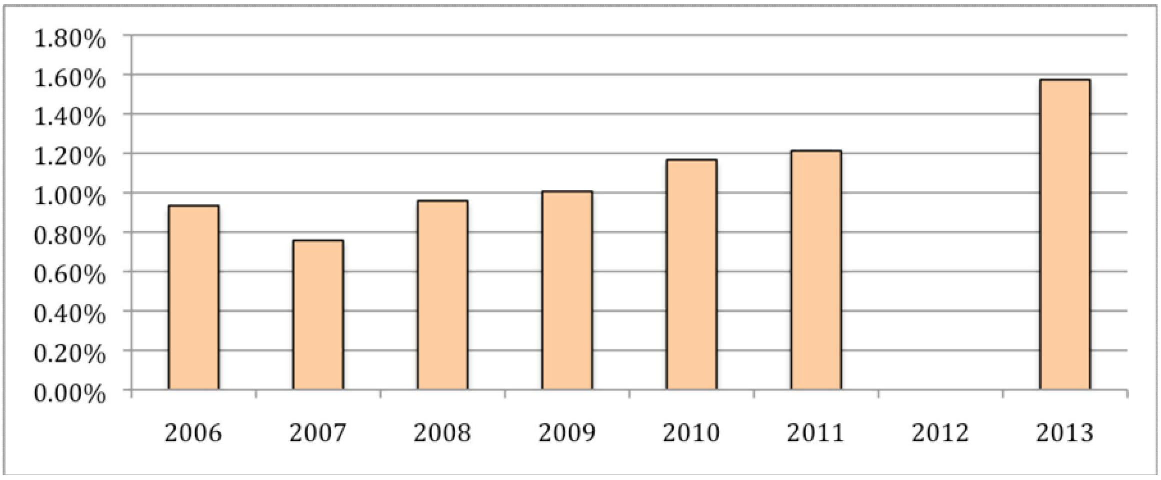

Figure 2: NSW: Female Industrial Technology 2 unit (15200) enrolments as a percentage of total HSC female candidature 2006-2011, 2013

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Queensland Certificate of Education (QCE) results

Statistics presented below for Queensland are for the period 2008-2013, for the comparable subjects Industrial Technology Studies (4 Sem) (06) in 2008-2009 and Technology Studies (07) for 2010-2013.

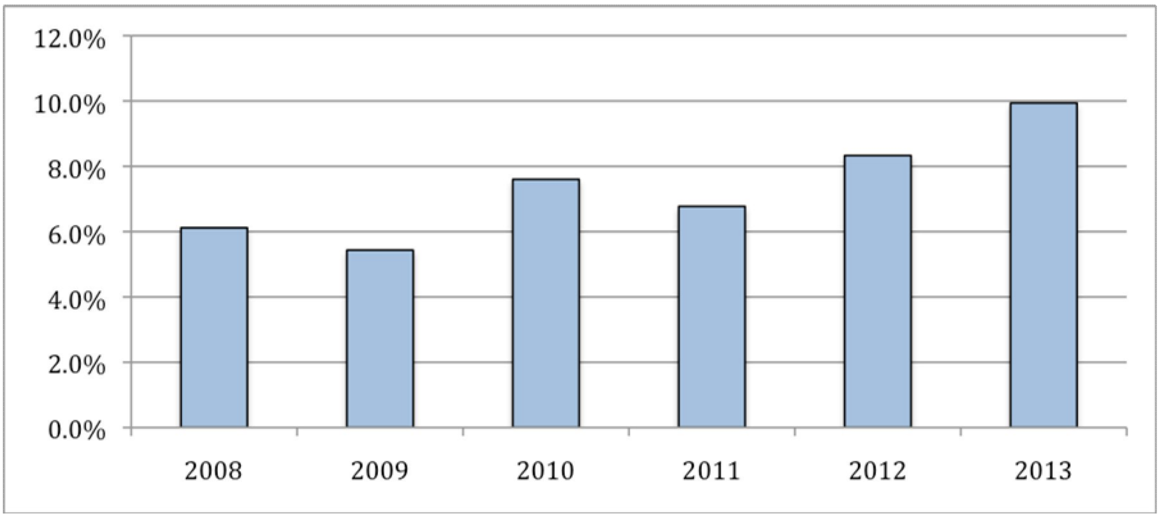

Figure 3: Queensland: Female enrolments as a percentage of total enrolments in Technology Studies 2008-2013

Figure 3 presents data on female enrolments as a percentage of total enrolments in Industrial Technology Studies (4 Sem) (06) and Technology Studies (07) over the period 2008-2013. The data show an increase from around 6% in 2008 to around 10% in 2013. The values are similar, but slightly less than the NSW values presented in Figure 1 above.

Figure 4 presents data on female Industrial Technology Studies (4 Sem) (06) and Technology Studies (07) over the period 2008-2013 enrolments as a percentage of total QCE certificates issued to female candidates. The data show a small increase from around 0.5% in 2006 to around 0.75% in 2013. These figures are lower than the NSW values presented in Figure 2, but with a comparable upwards trend.

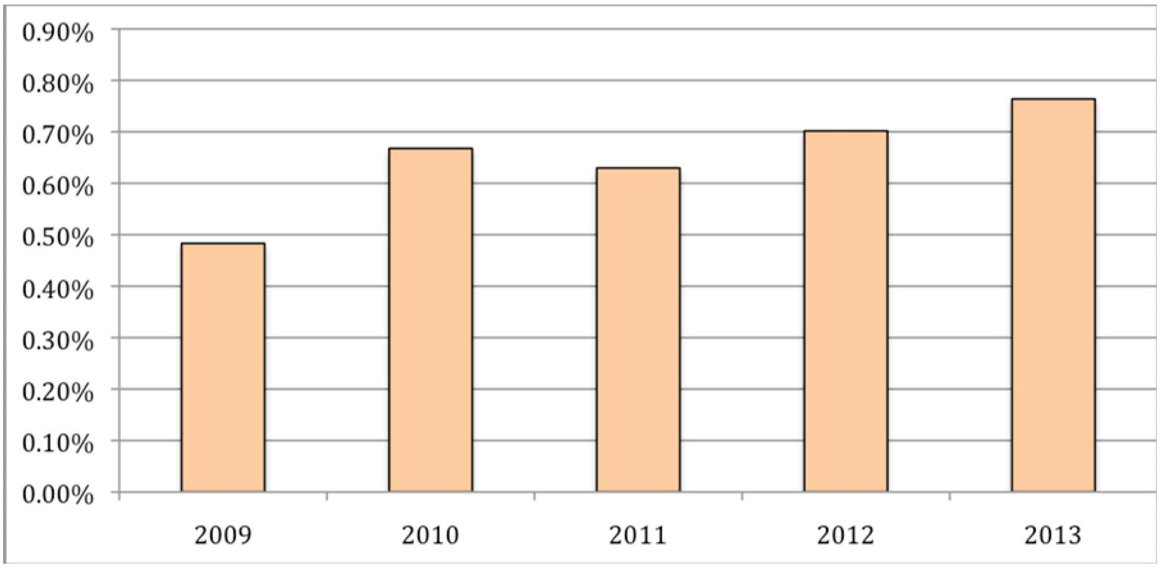

Figure 4: Queensland: Female enrolments in Technology Studies as a percentage of total QCE certificates issued to female candidates 2009-2013

Comparison of New South Wales and Queensland results

The data shown above clearly show the dramatically low female participation rates within the areas of industrial technology, of the order of 1% at year 11/12 level. I believe that this is in part due to the low rate of female teachers within these domains to act as role models for female students. Moreover, the traditional, restricted, and often limiting language utilised by male teachers often omits explanations of process and construction of design briefs. Girls and young women as well as female teachers are often confronted in the classroom with such inadequate and non-inclusive language (M. Lewis & Simon, 1991).

There has been a practice within certain states of Australia such as the ACT and NSW for example, that a teacher can be generically trained within secondary teaching, but teach within the area of design and technology without actually being trained in these areas. This places the teacher in a position where they are expected to implement the “Quality Teaching Module Practices” designed to promote a curriculum of intellectual quality, without their having detailed and specific subject knowledge. Moreover, this produces a learning environment whereby teachers cannot link students’ outcomes to contents and significance of curricula. If a teacher is not specifically trained within the area of industrial technology, how can they possibly be expected to implement an authentic and productive pedagogy?

Moreover, there has been a practice within the Department of Education, for instance in the New South Wales and the Independent school system, that primary-trained school teachers are able to teach up to secondary school year 10. This can place a primary school teacher with no specific training in the area of design technologies within a workshop environment. It is acknowledged that principals do endeavour to acquire appropriately trained teachers. The dilemma here is that there is a shortage of appropriately trained teachers and specifically female teachers.

It is proposed that the creation of a knowledge framework for better management of technological educational programs within secondary education results in a stronger participation rate and in creating technological programs with a gender use centred approach that is female-inclusive. Long-term practices of inclusivity increase high performance and create a culture of non-gender-based training rather than a culture of persistent sex stereotypes and segregation. Providing encouragement by parents, teachers, and counselors is of critical importance.

The importance of promoting girls and young women into technical education programs

It has become critical to increase the numbers of females into post secondary education within the domains of STEM and Product/Industrial technology, for the benefit of all, socially and economically (Fishman, Marx, Best, & Tal, 2003; National Women's Law Center, 2009). Females need to participate in a modern economy, irrespective of gender, within non-traditional education and subsequent career paths.

Within our society there are those individuals who would ask why do it at all? The importance of promoting young girls and females in these domains must be recognised by policymakers, within the education sphere. Recognition of ability to participate within an educational framework should not be based on the prevailing stereotypical perception of what engages girls and young women. As a teacher of heavy crafts and an artisan in the many years in the area, the first author would testify to witnessing over the years, female students looking at a design problem in a different light to their male counterparts. Their capacity to have a sensitivity of combining materials, colour, form and texture to enhance the final outcome has been evident. Female students are quick in recognising and combining high technology and its interaction with low technology. Taking old heavy crafts and teaching with a new design-centred slant can be very productive in engaging female students.

The significant component here is that females have always contributed not just their vision but also a

different perspective of knowing and interacting with technology and science. An example is Eileen Gray, who stands as one of the most important female architects and designers in the early 20th century, yet who remained relatively unknown until much later in her life. Her contributions and influence on modernism and art deco today cannot be contested (Adam, 2000; Andreas, Constant, Diamond, Hodge, & Wang, 1996).

This extraordinary woman was until recently known only to the few, and her innovative interpretation and treatment of light and space within her architectural designs was literally decades ahead of anyone else. If she had been a man she would have been as famous as Frank Lloyd Wright. Gray's "Bibendum Chair" stands as one of the most recognisable pieces of furniture of the 20th century.

Girls and young women: Examining barriers in technical education programs

This section describes the initial concept of barriers to technical education programs, and the associated difficulties. Typically, barriers are directly related to the obstacles that prevent or discourage, either directly or indirectly, girls and young females from participation in technical education. The principal difficulties encountered are, in the opinion of the authors, the following:

- Choices
- Knowledge of subject area
- Stereotyping with traditional outlook
- Peers
- Family, teachers, counsellors, and
- School curriculum

The above considerations include technical education generally, and more specifically industrial design and engineering subjects in a school setting.

One of the key components in avoidance of barriers is the creation of a culture and environment that is supportive of choices made by students for elective subjects. Such a culture leads to equity within technical education, which allows for expanding educational opportunities for females in non-traditional areas.

For the authors, "Choice" stands at the foundation of this key barrier. In particular, a student cannot be expected to make and formulate informed choices regarding elective subjects when in fact their knowledge of those subjects is often restrictive and based on traditional dialogue. For example, female students up until the 1970's were advised that they could not partake in wood, metalwork or even automotive classes (Lufkin et al., 2007). These attitudes were formed in a time of industrial development when it was anticipated that the physical demands of the work involved would be generally beyond the female capacity. This was also amplified by the prevailing social structures that expected women to be housekeepers. The physical demands are nowadays quite different in most of the craft and design industries and the old notions no longer apply. Furthermore, the exponential acceleration in the application of digital technologies in manufacturing has changed the landscape of design and technology, and the demands of these technologies are not in any way gender specific.

Examining barriers in current school practices and framework

Any examination of barriers to technical education within schools needs to be placed within the context of the current school curricula, including the Australian curriculum. The study of technology education currently in most states of Australia, for example Queensland, New South Wales, and Victoria is a compulsory subject in year 7 and 8 which then in year 9 becomes an elective subject. The ACT has year 7 as the compulsory year of study in technical education with the subject becoming an elective thereafter.

This compulsory study is placed within the context of the overall school curriculum, with the subject being an elective subject following the initial compulsory core introduction period. Students are at that time left with the choice to select those electives within the syllabus which they believe are appropriate and which fit into their learning.

How can students experience and gain the knowledge and varying abilities required to formulate the proper awareness in coming to the right decision in selecting their collective subsequent subjects.

One of the key issues, certainly at least initially, is that technical education specifically in the area of industrial technology offers a unique opportunity of working in a unit that teaches and exposes students to a broad subject area which is based on project-based learning, interlaced with problem solving to enhance motivation and to challenge students to not only be creative, but also getting them to think critically outside of the box, in both 2 dimensions and 3 dimensions (Barron et al., 1998; Wurdinger, Haar, Hugg, & Bezon, 2007).

The reality is that project based learning within technical education under the new Australian Curriculum is intended to be supported with IT, to lay a strong IT foundation for students. The intent is clear: that students are able to have a strong grounding and knowledge in this subject area. Typically within industrial technology, activities are involved with working with materials and structures that have appropriate structural and engineering components involving an understanding of visual, tactile and style in quality. With a strong foundation in these subjects and a positive focus and understanding of assessments and subject area, students can go on and make career choices that could lead them into STEM (Science Technology Engineering and Mathematics) career fields. Having a greater choice and knowledge within their schools subjects, enables a strong grounding if they choose later to participate within the domain of STEM.

The authors view is that technical education as not only an opportunity for students to have exposure to technology, innovation and design, but also as a foundation and potential feeder subject for further studies within vocational training, industry based training, and studies at university, including Industrial Design, Product Design, Engineering, Surveying, Interior Design, Architecture, Landscape Architecture and of course Furniture Design and Metal Design.

It is imperative that the exposure students receive to design and technologies in years seven and eight is strong enough to allow them to subsequently make decisions that can utilise elective subjects to lay a grounding for future studies.

Female students, particularly, have little or insufficient support from teachers and school counsellors in the current framework. Female students are frequently encouraged into a more stereotyped gender-based selection of elective subjects such as home economics, textiles and art so that the participation rates for females still remains substantially below in year 12 in the areas of industrial technology (Gross, 1988; Malgwi, Howe, & Burnaby, 2005).

Students often have no idea of what it is they intend to study or choose to study later on; their decisions are more often influenced strongly by their parents, peers, teachers and school counsellors. The dilemma here is the lack of knowledge and stereotypical influences guiding students in their decision making process (Congressional Research Service, 2006; Paldy, 2005).

Encouraging female participation within the discipline of technology is one of the key barriers that need to be overhauled in changing traditional restrictive views on females participating within non-traditional domains. Hall, Dickerson, Batts, Kauffmann, and Bosse (2011) state:

> *Numerous studies have been conducted on factors influencing students' choice of major….*
> *studies have identified personal interest as a key factor*

If we wish to have females participate equitably within these domains, then ensuring that they are coming from a position of knowledge that is based on a school environment and personnel that is

knowledgeable, supportive and encouraging of industrial technology and the different career fields that these subjects feed into.

Decisions are frequently being based on such factors as parent's knowledge and experience, peers, friend's teachers and even media exposure of females in these domains. Yet elective subjects and female participation still remains low in such areas as industrial technology. In a secondary ACT school, the first author was engaged as a teacher, and found that:

- in Wood Technology year 8 there were 4 females and 18 males
- in year 9/10 Furniture Making, 1 female and 11 males
- year 9/10 Wood Construction 2 females, and 22 males

Currently, within the College system in the ACT the first author has found that:

- year 12 metal technology ,1 female and 23 males
- Year 12 wood technology, 3 females 15 males
- year 11 wood technology, 1 female, 20 males

These figures are unfortunately typical within the school system across many Australian schools. They are consistent with the NSW and Queensland data provided in section 2 above, namely that females comprise around 10% of enrolments in these subjects.

Hall et al. (2011) state:

> *If school personnel have limited knowledge of these career options, many students may not know about or consider certain careers as viable choices. Teachers are key players in encouraging students' interest in various career options*

and

> *Additionally, parents groups should focus on helping parents understand their roles in encouraging their sons/daughters to consider various career options. It is important that parents be given broad knowledge of career options. Parental attitudes play an important role in encouraging students to consider various career options including career exploration, gender typing and future occupational plans.*

The author believes and supports the above research findings. Furthermore, the author believes that better understanding and a more systematic approach of increasing equitable participation of females in non-traditional subject areas is required. Elective subjects are left in a category of "less important" in the overall school curriculum and framework.

Importance of applying feminist perspective to curriculum development and pedagogy

The question here is: Why is it important to apply a feminist perspective at all?

The main objective of this part of the paper is to focus on the need of a feminist perspective, specifically to the development of technology education. Collaborative practices and development of curriculum and pedagogy within STEM (science, technology, engineering, maths), have been on the backburner since colonial times.

A feminist dialogue has only truly emerged within these industries in the latter part of the 20th century. It is the author's view that only with education and the relationship of the changing role of females within these industries can females slowly and increasingly be accepted as practitioners within these fields. More importantly, the right to become practitioners should not be based on gender; rather it should based on "skill". Only through the emergence of a feminist perspective and its application to the development of curriculum and educational pedagogy can a closing of the gap take place (Stone,

Kaminski, & Gloeckner, 2009).

As a teacher of technology, the first author views "language" as the cornerstone in communication of the curriculum, and educational pedagogy which is then expanded by embodying and imparting all the knowledge being taught.. Engagement has to be supported by an overall culture that is open to promoting gender equity within technical education, and all educational opportunities that exist must be supported by all parties to the process (Weber, 2009).

Feminist perspectives and theories open long needed discussion and influence in creating a conceptual framework to curriculum and pedagogy, specifically to the domains of STEM. In the last 30 years, research has identified factors influencing females' decisions in considering participation within STEM and specifically industrial technology. The research has shown that there are several key issues that play a critical role in female participation rates (Weber, 2009, pp. pp 14-19). It is not enough to simply produce curriculum reform (ACARA, 2013) without creating a curriculum, pedagogical practices and course content that is in fact not only supportive but critically inclusive of all students irrespective of gender (Stempel, Ney, & Ross, 2001).

There has been a history of gender stereotypes in career counseling and subject choice in schools (Kessler, Ashenden, Connell, & Dowsett, 1985). This stereotyping has continued to mainstream girls into traditional low-paying trades and professions. Though many teachers and policy makers are in fact supportive of inclusive education, the dilemma remains that it is still does not translate to actual participation rates within school subjects.

Considering strategies to increase female student participation in technical education programs

Increased female participation is achieved by identifying strategies to create new connections and possibilities for best addressing and developing significant practice and action in secondary technological education programs. Silverman, Pritchard, and Horrocks (1999) noted that "experience has shown that women are interested in non-traditional occupations when they are actively recruited. Female high school students who are good at maths and science and enjoy hands-on technology projects often turn away from higher levels subjects because they are not aware of the kind of non-traditional careers available to them and cannot see themselves in technical or scientific jobs".

Moreover, Annexstein (2003) presents a strong argument for the relationship between career and technical education programs and the importance for women and young girls participation within these domains. Annexstein (2003) states "girls in non-traditional programs are fewer and far between, and the isolation they face may result in unequal treatment or harassment. One study showing that 75% of female non-traditional students found that being the only girl was difficult and they were subjected to hostile environment from both teachers and male classmates."

The following strategies are specifically identified:

- Technology teachers to be provided with professional development and knowledge support in non-traditional areas for the gender. Department of Education and policy makers should provide teacher development programs on a more frequent and comprehensive basis (via workshops and resources that are specifically targeted towards gender support and sensitivity).
- Developing and building a network of educational and professional mentors for female students wishing to pursue heavy technology career paths.
- Mentoring programs specifically targeted to retain female students in technology programs.
- Technology teachers providing learning environments using varying instructional methodologies that are inclusive in learning style, for both female and male students.
- Creating learning opportunities that are hands on and skill based in design technology within the secondary school setting. These opportunities focus on the elementary years and create a

culture of inclusivity within heavy craft.
- Curriculum content that is inclusive and which recognises student learning differences and styles.
- Providing workshop environments, instructional material and usability of tools and machinery that is inclusive.
- Creating a classroom culture within the school curriculum that provides exposure to heavy crafts and technology and provides career guidance for all students irrespective of gender.
- Creating educational platforms which provide young female students with detailed knowledge of possible career paths that respond to labour markets.
- Department of Education to collect and provide ongoing data about student participation, and continuing into further technology education.

Conclusion

This paper discusses improved strategies for increasing female participation in design and technology subjects, which may also be relevant to many other STEM related disciplines. Within the domains of design and technology education systems, critical issues are strategies and performance that reflect national and international strategies, which are inclusive of technology processes and skills in a design-specific context. Formal 'design thinking' is powerful, relevant to much human activity and as such merits broad support.

The underpinning goals are ultimately to support increased female participation rates, and to support quality teaching and educational practices within secondary and post-secondary environments, especially in multidisciplinary areas such as Product Design, Industrial Design, Architecture, Engineering, and Technology.

The focus on traditional materials and technologies within schools and post-secondary educational environments has now expanded to include new 3D technologies. New experiences bring with them a new way of knowing for girls and young women and all students. Practical work creates self-reliance, and provides the opportunities for female students to develop skills within a design-specific context. This allows for the creation of female technical confidence and competency (Shanahan, 2006) and for supporting "woman think".

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