

First Aid for Female Casualties of the Information Highway



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ABSTRACT

Females are under-represented in education, training and employment in the area of Information Communication Technology (ICT). Research shows that girls are tuning out to ICTs in school and they have a low participation rate in ICT related tertiary study and employment. The Tech Savvy report by the American Association of University Women (2000) suggests “they are not so much phobic but are disenchanting”. This paper discusses a case study which is attempting to increase ICT skills and self confidence in a small group of female students through mentoring and increased access to ICT tools. It also considers whether isolated projects such as this one are attempts in first aid rather than radical surgery to ensure that females are not left behind in the digital revolution (Green, 2003).

INTRODUCTION:

Nelson and Watson (1991) suggest that, in the early years, both girls and boys are equally enthusiastic about the use of Information Communication Technologies (ICTs). In spite of this by their third or fourth year of schooling children's interest in ICTs veers off in different directions. Boys tend to play games and surf the Internet while girls tend to use ICTs to present information or as a creativity outlet and prefer computer games with real world applications, few of which have yet been designed. Sharon Schuster (n.d.) past president of the American Association of University Women (AAUW) remarks that when using ICTs girls “want high skill not high kill” (as cited in AAUW, n.d. para. 4).

Ann Cantelo (n.d.) has commented that “up to age 11 girls see ICT as entertaining and interesting, but after that age the negativity sets in, and by age 13 the negativity towards ICTs is entrenched” (as cited in Haughton, 2002, para. 6). Girls' limited interaction with ICTs beyond these ages reduces their opportunities for employment in highly paid jobs in the ICT field. Additionally the interest in and methods of interaction boys have with ICTs have resulted in them developing sophisticated ideas about how to use ICTs for their own purposes in both the short and long term.

Many authors (AAUW, 2000; Dorman, 1998; Farmer, 1998; Meredyth, Russell, Blackwood, Thomas, & Wise, 1999) report on how girls and boys interact differently with ICTs. For example boys are more likely to try to fix computers than girls, they appear to be interested in ICTs for its own sake as well as for personal use. Farmer (1998) indicates that there also appears to be a distinction between the male and female student ICT self talk where the boys might say “The computer is broken” (p.19) the girls are more likely to say “I think I broke the machine” (p.19).

Boys dominate computer use both in general classroom computer use and during free time (Koch & Uptis, 1996; Newmarch, Taylor-Steele & Cumpston, 2000). Farmer (1998) supports this notion and comments that when the school library opens, the boys “run to the computer area and occupy all machines” (p.19) and that most female students are often “too intimidated to tell a boy to give up a workstation” (p.19).

The New South Wales Department of Education and Training (n.d., para.2) states that “computers do not intimidate girls; however, venturing into male dominated areas such as computer programming, computer science or computer engineering may be intimidating”. This comment is reinforced by Newmarch et al. (2000) whose paper indicates an increasing number of young females are using ICTs for personal reasons and studying ICT related courses at school but there is a lack of interest by females to study ICT courses in the tertiary arena or to look at the ICT industry as a career. “Only 5% of girls would consider entering the industry, compared with 14% for law and 26% for medicine. A quarter think ICT jobs are boring, and 40% profess not to know anything about the industry at all” (Haughton, 2002, para. 5). Females tend to prefer careers which involve human interaction, variety, communication and job satisfaction. In the minds of most girls these are qualities which stereotypical ICT careers lack, although they admit that they have little knowledge of what it means to

work in the ICT industry. When working with females perhaps we should consider the provision of ICT role models or mentors to make them aware that the media stereotype ICT user is not the actual culture in the industry.

A scan of the current literature and numerous in-school projects in Queensland indicates a variety of projects are being implemented by schools in an attempt to break down the barriers for females entering the ICT industry. These projects tend to be mostly intervention projects based in schools and include the following: form single sex classes (female) or areas for ICT use; provide information about the qualities required for ICT work and the careers available in ICTs; provide female mentors and role models; increase computer ownership or access to girls; take on parents and others as partners; and create girls only ICT clubs or activities. This last type of project is the focus of this case study. Although there are quite a number of strategies, the big questions are: How successful are these strategies in improving the self confidence and the attitudes of females towards ICTs? And how do we achieve the long term goal of increased participation of females in ICT related secondary and tertiary courses and in the ICT workforce?

Contextualising the project

Two female ICT teachers in a provincial state school with over 400 students from years 8 - 10 observed that many girls in their classes had little confidence in the use of ICTs and felt overwhelmed by the boys within ICT classrooms. The teachers believed that these feelings resulted in the low participation by girls in ICT subjects in the upper year levels and ICT activities within the school. At that time there were only four female role models within the school for girls who would like to enter into the world of ICTs. A combination of these elements appears to have compounded the girls' lack of confidence in terms of ICTs.

The two female ICT teachers formed a Girls in ICT group named go gURLs. This group met weekly, outside school hours and in lunch times with a view to promote ICTs as possible subject selection, career path and more importantly as part of life long learning. The participants in the go gURLs ICT group were volunteers within the year 8 and 9 female cohort. The meetings started with a social get to know you or catch up session prior to investigating new technologies or completing projects using ICT tools.

The group has also had some night meetings, parent sharing sessions, has been invited to teacher conferences and has met with the Queensland Minister of Education. Additionally the group has made links to other Girls in ICT groups in Brisbane and throughout the state. The group was funded initially through an Education Queensland ICT Innovators Grant (Education Queensland, 2004). The grant funding was used to

purchase laptops, digital cameras and printers, and provided catering and travel to schools, government and community centres both locally and throughout the state for both the students and the mentor

From its inception the go gURLs project facilitated the mentoring and skill building of female junior secondary students and improved the access and participation in using ICTs. It was hoped that this support and mentoring would assist in reducing barriers the girls currently experience or perceive when using ICTs in their regular learning environments both at home and at school. The project also aimed to improve the girls' attitudes toward learning and motivation to learn ICTs, increase their ICT self-confidence and ICT skill levels.

Go gURLs aimed to make ICT activities fun and relevant while improving ICT skills. The sessions and projects have been designed to appeal to girls aged 13 to 15, incorporating interests such as sport, TV, music and fashion. One activity the girls participated in was to use a range of technologies to design and print the cover of a magazine suitable for their peers. The projects promote the use and learning of ICT skills just-in-time rather than just-in-case. At the conclusion of the first year of operation, the group held a showcase evening to present the projects they completed during the year.

Methodology

The primary research goal was to determine whether participation in go gURLs contributed to a change in the participants' attitudes toward ICT use. A second goal was to investigate the differences in attitude and skill levels between the girls and boys from the same year levels at the same school.

A case study approach was adopted to describe and analyse female students' attitudes towards use of ICTs prior to and after 12 months participation in project go gURLs. At the beginning of the project (also the beginning of the school year) and after a year of operation (at the beginning of the following school year), the researcher and the mentor teacher administered surveys to girls attending a weekly meeting. On each occasion 19 of 22 regular participants responded to the survey, which used a combination of open and closed questions to collect data about demographics, access to ICT tools, attitudes and student use of ICT. The questions were adapted from well-validated

attitudinal surveys used by other researchers (Christensen & Knezek, 1996; "High-school students'," 2001).

Data about attitudes to ICT and use of computers in school and for learning were collected as responses on a 5 point Likert scale (strongly disagree, disagree, undecided, agree and strongly agree). Typical items included: Working with computers makes me nervous and I enjoy doing things on a computer. Preferences for using ICT for school and leisure activities data were collected by selecting one option from a pair. Examples included: I would rather use a computer read a book, I learn more when I write use a computer. Student confidence with ICT data was collected using items with a 4 point scale (not at all confident, confident with help, confident without help and confident to teach others how to complete the task). Sample skills were: capturing images using a scanner and transferring them to a computer and creating a newsletter with columns.

In addition to these items, the second survey included open ended questions asking students to comment on their participation in the project and to evaluate the success of the go gURLs project group from a student perspective. At that time data were also collected from 10 year 8 and 9 boys who had the go gURLs mentor as their classroom teacher for the preceding 12 months. The boys completed the original form of the survey without the additional open ended evaluative questions.

The go gURLs mentor teacher was interviewed at the beginning and 6 months into the project in addition to being surveyed 12 months into the project. Data were collected from the semi structured interview questions and open ended survey questions.

Numeric data were analysed statistically to detect significant changes in measures for the girls over the period of the project and to compare measures for the girls and boys. Responses to open ended survey questions and transcripts of interviews were examined for common themes.

Findings and discussion:

Consistent with results reported by Young (2000), boys and girls reported similar levels of computer access at home and at school. Students reported an average of 2.4 computers in their homes. This was higher than might have been expected given the economic circumstances of most of the

students within the school. The average age of home computers for both males and females was reported as 3.3 years and 25% of students reported no home Internet access.

Both male and female students estimated that their access on home computers was an average of 5 – 10 hours per week. There was no significant difference between the boys and girls within the study in the time spent and activities completed on computers at home. The use of the computer time for leisure was predominately for games, internet surfing, email and chat, whereas the use of computer at home for school work was for internet searching, word-processing and PowerPoint.

At school both boys and girls reported that they used computers 1 – 2 hours per week. That was considerably less than the time spent on computer at home (5 – 10 hours). The lack of difference in access between male and female students at school may have occurred because the male students were taken from the ICT mentors class. This teacher has an awareness of female's lack of participation and may use proactive strategies in her classes to ensure boys don't dominate access to ICTs.

After 12 months participation in the go gURLs project the girls reported marginally more time spent on a computer both at home and at school than at the beginning of the project. This could be due them gaining confidence and improved ICT skills however this may be due to their increased access during the go gURLs meeting time and the need to complete projects associated with the groups' activities.

Initial results from the go gURLs participants indicated that in their leisure time they would choose to use a computer before reading a book or writing and watch TV rather than use a computer. After 12 months involvement in the project the girls changed their preferences towards computer use in their leisure time would prefer to use a computer than watch TV.

When considering the use of computers in learning, boys reported that when teachers use computers, they enjoyed school to a greater extent than the girls reported. Another gender difference indicated from the data is that girls perceived that they could learn more from a book than from a computer. The boys indicated that they could learn more from a computer than a book. Boys considered that the use of computers in learning activities would increase their enjoyment and the quality of their learning.

The girls have self reported an increased confidence in their ICT skills after 12 months involvement in the project. They felt they had improved in the areas such as file management, creating a spreadsheet with simple formulas, using troubleshooting strategies with a

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computer that is not working properly, evaluating trustworthiness of information on web pages and searching on the WWW. However, despite an improvement in the means of the girls in all of these areas they still reported lower mean levels in the same areas than that of their male counterparts.

The female students' evaluation of the go gURLs project after 12 months was very positive. One student commented that "I've become smarter". They believed that it was a worthwhile initiative and hoped that it would continue. The students revealed that participation in the group enabled them to communicate with other girls and learn new skills while completing fun ICT activities. The students also enjoyed the small size of the group which assisted in creating a strong bond among them. They believed that they were seen as being different because of their participation; they enjoyed both the hands on ICT and the social activities. The girls' comments indicated an increased confidence when using computers and one student relayed that "computers are now part of my every day life". Their responses indicated that they now realize that ICT will impact on their future careers. All of the participants would like to continue to participate and would recommend the group to other girls. When asked to comment on why they considered the group was successful, they consistently indicated that it was because being part of the group was "fun" and educational.

The go gURLs mentor comments from the survey and semi structured interview indicated a boost in the "confidence in girls in terms of overall personality and knowledge about ICTs". The mentor's comment about increased ICT knowledge is validated by the student comments and from the survey data. The mentor also commented that the girls also developed increased maturity, taking responsibility for themselves and others, particularly within the go gURLs group and she noticed an increased social interaction during lunch times between the participants of the group, "they have

a feeling of identity and belonging". The mentor noted that many quiet students now have "come out of their shell"; they are keen to share and have a boost in self confidence. "What I like about the project is that it has impacted on other parts of the girls' lives." The girls now feel empowered. This response echoes the finding of Hastie (n.d. as cited in Haughton 2002, Equal opportunities section 2, para. 4) "We targeted the girls unashamedly to raise their self-esteem and skills, and it made a huge impact on them in terms of their confidence and interest".

The students and the teacher found significant benefits in learning together. This was evident when the projects required the students to use software, hardware or skills that the mentor had no previous knowledge. The mentor teacher responded that "I've found it to be very powerful, the fact that teacher and students are learning together".

Although the data collected from 19 of the 22 girls in the go gURLs group can be considered representative of that group, the small size of the group operating in a single school does not support wider generalization. The imbalance in sizes between the small samples of boys and girls places further limitations on the generalization of the gender comparisons.

An alternative explanation for the results when comparing genders is that all of the students surveyed were influenced by the go gURLs mentor teacher either as participants in the mentor teacher's general classes or as part of the go gURLs project. The teacher as a common variable may have influenced the overall lack of significant difference between males and females in many of the survey questions.

Future research in this area requires longitudinal studies which would reveal whether the girls involved in individual strategies such as go gURLs demonstrate long term increased participation in the ICT world or whether these types of projects are first aide or a quick fix. Consideration should be given to surveying the initial and subsequent go gURLs students in 3 years time to examine what subject selection students made and to investigate their use of ICT in non-ICT courses and in their leisure time. This type of future research should provide a medium term view of the influence of such an ICT girls group and its influence on girls' subject

selection and use of ICTs at school and in leisure time. This would overcome some limitations of the present research which has collected data over a relatively short term and therefore gives no indication of impact over the medium or long term. To gain a better picture of the impact a further study of the girls after they leave school could be completed to see the longer term effects of their participation.

Further research could also be completed to identify if an increase in ICT skills and improved self confidence in the use of ICTs for personal use translates into employment in the ICT industry in positions which require employees to create and maintain ICT systems for other users rather than employees who are end users of ICT systems.

Looking forward:

Overall the data showed no significant difference between the girls' attitudes towards ICTs at the beginning of the project when compared to after 12 months participation in the project. This result is in contrast to the anecdotal evidence provided by the teacher and student comments. The findings of this research were not those expected by the mentor and the researcher and are in conflict with the original premise of the study. The insignificant difference between boys and girls in the same school was also contrary to what was anticipated.

Using just one of the many strategies mentioned previously, such as a Girls only ICT club, may be considered a short term first-aid solution. Longitudinal research should investigate the long term impact of these types of projects on the lack of participation by females in ICT at the tertiary level or in employment. However, perhaps without this project the female participants' ICT confidence would have been below that of their male peers rather than on par with them. Independently, projects such as go gURLs may act as a motivator and improve attitudes and ICT skill base but there is need for a cohesive whole school, systemic or social vision regarding the barriers to girls' participation in ICTs in an increasingly technology based society.

The key to promoting real change and moving beyond a first-aid approach to the problem requires "buy in" from all stakeholders and targeting a range of audiences of sexes, (Newmarch et al., 2000). These stakeholders include schools, students, parents, educators, pre-service teachers, teacher educators, universities,

government and employers. The Queensland Education Department is making a deliberate effort to increase the participation of girls in ICT. They have developed a Girls in ICT Strategic Action Plan and Framework for Action (Education Queensland, 2005a) and are also supporting an online space for interested stakeholders (Education Queensland, 2005b). A state-wide Girls in ICT reference group has been established as a means of increasing "the engagement of Girls with ICTs by bringing together a strong group of advocates for the cause" (Education Queensland, 2005a).

This school and others are trying to take on the challenge of ICT gender equity but they have inadequate resources and ability to create a cohesive strategy as a whole school particularly where many teachers have few ICT skills themselves and little knowledge of the ICT world of work. Individual projects such as go gURLs may lead to "innovation without change" (Sparkes, 1990). Having said that, there is anecdotal evidence to suggest the increased ICT usage has made a positive impact on overall schooling and self confidence of the participants at least in the short term. These types of local projects appear to be first-aid for the students as 'accidents', issues or incidents are noticed and they do little to challenge the conceptions, roles and beliefs of the larger population and in the long term have an unknown impact on reducing the gender divide on the information highway.

BIOGRAPHY

Petrea Redmond is currently working at the University of Calgary, Canada as part of an exchange program from the University of Southern Queensland in Toowoomba, Australia. She began her teaching career in a small rural high school in Queensland then moved to a large provincial high school leaving as Head of Department for Business, Industrial Arts and ICT. Prior to joining the University of Southern Queensland Petrea held the positions of Education Adviser - Learning Technology for the Toowoomba District and Technology Leader for the Toowoomba Technology, Mathematics and Science Centre of Excellence. Petrea's current work is in the areas of 21st century pedagogy, Girls in ICT, ICT integration, online and blended learning.

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