Barriers to women studying IT courses

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Abstract

One of the largest groups entering tertiary education in New Zealand are women seeking to retrain for the workforce, many of whom enrol in computer based courses. However, while research identifies these women as feeling quite comfortable with information communication technologies (ICTs), they still largely perceive Information Technology (IT) as a ‘male domain’. This paper investigates how women retraining for work make choices about their tertiary education courses. It analyses why women are far more likely to choose a qualification where computer literacy and the use of computers supports their career choice rather than a qualification with a strong IT focus. The study draws on survey questionnaires administered to students enrolled in a range of ICT courses at Waikato Institute of Technology (Wintec) and on individual and focus groups interviews. The findings indicate that factors involved for women in not choosing IT courses and qualifications included a lack of knowledge about IT courses, perceived male domination of the IT industry, lack of confidence in their ability to master IT, and traditional gendered perceptions of appropriate roles and careers for women.

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Keywords

Information technology education, women in IT, women studies

1. Introduction

Far fewer women than men are studying Information Technology (IT) at a tertiary level in New Zealand as well as in many other western countries. In spite of many intervention programmes over the years and a higher growth in female tertiary education enrolments generally (NZ Statistics, 1999), women's participation rate in such courses has not greatly improved, particularly in comparison with other disciplines such as law and medicine. There has also been a major fall in numbers of all students graduating with IT qualifications since the "dotcom crash" in 2001 (Griffin, 2004). This fall in student numbers, and the fact that women - as a significant group of potential students - are predominantly not choosing IT courses is likely to cause problems not only in terms of meeting the future staffing needs of the IT industry, but also in terms of the viability of IT education courses themselves.

As has been well documented, women's domestic and employment roles have changed considerably - from homemaker to income earner - over recent decades. Many women seeking to return to the workforce recognise that in order to be competitive in the labour market, they need to gain or update their computer skills. In up-skilling themselves women are generally choosing computer-application type courses or courses where computer technology is used as a tool, rather than IT courses as a means of enhancing their employment potential.

This paper examines the views of women students retraining for the workforce to ascertain their
motivations for study and the reasons why they do not elect to study IT courses. The concern is to understand why many women retraining for the workforce, who are often quite comfortable with computers per se, do not consider IT as an attractive educational course or career option, and to identify strategies to attract them into such courses to ensure a gender balanced IT industry and the ongoing viability of IT education itself. We also must, however, acknowledge the courage of these women in retraining, sometimes many years since they left school, as they overcome any fears they may have as they master the technology.

2. Literature Review

A recurring concern in the literature is that the numbers of women entering IT courses has been declining for the last twenty years and that more men than women are studying IT courses and choosing the IT industry as a career (Margolis & Fisher, 2002; Leathwood, 1999; Lopez, 2002; Richardson & French, 2002; Teague 2002; Trauth, 2002). This is of concern because not only are some of the fastest growing job categories computer related and have the highest average pay rates, but women need to be part of an industry that is shaping their lives in profound ways (Girl Power, 2003).

One explanation for differences between female and male participation in computer-related courses has been in the general historical and - though more recently to a lesser extent - ongoing social conditioning and stereotyping of females and males in relation to technology which commonly genders its creation and programming as 'masculine' domain. Consequently, where there has been a focus on the technical aspects of computing (as opposed to the practical uses) males have been more likely to be drawn to the field (Freedman, 1997). Durndell & Thompson (1997) also found that young women perceived computers "as machine-focused, boring and unsociable - the antithesis of their interest in communication and 'people-centred' professions" (p. 3, see also Lee, 2002.) However, some women clearly have no problem enrolling in educational programmes and courses that involve aspects of computer technology, recognising that to be competitive in the workplace they need computer skills (Durndell & Thompson, 1997). This suggests that using computers to learn, as opposed to learning about computers, may be less gendered.

There is evidence that women may choose some computing courses when they are offered in combination with other disciplines that emphasises social issues and computer applications (Siann, 1997, cited in Leathwood, 1999; Henwood et al., 2000). For example, in California Margolis and Fisher (reported in Read, 2002) very successfully increased the numbers of women enrolling in IT courses by enhancing the interdisciplinary base of those courses. It would therefore seem, as Durndell and Thompson, (1997) argue, that "In rejecting computing, women are making positive career choices in favour of what they consider socially useful, as well as academically challenging careers. The majority of girls choose academic disciplines that have a visible social dimension and where female role models are more accessible" (p. 3).

The issue of the lack of female role models in IT does appear to be a factor in how women view their abilities to study and do well in IT. Indeed, this could explain Henwood et al.'s (2000) finding that women tend to underestimate their IT skills in relation to their perceptions of men's skills, despite the fact that the women have proved themselves very capable, and at times more so than men, at learning IT.

Given that women have equal opportunity access into IT education courses, and are equally capable as performing as well on those courses as men, women themselves could be blamed for the gender imbalances in the IT industry. However, as Adam (1998) argues, such a position fails to explain "the reasons why women either do not or cannot choose technological careers, and it presupposes that there is something wrong with women's attitudes if they are not scrambling up the corporate ladders" (cited in Boyce, 1999, p. 23).

3. The Research Context and Method

A good starting place from which to examine women's decisions not to pursue a career in IT is, as other researchers have identified, at the point of entry into educational courses. It is at this point when they choose or choose not to gain the qualifications needed for an IT career that we need to ascertain the basis of their decisions. It was this approach that was taken in this New Zealand based study, which specifically explored women's decisions to study computer application based courses at the Waikato Institute of Technology (Wintec) in Hamilton, New Zealand.

There is certainly good reason to examine why, in New Zealand as in other national contexts, women are not studying IT. In 2001, 56% of all students enrolled in tertiary study in New Zealand were women
Yet the 2001 national census found that women made up only 30% of people with an IT qualification. In comparison, 93% of those reporting a post-school qualification level in office studies (which includes the study of computer applications) were women (Statistics NZ, 2001).

In 2004, women comprised 56% of all enrolments at Wintec (Student Enrolments, Wintec, 2004) and 73% of enrolments are aged 20 years and over and are thus predominantly made up of adults returning to study to gain qualifications that will retrain them for the workforce. Interestingly, however, only 20% of all students enrolled in any IT programme at Wintec are female, except for the National Certificate in Computing (NCC) where they make up 56.3% of the enrolments. It would seem that women are marginally over represented in the NCC because in 2004 the course was offered free and was taught within school hours. It was hoped that NCC graduates would staircase up to higher IT qualifications. This has not happened, however, though some of the graduates have gone on to further study in other disciplines.

In this paper we are focused on investigating the study-motivations of the women who were retraining for the workforce and who elected to choose either computer application based courses or IT, because these students comprise the greater proportion of all students entering tertiary education in New Zealand. It is likely that these students are especially affected by their perceptions of what type of study options will provide opportunities for employment, having already been out in the workforce and having decided to gain further qualifications in order to advance in their employment and career options.

In seeking to examine why women are not choosing to study IT courses in significant numbers, but are electing to study other computer based courses at Wintec, we conducted first conducted a pilot study, involved interviewing eleven women and surveying fifty-six women who were studying courses in order to retrain for the workforce. The women were enrolled for a range of Wintec qualifications from certificate to degree level in Business and Office Technology and degrees in IT. Following up on this pilot study, one hundred and seventy students studying computer education courses, were then surveyed of which 99 were women and 71 were men. Ninety-two of the respondents were studying Information Technology, of which there were 23 women (including 19 who were retraining for work) and 69 men (including 43 who were retraining for work). The other 78 comprised students taking courses where learning computer applications were the focus of their study such as Office Technology. Of these 78, 76 were women and 53 were retraining for the workforce.

The surveys completed contained a range of open and closed ended and 38 Likert-type scale questions asking students about their views on and uses of computers. The results of the two Likert-type scale surveys were statistically analysed using the ANOVA test.

Then a sub-set of the women studying computer application courses and already surveyed (n=40) participated in a more detailed qualitative research, where they presented written responses about their motivations and experiences of studying. A thematic analysis (Owen, 1984; 1985) was used to identify dominant themes in the qualitative data.

4. Results

The mean age for the 19 IT female retrainer respondents was 26 years old compared with 31 years for the 76 female computer applications retrainer respondents. Forty percent (n=21) of the computer application respondents reported no school qualifications while all IT respondents had some school qualifications. Fifty-three percent of the IT retrainers rated themselves comfortable/fairly competent or quite confident in their computer knowledge prior to starting their courses in comparison with 41% of the computer application retrainers. This shows that those entering IT were younger as a group so they might have been exposed to computers in other settings and might have been more comfortable (as they might have already achieved some success at school).

4.1 Perceived Benefits of Using Computers, Reasons and Motivation

Participants were asked what they most like about, and the benefits they gained from using computers. These respondents' retraining was driven by motivation to change careers, learn about computers, set an example for their children and provide financial security for themselves and their families. In line with these motivators, these respondents saw computer technology as extremely important in their future employment. In the words of one participant:

"All employment is based on computer technology - technology is the future"

The main reason for study for all female retrainers was, not surprisingly, to re-enter the workforce.
Gaining a qualification and gaining or updating their skills was also given as reasons. Rather similarly 53% of the computer application respondents were motivated to study by a desire to 'improve their employment prospects' and 'to be paid more' than they would have without their study. However, 38% were motivated by 'wanting to succeed', for 'self-improvement' and to develop 'self confidence'.

The respondents also indicated that they did not know what IT was all about. This means that these respondents were studying courses that they knew about, were comfortable with, and of course are traditional for women, therefore gender differences continue to be a factor.

4.2 Attitudes to Do with Being a Woman

When asked about the perceived advantages of studying computers, respondents commonly believed that such study as would help them to secure better jobs because they were up to date with technology and were computer literate. There was a very common perception that there was 'work is out there for women with computer literacy skills'. One respondent summed up such views stating:

"I think that everyone should study computers as without this knowledge they will be ignored and gradually pushed out of the workforce".

However, a small number of respondents explicitly identified gender and technology as a contemporary employment issue. For example:

"You are now competing in a males once dominated field",

"More office jobs available for women".

Such responses apparently reflect the view males no longer dominate the field of computer technology operation, but also that 'feminised' office administration work now requires women to be skilled users of computers on the same level as men.

Interestingly, however, a small number of women respondents identified particular tensions around women studying computer technology. One woman stated a concern that:

"In women studying computers ... women may become too career-minded and less family oriented."

From quite the opposite perspective other respondents felt that women are not treated as equals alongside men when studying computing. For example:

"Males could frown upon them as inferior",

"Men are in control".

In a more extended explanation of her feelings a Bachelor of Information Technology student detailed finding it very difficult to break through gendered barriers to IT study and employment. She stated:

"My goal is to voice my opinions and have confidence despite females (being) still a minority in the IT industry... I felt [that] the opposite genders [men] were a threat [to me]. I was anxious about their opinions of me and how they would react to a female in a male dominated field... An issue of gender cannot be overcome with ease."

Clearly for some of these women, old stereotypes persist about the role of women in terms of their place within their families: having a 'job' rather than a 'career,' and the perception of males being in a position of superiority. Choices regarding careers are being made on the basis of these stereotypes. However, statistical analyses of the survey responses does identify age and previous qualifications as also impacting on the study choices being made by the women. The areas, which were statistically significant, included women retrainers rating themselves as having less computer knowledge prior to starting their course, less competent with computers and feeling more nervous in using a computer than any other group.

4.3 Consideration of Another Technology Course

Respondents were asked if they had considered taking any other technology courses, for example, IT. Thirteen percent were quite happy with their current study and had not considered IT. A lack of confidence and skills, perception it was a 'lot harder', were mentioned by 39% of the respondents. Gender and age were mentioned as barriers to considering IT by 26%: 'past our age group' and 'too
"We think it is a man's domain, we are not so mechanically minded".

One respondent and already completed the NCC the previous year. This is consistent with other research including Henwood et al. (2000) who found that women did not perceive themselves as competent confident professionals in the same way that males did and in fact underreported their competency level and also thought that computing was a male-dominated field.

5. Discussion

Our research respondents are perpetuating the status quo by confining themselves to the position of operators of computer communication rather than designers of that communication. There still does appear to be a gender difference when it comes to women choosing their ICT courses. This has persisted since World War II when women's roles were again more clearly defined following the war. Many women are still flocking to the traditional office training and not considering a career in IT further, which may offer them more of a career in terms of financial rewards and status.

Many women are quite happy and prepared to study computers and work with them in conjunction with other roles but do not appear to perceive IT as an attractive career option. This stance needs to be respected. However, it also appeared that because of socialisation (Trauth, 2002) it is acceptable to get a 'job' and be supportive to one's family but not to get a 'career'. Studying a computer application type course allowed for 'getting a job in an office', given it was a traditional female occupation. Perhaps IT was seen as more in terms of 'career', which could conceivably 'undermine' the family without respondents looking at the long-term benefits to both them and their families.

Given the expectation that the women retrainers want a 'job' to support their families maybe they could start looking at a 'career': being successful in a 'career' and a mother and homemaker are not necessarily mutually exclusive. We all have 'careers' whether in the paid work force or not so the myth needs to be dispelled that putting energy into a rewarding job both financially and personally will compromise the family. It is clear that women are prepared to learn about computers. So the question is how policy makers and educators remove the barriers to full participation in the workforce.

Many interventions have been tried over the years to overcome this imbalance in IT but with limited success although recently there have been a number of new initiatives. Certainly, very recently educational institutions have started to attend to these issues. Staff and students in the Computer Science Department of the University of Waikato have initiated a number of strategies not only to increase the number of women enrolling by inviting high school students into their department but also offering further support to their current students. The issues identified as affecting women in computer science included: a higher drop out rate within the first two years, a lack of experience with computers before enrolling at university and a tendency to have little confidence to experiment with computer software and hardware which means more guidance and learning before gaining confidence is required. There is a perception that the curriculum is generally structured towards male rather than female styles of learning, computer science courses being mostly technical and tending to ignore people issues. Along side this, courses that require less technical knowledge, for examples analysis or management styles are not regarded as 'true' computer courses. Women also felt they have had no support structure whilst studying at university.

Another initiative is the recently launched mentoring programme by Women in Technology for women already in the IT field as well as a programme to increase the number of women working in the ICT industry (New Zealand Herald, 2004). Women within the ICT industry are now identifying the needs of women and developing strategies to ensure the ICT industry get a different 'voice'.

6. Recommendations

1. That the traditional demarcations between computer application courses and information technology be reviewed so that there are opportunities for students to 'cross-over' to other qualifications rather than be tied to the first one they enrol in.
2. That programmes adopt a multi-disciplinary approach ensuring that more socially oriented or management courses are available to students.
3. That students' horizons be broadened and they be introduced to the wide range of career options available within the IT industry after they have gain an initial confidence with computers.
4. That students be given the opportunity to meet with other women who are successfully working within the IT industry.
5. That further research is undertaken to identify the factors for women in the IT industry that helped and hindered them in their careers to date so that strategies could be developed to ensure they are not lost to the industry.

References


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