When I grow up: Young people’s understanding of work in “a large computer company”

Educational decisions which limit career choices are often made in the lower grades of secondary school (Hobbs, 1987; Johnston, 1990). These decisions are sometimes based on students’ poor understanding of what particular careers involve. This paper explores the understandings of a small group of Year 9 students about work in a large computer company. It analyses the types of jobs described by the students, the actions they expect to be performing and how they feel about this type of work. Gender differences play an important part in the analysis because it is widely reported (Shashaani, 1993, Grundy, 1996) that work with computers and participation in computer studies courses is gender differentiated. However it is also recognised that the investigation of other factors such as technological access, school experiences and socio-economic indicators could make equally useful contributions and have potential for further research in this genre. The conclusions reached are that these students have a reasonable knowledge of work with a computer company and there is little gender difference in this, however their descriptions of what they expect to be doing are much more gender differentiated. Students’ feelings about such work are also gender differentiated and reflect a high degree of boredom for both boys and girls. Specific interventions are suggested including the need to pay particular attention to students’ school experiences with computers.

Introduction

This paper is concerned with a small group of junior secondary students’ views on work in a large computer company and with their feelings about such a job. The paper is directed towards understanding the stereotypical nature of their views and feelings as a possible focus to disrupt the present gender differentiated structure of the information technology workforce. In a postmodern world it may seem incongruous to construct an analysis based on a meta-category such as gender and I agree with Nancy Fraser and Linda Nicholson (1990) that gender is “one relevant strand among others” such as “class, race, ethnicity, age and sexual orientation.” However to attend to all these strands at once would render the analysis extremely superficial and is not what this paper is about. Rather it is intended as a micro-analysis of the views of a particular group of students using a simple qualitative research process such as might facilitate teachers’ knowledge of the students in their class and thereby allow them to make appropriate interventions to facilitate more gender equitable outcomes for their own students.

The limited involvement of women with occupations in the information technology (IT) industry has been widely reported. Lily Shashaani (1993) notes that “Although the proportion of women in computer related jobs has increased in recent years, they concentrate in less skilled occupations and in jobs requiring less training”. Sanders and Stone (1986) report similarly: “The computer gender gap is ... pronounced in the workplace, where women are outnumbered two to one as programmers and even more so at higher-level computer jobs”. Frances Grundy (1996), also records this on-going problem where “fewer than two in ten (18%) higher status jobs in computing were held by women. Contrast this with seven out of ten lower status jobs held by women”.

This limited involvement of women in the information technology industry is attributed in part to stereotypical perceptions of employment in this industry. Lily Shashaani (1993) believes
“that there is an association between an individual’s vocational preference and his or her acceptance of occupational stereotypes”. Valerie Clarke (1989) also reflects this view. She says “one of the biggest barriers to the achievement of equal opportunity in the workforce may be the existence of sex-based occupational stereotypes”. Furthermore she says ‘Occupational sex-typing, where it exists, acts as a self-fulfilling prophecy’.

While the evidence concerning gender differentiation in occupational involvement seems to be clear cut, the evidence of differences in attitudes towards computers is less clear. Studies which demonstrate more positive attitudes are held by males abound (Chen, 1986; Hattie and Fitzgerald, 1987; Levin and Gordon, 1989; Shashaani, 1993) and this finding was particularly common in earlier work in this field (Ware and Stuck, 1985; Lockheed, 1985; Collis, 1985; Fish et al 1986). Some studies have found no gender differences in attitudes (Harvey and Wilson, 1985; Martin et al 1992; Francis, 1994). Studies which found more positive attitudes held by females seem to be very limited although Siann et al. (1990) found that 11 year olds stereotyped computer use as a female domain while Vasilios Makrakis (1993) recorded a “we can - I can’t” tendency for females to hold positive attitudes concerning ability with computers for women in general while holding negative attitudes for themselves personally.

The paper proceeds through a discussion of the research process, followed by an analysis of the students’ ideas and feelings on work in a large computer company and concludes with suggestions for addressing some of the issues which arise from the research.

Research Process

A group of 34 students in a Year 9 (approximately 14 years old) Computer Studies class were asked by their class teacher to respond in writing to the following information:

Imagine that you have finished school and got your degree. You have been lucky enough to get a job with a large computer company. Describe this job and what you expect to be doing. Describe how you feel about this job.

The students were told that their participation was voluntary although it is acknowledged that the power structure in a Year 9 classroom removes much of the element of free choice. They were also told the information they provided would be used by a university researcher who was studying young people’s attitudes to work with computers.

The students were from a Brisbane southside catholic co-educational college. The school is in a middle class suburb and attract students across socio-economic strata, academic abilities and ethnic origins. Computer Studies was an elective subject but some students were placed in this class because of administrative difficulties rather than by choice. Students had worked with introductory computer applications and the computer language Logo.

The students’ writings were analysed using an ‘open coding’ procedure as described by Anselm Strauss and Juliet Corbin (1990). The categories used in the analysis were indicated by the original statement supplied to the students, that is ‘describe this job’, ‘what you expect to be doing’ and ‘how you feel about this job’.

Young people’s ideas on work in a large computer company

In the boxes below are two of the more articulate responses to the research exercise.

A girl’s response:

The job would essentially involve working with computers in some way. Although just because your working for a computer company doesn’t really mean you have to work directly with computers. For example you could be a salesperson or a secretary. These jobs don’t directly involve computers. In my opinion the above statement to me is a degree done in Computer Science or Programming and would entail working with computers on a daily basis. I think that the job would be very routine. Because you would be doing almost the exact same thing every day.

Working directly with computers would to me be boring and would have no challenge. Although a career that I may choose could have computer involvement. I think that working with computers could have its advantages. I think one of the advantages would be that almost where ever you look in the employment sector computers are involved. A career such as forensic science works with computers but involves more than just computer knowledge. A job such as a computer programmer or any similar job would not be my preferred vocation.

A boy’s response:

My job would be designing new computer games. I would not be doing any programming. I would just thinking up new ideas for games new concepts and the virtual outline of what will happen in the game. Also after the game has been programmed and so forth I would test them by playing them to make sure they are right. I will be design games for arcades, PC and sometimes for games machines such as Sega and Nintendo.

I feel it is an easy job that does not include much hands on work with computers or actually programming. I think I need a good imagination to dream up new games considering how hard it is to get jobs these days. I think I am lucky to get such a decent job. I am happy to be doing a job where the end product is going to make someone very happy. The best thing is the pay.

Describe this job

The jobs described by the students were grouped under hardware related, software related and ancillary. The research statement constrained the students to describe the job which they had been ‘lucky’ enough to get with a ‘large computer company’. Students are used to writing imagination exercises such as ‘A day in the life of a pencil’ so for many students this was probably a similar exercise and therefore no indication of whether they were considering this job at all. What it probably shows however, is some indication of the types of jobs they thought would be available in a large computer company. Most students didn’t actually specify a particular job but described the
tasks that they would be undertaking. However some of the hardware related jobs mentioned included Computer Engineer, Electronic Engineer, Analyst, Installer and Repairer. The software related jobs specified were almost exclusively that of Programmer although one male detailed "artificial intelligence software, program engineering and program compiling". It is to be hoped that his programming skills are not commensurate with his spelling skills! Among the ancillary jobs were Secretary, Accountant, Sales person, Manager and Forensic Scientist. The jobs were gender divided to a limited extent. Only girls mentioned Secretary, only boys mentioned Sales or Electronics however Programmer was mentioned by both boys and girls in proportion to the gender ratio of the class. The Computer Engineer was a girl as was the budding Forensic Scientist. The Electronic Engineer was a boy, as was the Analyst.

Valerie Clarke (1989) reflects similar findings for some of these occupations. For the occupation ‘Computer Salesperson’ she records a strong male sex-typed response with males being more emphatic in this sex-typing than females. For the occupation ‘Computer Programmer’ she records only a slight male sex-typing with marginally more females than males holding this view. Clarke does not specifically record sex-typing attitudes to Computer Engineer but for the similar occupations of Industrial Engineer and Electrician she records the highest male sex-typing of all the occupations in her study, with females being more emphatic in this sex-typing than males.

**What you expect to be doing**

Students’ anticipated actions were more clearly gender divided both in what actions were mentioned by the genders and in the way the action was described. For example both girls and boys mentioned ‘typing’. However, girls saw themselves in fairly passive roles like “Sit down at a desk with a computer in front of you and just type out some data stuff” whereas when boys saw themselves typing it had a creative tone such as “Typing stuff into computers. Thinking of new things to put into computers” or to do with typing computer programs, for example “I suppose you would sit and type and programme (sic) computers”.

‘Data entry’ was an action that was particularly relevant to girls. For example “I will be expected to keep information about the other employees of the company. Like their address, phone number, date of birth etc and ‘I’ll have to key into the computers all kinds of things like:- the restaurant’s takings and expenses, the room service’s changes to menu’”. Jo Shuchat Sanders and Antonia Stone (1986) note that “The one computer job in which women are well represented is that of word processing secretary, a relatively low-status and low-paying occupation”. Valerie Clarke (1989) in her survey of sex-typed occupations records “data entry operator” as an occupation perceived by both males and females to be “more suited to females”, with males being decidedly more emphatic in this sex-typing than females.

The notion that computer work involved ‘sitting at desks’ was recorded much more frequently by boys than girls and usually to explain why they wouldn’t like the job. For example “the problem would be that you might be stuck behind a desk all day” or “I would expect to be doing is sitting behind a desk all day with programs stuffed into my face”. Durndell and Lightbody (1993) recorded similarly: “The student perception is still of a computer specialist hunched over their terminal all day having little contact with human beings”.

The more sociable possibilities of computer work such as ‘meeting people’ and ‘travelling’ seemed to be just as important to boys and girls. Actions which can be defined as ‘helping others’ are also, perhaps surprisingly, described by both girls and boys. For example a boy who was going to design computer games says “I am happy to be doing a job were the end product is going to make someone very happy”.

Proportionately twice as many boys as girls included some reference to ‘game playing’ in their response. Examples include “I would like to design my own computer game” and “my job would be designing new computer games” by boys and “I could even program computer games like Atari, Lynx, Nintendo and Sega. Maybe even try to play them to see if they work properly (or does someone else do that)” and “Making games people will play and like .... Anyone would love to have people play your game” by girls. The activity described by both boys and girls is similar but boys are very definite and very ‘I’ centred. In contrast the first girl, in using ‘even’ twice, seemed to be suggesting that such activity would be pushing the bounds of probable activity and when she thinks she might also test them she expresses doubt by asking if that would be someone else’s job. This contrasts with the second boy quoted above who is quite clear what his job entails “I would not be doing any programming. I would just be thinking up new ideas for games... also after the game has been programmed and so forth I would test them by playing them to make sure they are right”.

Actions like ‘designing’, ‘building’, ‘fixing’ and ‘testing’ were mentioned far more frequently by boys than girls. Only boys wrote about designing hardware for example and it was predominantly boys who saw themselves designing software, particularly software that had to do with computer games. Boys were particularly involved with making things ‘better’ or ‘faster’ or ‘perfect’. Both girls and boys wrote about building computers but boys tended to be more technical about their building, so they were “assembling computer parts” and “wiring and hooking up the hard drive and other things in a computer” or putting “together one of the best computers out in the shops”. Again the use of the superlative. Two girls saw themselves as fixing computers but it seemed to relate to fixing software whereas boys were “fixing and putting in hardware” and “training to use computers and how to fix them and how they work”. Only boys wrote about testing as an action and then it mostly related to testing games.

**How you feel about this job**

Some students were clearly positive about their job with the large computer company while others were clearly negative and some were ambivalent. The gender ratios for these feelings is shown in Figure 1. It can be
seen from this figure that boys expressed very positive feelings whereas girls were more evenly spread across the three categories. It can also be seen that girls were far more negative in their feelings than were boys. This reflects the findings of Arch and Cummins (1989) that females’ more negative feelings were retained, and indeed exacerbated, after a structured introduction to computers at tertiary level.

A range of positive feelings were expressed. ‘Control’, ‘challenge’ and ‘enjoyment’ were feelings expressed disproportionately by girls. Examples of these positive feelings included: “I would expect to be doing work that was fun but needs plenty of time and effort put into it”; “I think this job is interesting and chulgening (sic)” and “I think I will enjoy this job because I will meet lots of new people”.

‘Job opportunity’, ‘fun’ and ‘skill acquisitions’ were expressed in approximate proportion to the gender balance of the participants. A girl wrote “I think one of the advantages would be that almost wherever you look in the employment sector computers are involved” and a boy who thought his work would be ‘fun’ wrote “I think most computer jobs would be fun because you can muck around with them”. Positive feelings that related to skill acquisition included “I will be using the computer a lot which will be increasing my knowledge of the computers”.

‘Feel good’, ‘love’, ‘hours’, ‘easy work’, ‘chance of success’, ‘work place’, ‘interest’ and ‘pay’ were expressed disproportionately by boys. Examples are “A job like this would give you a really good feeling about yourself” and “I think it would be the perfect job seeing how I love to work with computers by making my dreams into reality. The ‘boss’ seemed important to boys, for example “my boss has a great personality” and “I expect a good working space and a nice boss”. Pay was the most frequently expressed, and the most differentially gendered positive feeling. Examples included: “The best thing is the pay”, “this will get me rich”, “the company pays great wages”. There was clearly a perception by the boys that work with a large computer company was well paid.

The range of negative feelings were also expressed. The negative feelings ‘boring’, ‘hate’, ‘long hours’, ‘lack interest’ and ‘stress’ were expressed disproportionately by girls. ‘Boring’ seems to be a word in frequent use in the teenage vocabulary and they used it ready in relation to working in a large computer company. One boy wrote “I hate working with computers because, they are so boring”. The use of the present rather than the future tense could possibly reflect present school experiences with computers. For example, one student who seemed to be transferring his ‘hate’ of his present experience to any future work wrote “If I had work in a computer (sic) company I would hate it totally because this subject isn’t the way I lead my life”. The negative feelings ‘lack challenge’, ‘health’ and ‘frustration’ were mentioned only by boys.

The responses considered to reflect ambivalence about work in a large computer company all revolved around an awareness that work would be difficult to attain. For example “I guess it would be better than nothing” and “Considering how hard it is nowadays to get a job, I would have to be pretty grateful that I landed this job” and another “I know I should be grateful for having a job in this time of depression when so many people are on the dole (sic)”. These comments probably reflect the economic realities of their families and are instructive when considering interventions in the gendered interest in work in the information technology industry.

**Conclusion**

This research constrained students to writing about work in a large computer company and made no attempt to uncover their knowledge of computer related work in general. On this basis, students expressed a reasonable knowledge of the types of jobs available in this industry. This knowledge showed very little gender differentiation. When asked to describe what they would be doing much greater gender differentiation became apparent as did fairly limited knowledge of what was entailed in work in this industry. Many of the comments seemed to reflect an understanding of the industry based on their school experiences with computers.

Students’ feelings about their work in a large computer company were clearly gender differentiated with boys being far more positive than girls. However specific feelings attracted girls and boys differentially. Of particular note is the large number of boys expressing positive feelings about the perceived pay advantage of the work. The large number of boys and girls who considered that such work would be ‘boring’ and probably by inference that their school experience with computers was ‘boring’ is of considerable concern.

This research leads to some suggestions regarding possible school based interventions to improve the gender imbalance in computer related work. These could include improving students’ knowledge of what sort of things people who work in the industry actually do. Industry visits which emphasise the specifics of what particular positions involve rather than ‘gee-whiz’ ones which emphasise the role of the computer; work shadow days where students shadow a particular employee for a day and then have opportunity to discuss this experience with other students; school visitors who talk specifically about what is entailed in a particular position; and specifically designed videos such as Real Girls Use Computers (VUT) and Girls, have you considered computing? (Clarke and Teague, 1992) might all be useful strategies.
Changes in attitudes also seem to be indicated from this research. Particular attention needs to be paid to students' school experiences with computers, particularly in student bodies where a large proportion of the students do not have home computers. This research also suggests that it is important to understand the gender differences in specific feelings about work with computers. It is clear that the attraction of good pay is not important for girls. Therefore, educational strategies designed to attract girls to the computer industry which emphasise the financial rewards of the occupation, are unlikely to be effective. It is also clear that attention needs to be paid to changing the students' perceptions that work in the computer industry is 'boring'. It is important to realise that the participants in this study mostly elected to do this computer studies subject. If their attitudes reflect a high level of boredom it is likely to be exacerbated in the total student body.

Finally, it is probably instructive when designing any intervention to note the research of Leslie Francis (1994) who finds no gender difference for 'Computer Liking' in the tertiary students in Wales and warns that "the expectation of such gender differences in computer-related attitudes cannot be uncritically generalised to all populations". Therefore it is recommended that any teacher considering intervention first ascertain the existence of gender differences in the particular population for which the intervention is intended. The type of small group research described in this article could provide an appropriate methodology for this purpose.

REFERENCES


Clarke, Val and Teague, Joy (1992). Girls, have you considered computers?. Geelongs: Deakin Uni. [video]


VUT Real Girls Use Computers. [video]