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N. F. Johnson
University of Wollongong, nicolaj@uow.edu.au

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"Boys and girls are the same": gender perceptions in using computers in the classroom.

Author: Nicola F. Johnson

Affiliation: Deakin University, Australia

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ABSTRACT

The New Zealand government has increasingly promoted computer use within schools, through policy, and through the provision of computers and professional development, amongst other initiatives. These trends seen in New Zealand are similar to those seen in other developed countries. Differences have been reported in girls' and boys' attitudes towards, experience with, amount of use, type of use, and interest in computers. The research reported here examined two senior primary school classrooms for evidence of these previously documented gender differences.

This empirical study found few differences between girls' and boys' use of computers; however, perceptions of computer expertise were gendered. Although, overall, students reported that neither gender was better at using computers, those students considered to be the computer experts within each class were boys.

Keywords: gender; computer; perception; expert

INTRODUCTION

Dominant discourses that construct technological progress still appear to be gendered, supporting a view of white, middle-class, educated, well-paid males as the typical user of computer-based technologies (Huber & Ward Schofield, 1998; Sofia, 1998; Weinstein, 1998). In 2003, I conducted an exploratory study of two senior primary classrooms as part of the requirements for my Masters thesis. Naturalistic classroom observations and a student questionnaire were used to explore both classroom practice with computers and students' perceptions and opinions. I found that previously reported differences between how girls and boys used computers were not evident in the two New Zealand classrooms observed. Nor were differences identified in their beliefs about, and attitudes towards, computers. By this I mean, the amount of use and the type of use of computers were very similar. This paper describes the study, and some of its outcomes, and suggests the need to ask different questions regarding issues of equality in the classroom.

Previous Research

In recent years, there have been many studies that have reported differences between boys' and girls' practice with and attitudes towards computers. The following points give examples about what has been reported about this field of practice regarding computers and gender.

Males view the computer as something to be mastered (Morritt, 1997; Turkle, 1988), whereas females predominantly use the computer as a tool, for a purpose, or to complete a task, and wish to view the computer as something they are comfortable with (Morritt, 1997; Turkle, 1988; Turkle & Papert, 1992; Wylie, 1995).

Boys have more computing experiences than do girls, both in terms of quantity and variety (Aman, 1992; Gaines, Johnson & King, 1996; Potter, 1996), and have greater access to school computers (Greenhill, 1998; Healy, 1998; Morritt, 1997; Potter, 1996; Spender, 1995). It has been reported that parents are more likely to buy home computers for boys than for girls (Spender, 1995; Swanson, 1998). In addition, males are more positive about their own personal experiences with computers than females (Busch, 1997; Kadijevich, 2000; Mitra, Lenzmeier, Steffensmeier, Avon, Qu, & Hazen, 2000; Sherman, End, Kraan, Martin, Cole, & Gardner, 1998).

Computer use has been associated with male geeks and techno-wizards – identity types that are unattractive to females (Morritt, 1997; Turkle, 1988). As females are surrounded by consumerism, advertising, and popular culture, which advocate females to be attractive to males (Bartky, 1990), very few females desire to achieve 'geek' status (Chandler-Olcott & Mahar, 2003; Turkle, 1984; Woodfield, 2000). Martin (1992) and Clarke (1992) argued that the world of computing, and the design of educational software, computer games, and computer science curriculum is designed from a male perspective (Huff, Fleming & Cooper, 1992; Edwards, 1992). Inkpen (1997) and Wegerif and Scrimshaw (1997) claimed that gender-based expectations are also reflected in the designs of interfaces and presentation.

Research findings suggest males and females approach computers differently, but much of this research is dated from the 1980s or 1990s. When I began this study in 2003, I wondered whether these previously reported gender differences had changed over the past decade, especially because of the prevalence of digital media found within society, and because the use of computers has moved from being a specialist tool towards commonplace usage.

METHODOLOGY

One of the objectives was to determine whether gender differences observed and reported in the 1980s and 1990s were apparent in a 2003 classroom context. To meet this aim, I sought to answer the following research questions:

- What differences and similarities are there between girls and boys in the amount and type of computer use?
- How do males and females interact with each other, and with their teacher, in the classroom when computers are being used?

A series of observations were conducted in two senior primary classrooms; these observations were explorative and naturalistic in their approach.

The Participants

The participants were 9 –13 year olds in two classrooms in two different schools and their female teachers (one for each class). There were twenty-eight children that participated in the research study from the School A classroom (fourteen boys and fourteen girls, year 7 and 8) and twenty-two children that participated in the research study from the School B classroom (eleven boys and eleven girls, year 5 and 6). The two schools that I selected were chosen because they were comparable, i.e. similar, being full primary schools (years 0 – 8) with the same decile ranking of socio-economic status.

I conducted fourteen naturalistic classroom observations (seven in each classroom), seeking to capture the micro-culture of each classroom through being a detached observer. I recorded

details regarding the social relations of gender between male and female students, groups of same sex students, and between students and their teacher. These observations were made specifically in relation to computer use. I recorded what girls and boys said to each other and to the teacher, how they and the teacher interacted with the computer, and what they said to others about the computer. Observations did not exclusively focus on interactions with computers. If computers were not used, observations were still recorded. My observations were therefore exploratory in nature. In the observations, I focused on two areas, one regarding Peter Twining's (2002) computer practice framework (CPF) which I used to code the focus and types of computer use, and two, regarding the types of talk, based on work completed by Wegerif and Scrimshaw (1997). I also used a type of content analysis on each observation record, whereby I tallied and coded each type of comment and interaction that was recorded.

Questionnaire

A questionnaire was administered to those students willing to participate (see Appendix A). These questionnaires were collated and categorized according to gender and school. The questionnaire focused on students' perceptions and attitudes towards computers at school and at home. The questionnaire asked what they liked and disliked about working on computers, the type of work they liked or disliked, and the perception of gender ability in using computers. The questionnaire also asked about the perceived practical difficulties and positive aspects of using computers both at school and at home. Items on the questionnaire were generated from a desire to confirm or dispute findings in literature, and explore issues in more detail that could not be determined from my observations.

The empirical study focused on two co-educational classrooms and their teachers within two schools. From twenty-one hours of observations and from questionnaire results of thirty respondents, the findings are relevant only to these contexts but will be discussed with reference to findings already found in published literature. The findings described below cannot be generalised and applied beyond the sample and its' context.

RESULTS AND DISCUSSION

The main findings of the research were that male students in both classrooms were considered the computer experts, but most students perceived that neither gender was better at using the computer. This finding seemed to be peculiar, because if males are the computer 'experts', then does not this mean males are better at using computers? These findings are discussed below, but first contextual information about the two classrooms is given.

Classroom Contexts for Schools A and B

The following information presents a snapshot of the 'goings on' in the School A classroom in relation to computer use.

The type of computer use between genders was similar – it depended on which tasks the teacher had set, and who was scheduled to be using the computers. School A had many tasks that were compulsorily to be done on the computer. The class had two desktop computers, which were always being used by individuals. For some tasks, additional laptop computers and one additional desktop computer were brought in to the classroom, but there were never enough for every individual student to have sole use. Some children shared the time on the computers, in a collaborative approach, still doing individual work, but taking turns. In School A, children asked

the teacher for technical help, but usually when they had already asked the official student computer 'expert' of the day, or another person deemed to be an expert. This computer 'expert' was always observed to be a boy.

Drafts and/or plans were rarely used before going to work on computers. Sometimes whole drafts would be completed on the computer, and then deleted, through a technical fault or because the child wanted to start again.

Two main computer tasks were observed in this classroom: the construction of a website titled "About Me", and the design of an animated superhero.

The following information presents a snapshot of the 'goings on' in the School B classroom in relation to computer use.

During some observations, the computers were not used. A computer with a large monitor (between approximately 29 – 32 inches diagonally) was situated beside the whiteboard near the front of the room, and a personal laptop for the teacher was placed in the office section of the classroom (children were permitted to use it at times). Beside the classroom was a 'computer suite' with three desktop computers, shared with the neighbouring classroom. If computers were unavailable in this 'computer suite', children would write their names up on the whiteboard and also write where they were going within the school to see if a computer was available there. I did not observe this use of computers in other areas of the school (I stayed in the same class). The software used was *Microsoft PowerPoint*, except for one case where a boy was using a programme for remedial English, alongside the teacher aide. I recorded more instances of boys using computers (sixteen times) than girls using computers (eleven times) within this classroom. From my observations, word processing was the only task children used computers for in this classroom.

In School B, some tasks were optional and some children chose to complete their work on the computer (others using pen and paper). Some tasks were to be compulsorily completed on a computer. No other practices, common or dissimilar, were identified in regard to gender. I found the predominant structures for lessons were in groups, in the forms of discussions, or tasks. Tasks completed through word processing were related to the essential learning areas of English, Health, and Social Studies. Some tasks were completed as individuals, and some of those tasks could be optionally completed on paper or published using a computer. The teacher sometimes used the class computer with the TV monitor screen as a teaching aide. At no stage were extra laptops or desktop computers brought into the class. School B did not have any official experts and if children needed help on the computer, they would ask another student who was close by, or ask the teacher to help them.

Observations about experts

The expert role observed in School A was a structure set up in the classroom to help those who were not as confident with using computers. The confident, skilled children, in their role as experts, were asked to help out those in need. However in School A, boys dominated the use of the mouse, usually in their role as expert. During each observation, the teacher delegated a child as the expert for those using the computers. The criterion for selecting these experts was not known, though I understood that the 'experts' would take turns. When students needed help with their computer, they put a plastic 'helping hand' on top of the computer screen and this signified to the expert that s/he was needed. There were four boys whom I observed in the expert role. In

the first interview by e-mail, the teacher named three of these same boys and another girl as her computer experts in the class. I did not see the girl operating in this role during my observations.

In their role as 'experts', the boys were observed to take over the mouse when they were asked for help, and also when they were equal participants within a mixed group, i.e. when the expert role was not allocated to them.

If girls needed help with the computer, they generally asked a boy for help. It was observed that a boy took over the use of a mouse from a girl thirteen times. A boy took over the use of a mouse from another boy seven times. I did not observe a girl taking over the use of a mouse from anyone, but I did observe girls asking other girls to use the computer to do a task, either for them, or because they were taking turns. The teacher in School A took over the use of the mouse from children seven times. I wondered whether this was a practice that existed in the class because the teacher herself modelled this behaviour in giving help to children. Perhaps this was one reason for the boys' domination of the mouse. Because some boys dominated the use of the mouse, they also dominated the workings of the computer. What can be done to ensure boys do not take over from other boys or girls who are less confident about their computing abilities? I think there needs to be encouragement from teachers and those employed in technical roles within schools, that if a child is struggling, an expert (whether student or adult) should not take over and 'fix it' for them, but that the experts should explain how to fix it, so that the child learns to manipulate the computer's functions and become more comfortable with its workings in trying to solve problems. This may increase technological 'know-how' and aptitude.

Themes from the Questionnaire

In this section, I briefly summarize the findings of the questionnaire, focusing on specific areas of interest regarding gendered perceptions of expertise in using computers, in comparison to the findings stated previously, which found no difference in type of use.

In regard to home use, playing games was reported to be the most common use of home computers, but only just ahead of 'doing schoolwork' and 'going on the Internet'. No significant gender differences in preference were observed. In comparison between gender, boys mainly used home computers to play games, whereas girls' answers were more evenly spread amongst three categories (playing games, doing schoolwork, and going on the Internet). The type and amount of Internet use was not specified. These results were not statistically significant, but suggest that the type of computer use between genders was similar.

The girls valued computers more than boys, with more female respondents stating that computers were 'very important' to them. Four boys stated computers weren't important at all, which is a stark contrast to the fact that no females chose that option. This is a direct contrast to Lawrence's (1984) observation that "Many girls seem unaware of the likely impact of computers on their lives, and in fact often have a most unrealistic view of the likely pattern of their lives in general" (p. 14). If one viewed these results from a gender role socialisation perspective, the results of this study suggest that the usefulness of computers are being emphasised by parents and educators, and that this is happening within the homes and schools of these girls. This leads one to question whether having a female teacher affects female students' perceptions of their computing abilities, and is it dependent on the teacher's level of computer competency and confidence that she models? It appears that in order to answer this question another study would need to be conducted with male teachers and their co-ed classroom, in comparison with female

teachers. From their study of 30 Canadian schools, Jenson and Brushwood Rose (2003) found that female teachers were not considered to be technology users despite their actual level of expertise. This could lead to the perpetuation of minimal involvement of females in technological fields.

Table 1 displays some of the questionnaire results, which presents a contradiction in children's' perceptions.

	Boys	**Girls**	**Total**
Number of completed questionnaires	16	14	30
Gender of those considered experts – "Which students are the computer experts in your class this year?"	45 boys' names were listed	15 girls' names were listed	60 names listed (75% of which were boys)
	Boys	**Girls**	**Same**
"Who is better at using computers? a) boys, b) girls, or c) they are the same."	6	2	22
	Yes	**No**	**Other**
"Do you think girls and boys use computers in the same way?"	12	10	8

Table 1

Within both schools, the questionnaire respondents reported that neither gender was better than the other when using computers, yet most believed boys were the computer experts within each class. This warrants further probing because, as Brosnan (1998) stated, using males as support for females' computer use confirms that males are better at using computers. It appeared to me that these students did not think in binary concepts of gender, but in actuality, were more focused on the aptitude of individuals. Perhaps they had not thought of the possibility that the boys, in general, were better than the girls at using computers or historically, had dominated computer use in the past (Adams, 1996; Herring, 1996; Huber & Ward Schofield, 1998; Ryba & Selby, 1994; Webster, 1996). Some respondents believed that if the teacher set the class work to do on a computer, then both genders would use the computer the same way because they were doing the same work.

It would be interesting to ask participants which gender was better at using specific applications, such as *Microsoft Word, Flash 5*, etc., or to ask about different functions such as saving files, typing, creating art, or playing games, etc., because then I assume, one would gauge the details of these perceptions of ability and what criteria it was dependent on.

So what don't we know?

From these findings, it seems that boys and girls are using computers similarly in regard to amount of time and type of use, but that boys are still dominating school computers in terms of taking over the use of computers from those that are not as confident (Huber & Ward Schofield, 1998; Ryba & Selby, 1994). Other studies have documented the male domination of computer use in leisure (Adams, 1996), online communication (Herring, 1996), and in regard to work (Webster, 1996).

I was surprised in the lack of difference evident between males' and females' use of computers in both classrooms. This lack of difference could be due to my not observing enough instances of computer use (specifically in School B), or to my not interviewing children about their attitudes and motivation when using computers, or it could be that these gender differences were not present. As some literature, admittedly dated, documented differences between male and female use of computers across a wide range of methodologies (e.g. Busch, 1997; Kadijevich, 2000; Mitra et al., 2000; Morritt, 1997; Sherman et al., 1998) I assumed that there would be differences in use, but there were none that I could determine.

It seems that most of the respondents believe there is no difference between genders in computer use, that is, one gender being better than the other. According to the literature on male and female computer use (e.g. Busch, 1997; Kadijevich, 2000; Martin & Murchie-Beyma, 1992; Mitra et al., 2000; Morritt, 1997; Sherman et al., 1998; Sofia, 1993; Spender, 1995), girls and boys use the computer differently. This was not evident within the two observed classrooms, or from the questionnaire results on home computer use. Earlier research reported that attitudes towards computers were different between genders (Busch, 1997; Kadijevich, 2000; Kay, 1992; Mitra et al., 2000; Sherman et al., 1998). I found that females were generally more positive than males about computer use in their everyday lives. This contradicts literature that expounds that males are more positive and have higher levels of self-efficacy when using computers (Busch, 1997; Morritt, 1997). Further research needs to concern itself with asking whether these research findings are indicative of current day New Zealand. We should ask alternative questions that will enlighten us as to where our children are at in New Zealand primary school classrooms:

- Why do these males and females think that neither gender is better at using computers, yet identify male students as experts in the class?
- If both genders are the same at using computers, should there not be an even spread of expertise amongst both genders?
- If teacher-directed work were the same for both males and females, would this not influence the perception that both genders use the computer in the same way when completing the same tasks?
- What functions of computer use are males perceived to be experts compared to areas that are deemed to be areas of female expertise (E.g. games, typing, creating, saving files, using accessories (scanners, digital cameras, etc)? Why? By whom? And what are the impacts of these perceptions?
- Is it just a coincidence that the computer experts that were used were all boys? Using males to support technological endeavours confirms that they are perceived as more adept at these specific operations (Brosnan, 1998). What can be done to challenge this

gendered stereotype? Research conducted ten years ago also found that boys were perceived as the computer experts (see Ryba & Selby, 1994). Why has this not changed?

- Why do teachers ask male 'experts' (other students and other teachers) to 'fix' the computer? What messages are sent to students? As Jenson and Brushwood Rose (2003) argued, female teachers are not imagined to be technology users regardless of their actual expertise.
- Are students ignoring the gender binary associated with this area, in that they give credit to those who are experts because they are experienced and because they have confidence to solve technical problems? Or, are students in fact ignorant of the gendered discourse that stereotypes male users as dominant computer users (Ryba & Selby, 1994) and females as passive computer users (Stepuvelage, 2001), who prefer a collaborative rather than competitive approach (Wegerif & Scrimshaw, 1997)? Do students need to be educated about the hegemonic discourse that positions some groups of students as subordinate (specifically females in this context), and be provided with tools to subvert this hegemonic discourse?

I believe that further research needs to determine which ways males and females are using computers similarly, and in which ways males and females are using computers differently. While on the surface this study found no gender differences in terms of amount and type of use, it remains inconclusive about the more subtle ways that gender affects and is affected by discourses about computer expertise and use.

Limitations that may have affected the quality of the study include a) my inability to record all verbatim talk going on in the classroom, b) absences of various children at various times, c) possible researcher bias, d) possible researcher error, e) both classes had a student teacher in the room for some weeks, f) only parts of the curriculum programme was observed, that is, not all subjects were observed being taught, g) my observations only occurred in the morning sessions, and h) my presence may have influenced teacher and/or student behaviour.

Ethical issues were addressed through the use of plain language statements and the obtaining of informed consent. Participants were able to decline involvement in the study from whence they were not included in observations. Participants were able to make an informed decision about filling out the questionnaire and were not obliged to complete the questionnaire (the second stage of the research) if their consent had been gained prior for the observations.

CONCLUSION

The findings from my study suggest that perhaps girls are on a par with boys in terms of their self-efficacy, and their comfort with using computers. It seems that the girls in my study had similar types of access, usage, ownership, experience, and efficacy as the boys did. A key finding was that most participants thought, "neither gender was better" at using computers; however, a seeming contradiction is that the computer experts identified in each class were male.

Having technology in classrooms does not mean effective learning is taking place (Bigum, 2002), but students who use technology in the classroom can be empowered in their learning, and for their futures. As we are moving towards a digital culture, which is indeed in our midst, teachers need to prepare students for a technological world. This study suggests that computers are being used more and more by girls and boys alike, because of the perceived importance and

relevance of digital media within society, but it raises questions for future research in the area of gender and technology.

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APPENDIX A - QUESTIONNAIRE

1. Are you a boy or a girl?
2. Are you year 5, 6, 7, or 8?
3. Which students are the computer experts in your class this year? Please write their name/s.
4. How important are computers to you? a) not important, b) important, c) very important, d) something else (please state). Why?
5. What is the best thing about working on computers?
6. What is the worst thing about working on computers?

7. If you had to do some work quickly, would you rather write on paper or use a computer?
8. At school, which activities do you like using computers for?
9. At school, which activities do you NOT like using computers for?
10. What is the most difficult thing about using computers at school?
11. Who is better at using computers? a) boys, b) girls, or c) they are the same.
12. Do you think girls and boys use computers in the same way? Explain your answer.
13. Do you think computers are male or female?
14. Do you have a computer at home that you use?
15. At home, do you use computers mainly to a) play games, b) do school work, c) go on the Internet, d) something else (please state), or e) I don't have a computer at home.