

Gender and information communication technology

Information communications technology is used more and more in education, so much so, that it is becoming a ubiquitous resource for supporting students' learning. Several commentators have, however, raised concerns that socio-economic and cultural factors may mediate access to and use of information communication technology (ICT; e.g. Laboratory of Comparative Human Cognition 1989; Jackson, Ervin, Gardner, & Schmitt 2001a; Littleton & Hoyles 2002). Issues of equality of opportunity and access to information and communications technology may thus arise for a number of different groups, for example those of low socio-economic status and ethnic minorities, creating a number of 'digital divides' with respect to the take-up, or effective use of, ICTs. Gender is thought to be one such digital divide (Cooper & Weaver 2003; Joiner *et al.* 2005). However, recently, there have been a number of commentators who have suggested that the gendered digital divide may be diminishing (Losh 2004) or even disappearing (Stanford Internet Study 2000; UCLA Internet Project 2000, 2001, 2003). The aim of this special issue was thus to examine this issue of the gendered digital divide in the use of computer technology.

The special issue opens with a review article by Joel Cooper, who unequivocally states that that 'There is a dramatic digital divide for gender such that women are not reaping the benefits of the technological revolution on a par with men' (p. 321). This, he suggests, is a 'pernicious and often overlooked wedge' (p. 320) that divides, and is a problem, for modern society. In making the case for a digital divide, Cooper points to manifestations of the divide in terms of gendered patterns of engagement with and ownership of computer technology and he also highlights the persistence of females' computer anxiety over time and across international boundaries. Having presented evidence to suggest that there is a digital divide, Cooper asserts that this divide is 'multiply determined' (p. 322) and goes on to consider factors that may facilitate it. Among the factors discussed are the potentially dele-

terious effects of 'boy-toy' computer software and the consequences of girls making personal attributions for computational failures and attributions of effort and luck for computational success. Cooper also speculates that 'gender stereotypes can have the power of the self-fulfilling prophecy, creating further evidence for the stereotype' (p. 328) and he presents work on stereotype threat, which suggests that the 'mere knowledge of a negative stereotype applying to a person's group can cause that person to perform poorly at a particular task' (p. 329). Towards the end of the paper, Cooper describes an experimental study specifically designed to explore the effect of stereotype threat on girls' performance with computers and this work indicates that 'the mere knowledge of a stereotype that holds that girls are not good at computers causes girls to suffer stress when learning from a computer and leads to decrements in computer performance . . . at least when their identity as females is made salient' (p. 331). The paper culminates with the development of a model for understanding some of the key factors that create the digital divide for gender. Although Cooper acknowledges that 'solving the problem of the gender digital divide will not be easy' (p. x), some specific suggestions for change emerge from the model that he proposes, and he underscores the need to alter stereotypes by attacking the phenomena that support them.

One must, however, continually guard against making simplistic overgeneralisations with respect to gender and computing and the 'digital divide' for, as in Cooper's words, 'social context matters' (p. 324). The importance of understanding students' technological engagements in context is a theme that emerges from the paper by Emma Mercier, Brigid Barron and Kathleen O'Connor. These authors used surveys, drawings and interviews to investigate 10–14-year-olds' perceptions of knowledgeable computer users and their self-perceptions as 'a computer-type person'. Their findings indicate that students' engagement in technology is: 'a complex relationship between

students' experiences, their perceptions about others who are engaged in the field and their personal identity in relation to the field, reiterating the importance of thinking about students' learning ecologies when we consider issues of engagement' (p. 345). The relationship between gender and technology is thus construed as being: 'more complex than a simple divide along gender lines' (p. 344), and their work indicates how research sometimes reveals 'more variation within each gender than between genders in level of engagement and experience' (p. 344).

The need for more nuanced analytic work on the theme of gender and technology is further highlighted in the paper by Linda Price, which examines current trends in women's performance on, access to and experience of online courses. Her analyses demonstrate that in the distance-education context, she investigated 'women studying online are confident, independent learners who may out-perform their male counterparts. They do not have reduced computer and internet access compared to men, nor are they disinclined to enrol on online courses' (p. 357). Interestingly, the women in Price's study attached greater value to the pastoral aspects of tutoring and had different interaction styles from men – something that may have implications for online tutoring support. Such observations lead Price to argue that the gender debate needs to 'move on from access and performance to the differences and similarities in the degree of importance that men and women place on different interaction and tutoring styles online' (p. 358). She therefore proposes a research agenda concerned with 'examining different interaction styles online and whether interactions vary depending on the perceived gender of the recipient' (p. 358).

The challenge of examining gendered interactions online is taken up in two of the contributions in the special issue. Ruth O'Neill and Ann Colley report an experimental investigation of gender and status effects in the kind of e-mails used to manage course administration in a higher educational setting. The undergraduate students participating in the study were asked to respond to an e-mail presented as being from a member of staff, informing them of failure to submit course work and asking for an explanation to be provided. The sex and status of the sender were varied. The data showed both gender and status effects, that suggest the need for further research on staff–student

interactions and of the way in which electronic mail might impact upon them.

Jane Guiller and Alan Durndell discuss findings from an extensive project examining gender, language and computer-mediated communication in the context of undergraduate psychology courses. Their analyses of the students' contributions to asynchronous discussion forums indicate that: 'females were more likely to make attenuated contributions than males and express agreement, whereas males were more likely to make authoritative contributions and express disagreement than females' (p. 368). In light of these findings, the authors suggest that: 'students and staff using online discussion forums should be aware of possible differences in communication style and come to an agreed style of contribution and protocol for use of CMC in undergraduate psychology courses' (p. 379). They also point to the need to: 'help students learn how to use language for the sharing of knowledge, argumentation and the construction of meaning on line' (p. 379).

The issue concludes with a paper by Karen Littleton, Clare Wood and Pav Chera, which investigates the potential of talking books software to support the literacy development of male beginning readers. In this context, these authors highlight the popular misconception between boys, new technologies and remediation, pointing to potentially disadvantaging cultural models that expect all boys to have a natural affinity with computers. Littleton *et al.* argue that we cannot take as 'given' the notion that boys' perceived positive disposition towards computer technology will necessarily mean that such technologies can be readily and unproblematically harnessed to support literacy development. Their work shows that talking books do have the potential to support boys' literacy development but that this potential is realised in different ways depending on the boys' developmental level, with phonological awareness being seen to affect boys' software use. Littleton *et al.* assert that in the current climate of anxiety concerning boys' literacy attainment 'it is vital that we move beyond the notion that computers are 'engaging and 'appeal to boys'' (p. 389), and they highlight the need for 'a more detailed understanding of how specific computer technologies may resource or constrain boys literacy learning interactions and how these interactions are further mediated by individual differences and social context (p. 389).'

Taken together, the papers suggest that the interaction between gender and technology is complex, being mediated by a number of factors such as status and identity. The work presented in this special issue reminds us that technologies inevitably arise in the context of existing social relations and for this reason are highly likely to result in the reproduction of these forms of relationship. Nonetheless, the work presented here also highlights how the same technologies may open up possibilities for the transformation of these social relations. In the case of ICT, it is imperative that we seek out and create the conditions for achieving such a transformation.

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