Gender and cultural differences in Internet use: A study of China and the UK

Nai Li [a], Gill Kirkup [b,*]

[a] *Faculty of Education and Language Studies, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK*
[b] *Institute of Educational Technology, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK*

Abstract

This study investigates differences in use of, and attitudes toward the Internet and computers generally for Chinese and British students, and gender differences in this cross-cultural context. Two hundred and twenty Chinese and 245 British students' responses to a self-report survey questionnaire are discussed. Significant differences were found in Internet experience, attitudes, usage, and self-confidence between Chinese and British students. British students were more likely to use computers for study purposes than Chinese students, but Chinese students were more self-confident about their advanced computer skills. Significant gender differences were also found in both national groups. Men in both countries were more likely than women to use email or 'chat' rooms. Men played more computer games than women; Chinese men being the most active games players. Men in both countries were more self-confident about their computer skills than women, and were more likely to express the opinion that using computers was a male activity and skill than were women. Gender differences were higher in the British group than the Chinese group. The present study illustrates the continued significance of gender in students' attitudes towards, and use of computers, within different cultural contexts.
© 2005 Elsevier Ltd. All rights reserved.

Keywords: Cross-cultural issues; Gender; The Internet; Attitudes; Usage patterns

---

* Corresponding author. Tel.: +44 1908 652412; fax: +44 1908 654173.
  E-mail address: g.e.kirkup@open.ac.uk (G. Kirkup).

1. Introduction

Incorporating information and communication technologies (ICTs), particularly the Internet, into teaching and learning in higher education has become an important issue in both economically developed and rapidly developing countries, and in this research study Britain and China represent such regions. Despite the economic agenda driving the adoption of the Internet, little cross-cultural educational research has been done on its use, although surveys such as those of Pelgrum and Plomp (1991) have assembled comparative data about educational policy and computer use since the early 1990s. Cross-cultural comparisons are needed to give a better understanding of students' use of the Internet in different national cultural backgrounds. The Internet may be a global technology but students work in local/national contexts, and have differences in other aspects of their identities; one of the most important of which is gender identity.

Gender differences in the use of computers have been well documented in the last two decades (Brosnan, 1998; Comber, Colley, Hargreaves, & Dorn, 1997; Durndell, Macleod, & Siann, 1987; Kirkpatrick & Cuban, 1998; Kirkup, 1995; Meredith, Helen, & Woodcock, 1998; Scragg, Smith, & Geneseo, 1998; Shashaani, 1993, 1997). Where researchers have looked for gender differences in the use of computers they have found them. In this research we examine whether, in a selected sample of university students in China and the UK, there were equal opportunities for women and men to use computers and the Internet, and whether the opportunities were taken. Most research on gender differences in use of the Internet has been done in Western countries. But, If gender is a social construct one cannot presume that it will be expressed in the same way everywhere. Therefore studies of gender differences in Internet use in different cultural contexts need to be carried out.

This paper reports research carried out with higher education students studying in China and Britain, which investigated their attitudes towards using computers and the Internet and their Internet usage patterns, to explore what, if any, gender differences were observed between the two countries/cultures. It reports on only one particular aspect of the research: a questionnaire survey carried out with samples of male and female undergraduate students in the 18–23 age group.

2. Background to the research

There has been a great deal of research on gender differences in access to and use of computers and more recently of the Internet. This body of research is too great to be summarised effectively in this paper, but findings seem to suggest certain consistent trends. Despite having generally positive attitudes towards computers, women's attitudes are more negative than those of men, and they have higher computer anxiety than men (Comber et al., 1997; Kirkpatrick & Cuban, 1998). There is abundant evidence that women's use of, and liking for, computer technology is less than that of men (Brosnan, 1998; Collis, 1985; Durndell et al., 1987; Meredith et al., 1998). Even when given equal access to computers, women use them less than men do (Kirkup, 1995; Scragg et al., 1998; Shashaani, 1993, 1997). Research with young adults shows that information technology, as an activity, was found to be male stereotyped. Women are less likely to be attracted to computer courses and to a computer-related career; Durndell and Lightbody's research (1993) suggests that

this phenomenon has not changed during the last decade, although recently women have more access computers technology.

Differences have been reported in attitudes toward Internet searching and Internet usage patterns between women and men; although women and men have little difference in general attitudes toward the Internet. For example, Ford and Miller (1996) suggest that women were more likely to report significantly greater levels of disorientation and disenchantment in relation to the Internet, compared with their male counterparts. A GVU Centre (1998b) survey also indicated that women had more difficulty and were less confident in finding information on the Internet than men. Morahan-Martin (1999) found that women college students went online less frequently, spent less time per session, and used the Internet for fewer purposes than men. Although, surveys (Emarketer, 1999; NetSmart America, 1999; NUA, 1999, 2000) suggest that there is an increasing number of women going online and that the gender gap in Internet use may be narrowing, actual behaviour once online, e.g., sites 'visited' and reasons for searching, we would predict, are still gendered. However, very little of this work on gender and Internet use has been done in 'non-western' cultures.

The increasing use of ICTs in education throughout the world has raised important questions about the relationship between cultures and technologies (Holmes, 1998). Most authors identify the symbiotic relationship of technology (ICTs) and society. Davies (1988), for example, states that 'the *creation of a technology does not occur in a vacuum but instead encompasses social and cultural phenomena*' (p. 163). Layton (1994) also argues that tools and machines reflect the values of the culture in which they are designed.

The origin of the Internet is as an American technology. It has been argued (Chen & Collis, 1999; Chen, Mashhadi, Ang, & Harkrider, 1999; Collis, 1999; Joo, 1999) that ICTs are racially white, Western, male artefacts and that the Internet itself overtly embodies American cultural qualities in terms of its language and technical users' values. These cultural issues have been given attention recently by educators. Collis (1999) argues that culture is a critical factor in influencing people's acceptance and use of Internet-based learning resources.

It is not surprising that American/English makes up 80% of the language of Web sites on the Internet. For example, a CVU centre (1997b) survey indicated that 75% of Internet users use English as their first language. Emarketer (1999) data showed most people agreeing that English is the global 'e-language'. Surveys carried out in non-English countries, for instance in China (CNNIC, 2001), support the criticism that the Internet is too English and too Western. This begs the question whether Chinese students have obstacles to their Internet use in this English-dominated culture. Furthermore, could the Internet be more culture-sensitive? The Internet can deliver learning environments which may restructure the learner's view of the world. Learners who do not share the same cultural backgrounds as the educational designers and programmers (who have been predominantly male, white, and until recently from the West) might be 'culturally dominated' by the technology. Joo (1999) has argued that there is a need to eliminate linguistic and cultural obstacles to the Internet in order to provide all students globally with an equal opportunity to access information and communication through it.

The few examples of cross-cultural studies of people's perceptions of computers that have been done suggest that, in different cultures, people might have different perceptions and uses of computers and the Internet (Allwood & Wang, 1990; Brosnan & Lee, 1998; Makrakis, 1992; Martin, Heller, & Mahmoud, 1992; Omar, 1992). Allwood and Wang (1990) for example, studied the

conceptions of computers held by students in China and Sweden. They found that Chinese students were more optimistic about the effects of computers on society than were Swedish students. Other research (Brosnan & Lee, 1998; Collis & Williams, 1987) also suggests that students' attitudes toward computers and their usage of them were found to be related to certain cultural and background characteristics. Makrakis' study (1992) confirmed that the culture and the society in which people live appears to be of great importance in determining people's attitudes toward computers. However, how far culture influences people's perception of the Internet and their use of it, and how far the Internet impacts on natural and local culture needs further research.

Social experience and attitude formation takes place in widely varying contexts (Berry, Poortinga, Segall, & Dasen, 1992). A considerable body of empirical studies (Allwood & Wang, 1990; Boone, 1997; Brown, Williams, & Brown, 1998; Martin et al., 1992; Omar, 1992; Weil & Rosen, 1995), mainly focused on attitudes to computers, suggests that people in different national cultures hold different attitudes. Omar (1992) investigated college students' attitudes to computers in the United States and Kuwait and found that scores on a Computer Attitude Scale were significantly different between students from the two countries. Students in the United States held more positive attitudes to computers than their Kuwait counterparts. Martin et al. (1992) studied American and Soviet children's attitudes toward computers. They found that children from the two countries had similar positive attitudes to computers, but the type of exposure to computers experienced by the children from the two countries was quite different due to different computer education in the two countries.

The above studies provide empirical evidence that national cultures have an effect on people's attitudes and usage in terms of ICTs. Based on these previous studies, the research reported here hypothesised that Chinese and British students would have different experiences of the Internet, hold different attitudes toward the Internet, have different opinions on how the Internet will affect society and their own lives, and use it themselves differently. The students in these two countries have been educated in different educational systems, live in different political systems, speak different languages, and have different views on the value of ICTs. But how national cultures influence students' use of the Internet needs to be explained theoretically and investigated systematically. It can also be argued that there are two global cultures with respect to the Internet and these are organised by gender. The question remains whether these two cultures exist across all national cultures, or whether there is a different interplay of gender and the Internet in different national contexts. This is the main question addressed by this research, in which the two geographical cultures being compared are China and Britain. It is hypothesised that in a comparison of UK and Chinese undergraduate students there will be both gender and cultural differences in attitudes towards and use of the Internet, and gender differences will remain constant across these cultures.

3. Methodology

3.1. Research instruments

This study developed a semi-structured questionnaire designed to explore students' attitudes toward the Internet and usage in both Chinese and British backgrounds. A portion of the question-

naire consists of statements that have been adopted and modified from previously published questionnaires. All the data reported here are therefore self-report measures.

The questionnaire consisted of four sections: basic demographic information; information on access and use; measures of self-efficacy; and attitude scales.

To assess the extent of students' experience with computers and the Internet, 15 single or multiple-choice format questions were developed. For example, a computer ownership question asked: *Do you have a computer of your own*? The questionnaire also explored whether students had taken any computer-related courses, and how they learned to use computers. They were asked about their experience of the Internet, for example: *When did you first use the Internet? How much time per week do you spend using the Internet for course study and personal interests respectively?*

A computer technology self-assessment scale was included, and questions in this were modified from previous research (Collis & Williams, 1987; Ford & Miller, 1996; Karsten & Roth, 1998; Lazinger et al., 1997; Popovich, Hyde, Zakrajsk, & Blumer, 1987; Ropp, 1999) in order to test participants' computer and Internet knowledge and competence. Previous studies revealed that students' knowledge about computers and the Internet influenced their perception of the Internet and the way they used the Internet for information searching. Ten multiple-choice questions were modified from previous research (Ford & Miller, 1996; Karsten & Roth, 1998; Ropp, 1999), to indicate students' knowledge about ICTs and the Internet. A 23-item measure of computer technologies self-efficacy was developed for the current study. A 6-point Likert scale ranging from strongly disagree to strongly agree was used to assess the participants' confidence in their use of both computers and the Internet. The scale was made up of three main computer technologies self-efficacy constructs: self-efficacy with basic skills; self-efficacy with advanced skills; self-efficacy with file-handling and software skills. Questions such as '*How do you rate your ability to use Windows or Macintosh interfaces*?' and '*How would you rate your ability to use the Internet*?' also assessed their confidence in their own ability to use computers and the Internet. The response options available were: '*awful, not very good, ok, good, very good*'. (Cronbach's α for this scale is 0.83.)

The fourth section measured students' attitudes toward the Internet. This section was made up of three categories of questions on attitudes. There were 27 statements about the Internet, such as '*I enjoy using the Internet*', with a Likert scale ranging from 1 to 6, with '1' indicating 'strong disagreement' and 6 indicating 'strong agreement' (Cronbach's α for this scale is 0.81). Since the statements were positively and negatively worded, the values of the negative statements were reordered before grouping them. Thus, in reporting the results, the higher scores indicate more positive attitudes toward the Internet. There were measures of gender stereotyping for computers and the Internet, using 15 items on a 6-point Likert scale (Cronbach's α for this scale is 0.88). A third section attempted to measure the depth of students' thinking about the Internet and its influence on education through six open-ended questions such as '*How do you think that the Internet will impact on education?*'

The questionnaire was initially constructed in English, and then translated into Chinese. Translation of the instrument was verified by one additional completely bilingual Chinese person living in England. This version was then 'back translated' into English by another bilingual Chinese–British person. The back translations were checked, in collaboration with Chinese colleagues, to ensure that the Chinese version maintained the original meanings and concepts in the original English version. Every attempt was made to provide a Chinese version that was as faithful a representation of the English as possible.

3.2. Participants

The participants for this questionnaire survey consisted of a total of 465 Chinese and British students (220 Chinese and 245 British) aged between 18 and 25. Efforts were made to ensure that participants in the two groups were also matched for subject areas of study. Students who were studying computer science or information technology as main fields of study were excluded, so as to focus attention on non-expert student use.

Chinese participants came from five Chinese universities representative of the general size and academic level of universities in China. Their geographical locations were the south and north part of China respectively. Of the 220 Chinese participants in the study, 110 (50%) were women and 110 (50%) were men. British participants came from six universities, also representative of the different size and academic status of universities in the UK. Of the 245 British participants in the study, 138 (56%) were women and 107 (44%) were men (see Table 1).

3.3. Administration of the questionnaire

The questionnaires were handed out to British subjects by the researcher at beginning of their lectures, and they were asked to fill them in at their leisure and return them to the researcher by post. Chinese students were given the questionnaire during regular class time by the researcher's Chinese colleagues in China and returned by post. Responses to the questionnaire were coded and analysed through the use of the SPSS V10.0 statistical package.

4. Research results

The analysis focused upon the calculation of descriptive statistics and *t*-test statistics to investigate students' differences on the basis of country, and experience of the Internet, attitudes toward the Internet and Internet usage. The internal reliability of the questionnaire was measured by conducting the Cronbach's α test for each individual scale; these are 0.83, 0.81, 0.88, respectively. In this section of the paper, the results of several statistical tests are presented, followed by an extended discussion of their meaning and implications.

Table 1
Participants' background information

	Chinese		British	
	Female	Male	Female	Male
Age group				
18–25	110	110	138	107
Subject				
Social science	82	59	105	29
Science	28	51	33	78

4.1. Internet experience and usage patterns

There was no significant difference at the time of the research in opportunity to access the Internet for the sample when grouped by country. But the British students overall had been using the Internet longer than Chinese students. More than half the Chinese students reported that they had less than 5 years, but more than one year of Internet experience (52.3%). One third of Chinese students (31%) had less than one year, but more than six months of Internet experience. Fifteen percent of Chinese students reported that they had only begun to use the Internet recently and had less than 6 months experience. This compared with 76.7% of British students who had less than 5 years, but more than 1-year experience. In Britain male students had been using the Internet for longer than women, and a statistically significant gender difference was found ($t = 4.309$, df = 243, $p < 0.001$, see Table 2).

However in both Britain and China male respondents used the Internet more frequently than women. When asked about their agreement with a statement 'men spend more time on computers and surfing the Internet than women' only Chinese women recognised this to be the case, and almost 80% of Chinese women agreed that this was true.

When students were asked about general computer use (not only Internet use), only male Chinese students said that they spent more time using computers than women. Chinese male students reported that they spent on average 5–10 h per week, while female Chinese students reported that they spent less than 5 h average per week, a statistically significant difference ($t = 5.510$, df = 218, $p < 0.001$). This difference in use was recognised by the Chinese women. There was no significant gender difference in overall computer use for British students ($t = 1.269$, df = 243, $p = 0.506$). This suggests that women and men were using computers for different purposes. If, in the UK, the time spent overall was the same for both men and women, but men were using the Internet more than women, then women were spending longer on other (non-Internet) computer activities. In China male students used both the computer generally, and the Internet more than women.

In both British and Chinese groups men spent more time using the Internet for personal interests. In the British group the gender difference was greatest ($t = 10.649$, df = 243, $p < 0.001$). This difference was compounded in the British sample by the fact that women said that they were more likely to use the Internet for study purposes and men for 'personal interest' (see Table 3).

Overall, men in both countries reported using email more often than women, and British men most often ($t = 5.1232$. df = 463, $p < 0.001$). Chinese students reported using 'chat rooms' more than British students ($t = 4.368$, df = 463, $p < 0.001$). Male students reported using the Internet more for playing games ($t = 8.784$, df = 463, $p < 0.001$). Chinese men played games most

Table 2
Internet experience by gender

| | Mean | | t |
	Men	Women	
Chinese	2.46 ($n = 110$)	2.36 ($n = 110$)	$t = 0.884$, df = 218, not significant[*]
British	3.01 ($n = 107$)	2.68 ($n = 138$)	$t = 4.309$, df = 243, $p < 0.001$[**]

[*] No significant difference.
[**] $p < 0.001$.

Table 3
Frequency of Internet use by gender

	British students			Chinese students		
	Male (Mean)	Female (Mean)	t	Male (Mean)	Female (Mean)	t
Overall use	5.50	5.28	$t = 3.421$, df = 243, $p < 0.001$[**]	3.50	3.11	$t = 2.544$, df = 218, $p < 0.001$[**]
For studying	4.87	4.36	$t = 6.211$, df = 243, $p < 0.001$[**]	2.70	2.90	$t = 0.211$, df = 218, not significant[*]
For personal interests	5.39	5.10	$t = 10.649$, df = 243, $p < 0.001$[**]	4.27	3.41	$t = 8.317$, df = 218, $p < 0.001$[**]

[*] No significant difference.
[**] $p < 0.001$.

frequently of all of the groups, while Chinese women played least frequently. British students, and male students, browsed for personal information more often than Chinese, or women students ($t = 6.881$, df = 463, $p < 0.001$; $t = 8.784$, df = 463, $p < 0.001$). British students browsed for research and study more than Chinese students ($t = 5, 241$, df = 463, $p < 0.001$) but the British women browsed for this purpose more than British men ($t = 4.638$, df = 243, $p < 0.001$).

4.2. Internet confidence and skills

Students were asked about their confidence in using the Internet for various activities. Men tended to report greater confidence in using the Internet. In both national samples men reported themselves more confident in knowing how to use search engines to find information, more confident in downloading materials from the Internet, and more confident about keeping records of websites accessed (see Table 4). Although, in response to a more general question about their ability to the use the Internet, it was only in the British sample that men were significantly more con-

Table 4
Internet skills self-assessment by gender

	British students			Chinese students		
	Male (Mean)	Female (Mean)	t	Male (Mean)	Female (Mean)	t
Send an email	5.50	5.28	0.487[*]	5.39	5.22	0.632[*]
Use a search engine to find information	4.87	4.36	3.613[**]	4.74	4.25	3.846[**]
Create my own Web pages	3.45	2.11	6.579[**]	4.13	3.86	1.063[*]
Keep records of websites	4.90	3.57	7.950[**]	4.80	3.65	5.975[**]
Understanding navigation buttons and keys	5.39	5.30	0.386[*]	5.36	5.27	1.498[*]

[*] No significant difference.
[**] $p < 0.001$.

fident than women ($t = 5.038$, df = 243, $p < 0.001$). In both national groups women were significantly more likely to report that they 'got lost' when searching the Internet. In both groups men were significantly more likely to feel that the Internet was useful ($t = 6.121$, df = 243, $p < 0.001$)

4.3. Attitudes toward the Internet

The questionnaire asked students about their attitudes toward the Internet, and the results showed some significant national cultural and gender differences. In general, all the students agreed with the statement that the Internet is a useful source of information. They all reported that they enjoyed using the Internet, however, men students showed stronger positive attitudes than women ($t = 5.692$, df = 463, $p < 0.001$). Women tended to hold less gender stereotyped attitudes about the relationship between computers and the Internet than did men. They, more than men, felt that women were as skilled as men in using the Internet ($t = 4.820$, df = 463, $p < 0.001$), and that the Internet was *not* male dominated ($t = 6.373$, df = 463, $p < 0.001$). Men on the other hand were more likely to believe that men in general were better at using the Internet than women ($t = 4.833$, df = 463, $p < 0.001$), and that computer science was a more suitable job for men ($t = 10.857$, df = 463, $p < 0.001$). A significant effect was found for cultural background in the way women regarded computing activities and using the Internet. For example, Chinese women agreed that men enjoyed playing computer games more than women, but British women did not. Chinese women suggested that men spent more time surfing the Internet than women, while British women did not.

4.4. Issues of national culture and Internet use

It is no surprise that most British students (91%) reported that they only looked at English language websites, because most websites are English language and American dominated (89%). Most Chinese students (72%) not only looked at Chinese sites but also visited English language websites. Language sometimes caused difficulties for Chinese students using the Internet. For instance, some mentioned that they did not like using the Internet just because there were too many English language sites, and their English was not good. Chinese students were more likely to feel that that the Internet was not very good for cross-cultural exchange because of its linguistic and cultural barriers.

5. Discussion and conclusions

5.1. Internet use and national cultural context

This study showed that Chinese and British students had differences in their prior experience of computers and the Internet and in the availability of Internet access. These differences are directly attributable to the different stages of technology adoption in the two countries. China is a rapidly developing area of the world with respect to a range of technologies. ICTs were still very new at the time of the research, and most Chinese educational settings had only started to use computers

in the middle of the 1990s. It is not surprising therefore that Chinese students in the study had less prior experience of computers and the Internet, were less likely own computers, or have good Internet access in their living accommodation, compared to their British counterparts.

However, Chinese students did not report less confidence than British students in their ability to use computers and the Internet. On the contrary, Chinese students were more confident about advanced computer skills such as using computer programming languages and knowledge of computer architecture, while British students had more confidence in using applications, such as a word-processing and presentation packages. These results can be explained by differences in the computer education of the two countries. In China, university students must attend a computer literacy course that covers the basic principles of computers such as computer architecture, and computer-programming languages. Students are required to master at least one programming language such as 'BASIC' or 'C' to pass the National Computer Skills Grades Examination. However, the use of applications was neglected in Chinese computer education in the 1990s. On the other hand, British students had a basic training in computer applications such as word-processing during their school or university education. Knowledge of programming is not required in the UK for non-computer-science students. These results challenged some of the assumptions of previous research (Campbell & McCabe, 1984; Murphy, Coover, & Owen, 1989; Torkzadeh & Koufteros, 1994; Torkzadeh, Pflughoeft, & Hall, 1999; Zhang & Espinoza, 1998) based only on Western subjects: that students with less prior experience of computers are less confident in their knowledge of computers. It also indicates that some training in advanced computer knowledge or programming skills may help enhance students' confidence with ICTs overall.

Differences between Chinese and British students' Internet usage patterns were found in the study. Both Chinese and British students reported that they used the Internet for study and personal interests, but Chinese students used the Internet for mainly personal interests, and British students used it mainly for study purposes. Again these differences reflect the different stages of integration of ICTs in higher education and the way it is used in the two countries. It may also reflect the different educational styles. In the UK much of higher education is project-based with students being required to identify useful resources for assignment topics. Under this educational style, British students need to explore various resources by using libraries, the Internet, and online databases. Then they analyse, judge and select the most suitable sources for their assignments. However, in Chinese higher education, the focus is still very much on textbooks. Chinese university students give most respect to textbooks, and the materials assigned by lecturers. Therefore, use of the Internet as a resource for study and research has not, in the past, been an issue for teachers and students in China, as it has in Britain.

The introduction of ICTs into education has been a key component of UK government policy since around 1980 (Somekh, 2000). Statistical research suggests that UK higher education was spending up to one billion pounds a year on ICTs by the end of the 1990s (McMahon, 1997). Students and educators are being encouraged to learn and teach through online courses, communicate electronically, and generate and collect information by accessing list servers, computer conferences, news groups and high quality websites. Consequently, use of the Internet has become a part of UK university students' daily lives. On the other hand, the use of ICTs in Chinese higher education is still at an early stage. Although in most Chinese universities, the Internet is available and students and teachers use e-mail, FTP, BBS, IRC; use of the Internet specifically as a resource for learning and teaching is still underdeveloped, and the availability of Chinese Internet resources

for studying is poor. This present research raises serious issues for Chinese educators and researchers. In the current study, all the Chinese students had access to the Internet at their universities, as did the British students. But little effort has been put into research in China on the use of the Internet for teaching and learning, such as new pedagogies and how to deliver online courses which are suitable for Chinese students' learning styles, and appropriate to the Chinese educational system. Many Chinese students also pointed out that there was an urgent need for Chinese professors to improve their Internet skills and ability to use ICTs in their teaching.

While the finding that students' attitudes toward the Internet are associated with their national cultural characteristics is consistent with the previous literature, this study adds to the existing body of work by confirming that this holds true for students from China and the UK. These findings lead to new research questions about implementing ICTs into education. Any understanding of students' use of the Internet needs to be sensitive to cultural context. The implementation of ICTs in an education system builds onto national cultural context. More important than the technical aspects of the technology are the social and cultural foundations for education.

5.2. Gender differences in use of the Internet in national cultural contexts

One of the main objectives of the study was to investigate whether the results of previous research into gender differences in the use of the Internet, based largely on Western populations such as American, European and Australian students, held true for Chinese students.

From a social constructionist perspective the relationship between gender and technology, is one where: '*Both gender and technology are processes; they are shaped, or acted out, in interaction*' (Silva, 2000, p. 613). This argument suggests that both gender and technology change along with the societies they are part of, and the whole is both culturally and historically shaped. Gender identities in different national cultural contexts embody different expectations of the people performing them.

This study suggests that in both China and the UK gender differences in computer ownership might no longer exist for young adults at university. This result conflicts with previous research (Brosnan, 1998; Comber et al., 1997; Durndell et al., 1987; Kirkpatrick & Cuban, 1998; Kirkup, 1995; Meredith et al., 1998; Scragg et al., 1998; Shashaani, 1993, 1997; Siann, Macleod, Glissov, & Durndell, 1990) that men were more likely to have their own computers than their female counterparts. For the British group this equality of ownership could be due to a UK context where computers have become a common household item. Most previous studies of gender differences in computer ownership were carried out in the 1980s and 1990s. Furthermore, given the fact that computers have been a compulsory or integrated part of most educational courses in British higher education since the late 1990s, and students increasingly recognise the importance of using them, it is not surprising that no gender differences in computer ownership were found within the British student group. Chinese students were less likely to have their own computers, but gender differences in computer ownership were not found in that group. With the 'open door' policy now practised in China, and the promotion of trade and business, the financial situation of its citizens has improved considerably in recent years. Generally in China, parents place a high value on education and employ a concept roughly translated, as 'studying is the most highly appreciated activity.' University graduates need to be well equipped with computing skills, as computer studies have become very popular in China. Computer-related courses have been offered in some

universities since the early 1980s and there is an increasing trend for families in China to have a PC at home.

The present study confirms previous research that British males were more likely to have used a computer for the first time earlier than their female counterparts. This could be explained by the fact that most British students in the study used computers for the first time more than five years previously when a computer was perhaps characterised as more 'masculine', than at the time of the study. The present study also showed no gender differences in access to the Internet at university for both Chinese and British groups. However, access to the Internet at the students' own accommodation showed a significant gender difference within the British group, with men more likely to have such access. This result confirms previous research and suggests that even when women have computers in their own homes they may not necessarily have access to the Internet.

Despite an apparent increased equality in access and ownership, the present study consistently found significant gender differences in Internet usage in terms of frequency and diversity of use in both Chinese and British groups. There was also a general tendency in the study for men in both countries to use the Internet for personal interests more than women. However, British women students were more likely to use the Internet for studying. These results suggest that to some extent Internet usage shadows computer usage, and British women still regard the Internet as 'tool' rather than 'toy' compared to their male counterparts. Silva (2000) discusses how inscriptions about the gender of users of technology have changed historically, but the dominant inscription of computers and the Internet, is as objects for use by men, it is 'masculine'. The Internet was originally invented in a male dominated environment. However, use is no longer limited to men, but both computers and the Internet are still characterised as 'masculine'. This was also confirmed in the investigation of gender stereotypes about computers and the Internet use.

The finding that British women students spent more time on the Internet for study purposes than the British male students, might be a reflection of gender differences in approaches to academic work in the UK. There have been concerns expressed in the UK press in the early 21st century that British boys are not interested in academic work, and that male youth culture does not value academic achievement. These early attitudes toward academic work may be having an impact on university study too.

The present study also found that the male students in both countries reported more frequent use of e-mail than the female students. Although female students reported enjoying using e-mail, they used it less than the men. These results appear to be in conflict with the findings of previous studies (Gibbs, 1998; Jackson, Ervin, Gardner, & Schmitt, 2001; Odell, Korgen, & Schumacher, 2000; Savicki & Kelley, 2000). There is a contradiction here, on the one hand the literature suggests that culturally women are more involved in interpersonal communication activities, but this seems not to be the case when that communication is mediated by a 'masculine' technology.

The present research suggests that women students in both countries underestimate their ability to use computers and the Internet. From observations made during another part of the study, women in both groups performed as well as their male counterparts in terms of information searching tasks. However, female students were more likely to report that they had difficulty doing these tasks. This result suggests new research questions. For example, is women's lower confidence in their ability to use the Internet due to 'psychological gender' or 'the expectation of gender roles in national cultural dimensions?' There is an extensive literature on gender differences in use of

computers, which consistently finds that women have less confidence in their ability to use computers, even when their computer performance was much better than those of their male counterparts (Brosnan, 1998; Comber et al., 1997; Durndell et al., 1987; Kirkpatrick & Cuban, 1998; Kirkup, 1995 Meredith et al., 1998; Morahan-Martin, 1998a, 1998b; Schumacher & Morahan-Martin, 2001; Scragg et al., 1998; Shade, 1998; Shashaani, 1993, 1997; Siann et al., 1990; Weiser, 2000).

Patterns of gender difference in the two countries show similar trends in the current study. Male students in both countries were more likely to have positive attitudes towards the Internet, spent more time on the Internet, and used the Internet more extensively. Males in both countries also reported more confidence in using the Internet. Taking these results together, women students seem to attribute their own ability to use technology as lower than their male counterparts. However, when the study asked their opinion about 'women' as 'a group', the same women students reported that 'women' had similar confidence and ability in use of the Internet. This result confirms the work of Durndell and others (Durndell et al., 1987; Durndell & Lightbody, 1993; Durndell, Glissov, & Siann, 1995; Durndell & Thomson, 1997) that women believe that: 'we can, but I can't' (use it) with respect to ICTs.

The present study reports gender differences within the British group that were more significant than those within the Chinese group. This may due to the fact that British women in the study had negative computer experiences in their early stage of computer use in school and at home. Previous research has suggested that many students in Western cultures started to use computers as games devices, and boys were more likely to play computer games than girls. Most Chinese students use computers and the Internet for the first time at school or university. Chinese educational settings provide equal opportunities for students to use computers and the Internet, and gender differences in the Chinese group are less significant than those of British students in the present study. But Chinese male students were the highest users of games in this study. This kind of gendered pattern of activity could encourage a progressive 'masculinization' of the technology in the Chinese context. This issue needs further exploration.

Although there are some different patterns in terms of gender differences in the use of the Internet between Chinese and British students, there are similar patterns in gender stereotypes in both countries in the current study. This result confirms previous research (Arbaugh, 2000; Clegg, Mayfield, & Trayhurn, 1999; Ford & Miller, 1996; Morahan-Martin, 1998a, 1998b; Schott & Selwyn, 2000; Schumacher & Morahan-Martin, 2001; Sherman, End, & Kraan, 2000) on gender stereotypes in Internet use carried out with Western subjects. This also suggests that gender stereotyping is a worldwide issue. Women students in both China and Britain hold stronger beliefs that 'women' in general have ability equal to men to use the Internet and to study computer science. On the other hand, men students in both countries held stronger negative gender stereotypes in terms of use of the Internet: that it was an activity more appropriate to men. Gender stereotypes about the use of computers and the Internet seem to be a legacy accepted by both women and men. The present study finds women students reporting that they enjoy using the Internet as much as men, but also agreeing that men were more likely to use the Internet and computers more than they were, and be more likely to work in computer sciences. These perceptions accurately reflect the situation as demonstrated both in national statistics and research (CME, 1997; EOC, 1999). Male students in the present study believed that they were good at using computers and the Internet, and they used them more.

Harding's four stage (individual, material, symbolic, resources) model of gender (1997, 1998) works well to explain the findings of this present research. Students, at an individual level, have gendered experiences and lives that lead to individual differences in motivation, confidence and interest. In terms of use of technology, in this case computers and the Internet, female students' negative experience of using them, and the 'masculine' culture of ICTs might lead women to have negative attitudes toward computers and the Internet, and less confidence in using them, compared to their male counterparts.

At the level of material structures, women and men have been assigned different social roles in both the UK and China, which have an effect on their access to, and interest in education. In the case of the use of technology traditionally men are regarded as 'having technological and sophisticated minds', and they are expected to take a superior role such managing activities, while women are regarded as 'non-technological', and are expected to take socially inferior roles such as 'caring'. These have produced gender differences in the choice of career and field of study in the past.

At the symbolic level, the content of education itself can be seen as gendered in both the UK and China, educational media, and content of textbooks are all gendered. Traditionally women are not supposed to be good at 'sophisticated knowledge', such as mathematics, or computer sciences, their fields are nursing, education, etc. Therefore, the image of a computer scientist is usually male. Male students get more attention and more opportunity to use computers in classrooms (Brosnan, 1998; Kirkpatrick & Cuban, 1998; Meredith et al., 1998; Shashaani, 1993, 1997). Although this situation is changing, women students in the current study are likely to have had this negative experience in their earlier education. This may also be one of the reasons why more men choose to study computer science than women, in both China and the West.

At the level of resources, historically men and women have unequal access to the resources needed for education such as money, time, etc. In previous studies, women were less likely to have their own computers, and access to computers than men (Brosnan, 1998; Durndell et al., 1987; Meredith et al., 1998; Siann et al., 1990). Although this is not true in the current study and women nowadays have more opportunity to access computers and the Internet, women students in the study still report that they do not have the time to use computers and the Internet simply for pleasure.

In summary, the formation of gender stereotypes in activities associated with ICTs is a complex process, and of gendered patterns of use is influenced by many factors and well documented in education in the West. It is worrying to see these patterns being produced in societies in which ICTs are a recent introduction.

References

Allwood, C. M., & Wang, Z.-M. (1990). Conceptions of computers among students in China and Sweden. *Computers in Human Behaviour, 6*, 185–199.

Arbaugh, J. B. (2000). An exploratory study of the effects of gender on student learning and class participation in an Internet-based MBA course. *Management Learning, 31*(4), 503–519.

Berry, J., Poortinga, Y. H., Segall, M., & Dasen, P. (1992). *Cross-cultural psychology: research and applications*. New York: Cambridge University Press, p. 231.

Boone, W. J. (1997). Science attitudes of selected middle school students in China: a preliminary investigation of similarities and differences as a function of gender. *School Science and Mathematics, 97*(2), 96–103.

Brosnan, M. (1998). *Technophobia: the psychological impact of information technology*. London: Routledge.

Brosnan, M., & Lee, W. (1998). A cross-cultural comparison of gender differences in computer attitudes and anxieties: the United Kingdom and Hong Kong. *Computers in Human Behaviour, 14*(4), 559–577.

Brown, T. S., Williams, R., & Brown, J. T. (1998). A comparison of attitudes toward computers among business professionals in China, Japan, and the United States. *Journal of Computer Information Systems, Spring*, 1–6.

Campbell, M. A., & McCabe, G. (1984). Predicting the success of freshman in a computer science major. *Communications of the ACM, 27*, 1108–1113.

Chen, A. Y., & Collis, A. B. (1999). Designing for differences: cultural issues in the design of WWW-based course-support sites. *British Journal of Educational Technology, 30*(3), 201–215.

Chen, A. Y., Mashhadi, A., Ang, D., & Harkrider, N. (1999). Cultural issues in the design of technology-enhanced learning systems. *British Journal of Educational Technology, 30*(3), 217–230.

Clegg, S., Mayfield, W., & Trayhurn, D. (1999). Disciplinary discourse: a case study of gender in information technology and design courses. *Gender and Education, 11*(1), 43–55.

Chinese Ministry of Education (CME) (1997). CME 1997 report on Chinese higher education, CME, Beijing.

CNNIC (07/2001). Semi-annual Survey Report on the Development of China's Internet (06/2001), retrieved 06 November, 2001 from http://www.cnnic.net.cn/develst/rep200107-e.shtml.

Collis, B. (1985). Reflections on inequities in computer education: do the rich get richer? *Education and Computing, 1*, 179–186.

Collis, B. (1999). Designing for differences: cultural issues in the design of WWW-based course-support sites. *British Journal of Educational Technology, 30*(3), 201–215.

Collis, B. A., & Williams, R. L. (1987). Cross-cultural comparison of gender differences in adolescent's attitudes toward computers and selected school subjects. *Journal of Educational Research, 81*(1), 17–27.

Comber, C., Colley, A., Hargreaves, D. J., & Dorn, L. (1997). The effects of age, gender and computer experience upon computer attitudes. *Educational Research, 39*(2), 123–134.

Davies, M. W. (1988). Women clerical workers and the typewriter: the writing machine. In C. Kramarae (Ed.), *Technology and women's voices: keeping in touch*. New York: Routledge.

Durndell, A., Glissov, P., & Siann, G. (1995). Gender and computing: persisting differences. *Educational Research, 37*(3), 219–227.

Durndell, A., & Lightbody, P. (1993). Gender and computing: change over time?. *Computers & Education, 21*(4), 16–25.

Durndell, A., Macleod, H., & Siann, G. (1987). A survey of attitudes to, knowledge about and experience of computers. *Computers & Education, 11*(3), 167–175.

Durndell, A., & Thomson, K. (1997). Gender and computing: a decade of change?. *Computers & Education, 28*(1), 1–9.

Emarketer (1999). Internet users survey report, retrieved 21 May, 2000 from http://www.emarketnews.com/emetrics.htm#titles.

Equal Opportunities Commission (EOC) (1999). 'Gender and differential achievement in education and training: a research review', retrieved 25 June, 2000 from http://www.eoc.org.uk/EOCeng/dynpages/research_edu.asp.

Ford, N., & Miller, D. (1996). Gender differences in Internet perceptions and use. *Aslib Proceedings, 48*(7/8), 183–192.

Gibbs, S. (1998). Women on the Web: a two-year journey in cyberspace. *The European Journal of Women's Studies, 5*, 253–261.

GVU (1997b, 1998b) GVU's WWW User Survey, retrieved 23 May, 1999 from http://www.cc.gatech.edu/gvu/user_surveys/survey-1998-10/.

Harding, S. (1997). Multicultural and global feminist philosophies of science: resources and challenges. In L. H. Neeson, & J. Neeson (Eds.), *Feminisms, Science and the Philosophy of Science*. Dordrecht: Kluwer Acadmic Publishers.

Harding, S. (1998). *Is science multicultural? Postcolonialisms, feminisms, and epistemologies*. USA: Indiana University Press.

Holmes, B. (1998). Cross-cultural differences of use of information technology in education: a comparative study of the use of computers in Japanese and British classrooms. Unpublished PhD dissertation, Wolfson College, University of Cambridge, p. 161.

Jackson, L. A., Ervin, K. S., Gardner, P. D., & Schmitt, N. (2001). Gender and the Internet: women communicating and men searching. *Sex roles, 44*(5–6), 363–379.

Joo, J. E. (1999). Cultural issues of the Internet in classrooms. *British Journal of Educational Technology, 30*(3), 245–250.

Karsten, R., & Roth, R. M. (1998). The relationship of computer experiences and computer self-efficacy to performance in introductory computer literacy courses. *Journal of Research on Computing in Education, 31*(1), 14–24.

Kirkpatrick, H., & Cuban, L. (1998). Should we be worried. What the research says about gender differences in access, use, attitudes, and achievement with computers. *Educational Technology*(July–August), 56–61.

Kirkup, G. (1995). Gender issues and learning technologies. *British Journal of Educational Technology, 26*(3), 218–219.

Layton, E. T. (1994). Technology and Civlilization: Renaissance to Industrial Revolution, Hsci 1712/3712, University of Minnesota.

Lazinger, S. S. J., & Bar-Llan, et al. (1997). Internet use by faculty members in various disciplines: a comparative case study. *Journal of the American Society for Information Science, 48*(6), 508–518.

Makrakis, V. (1992). Cross-cultural comparison of gender differences in attitude towards computers in Japan and Sweden. *Scandinavian Journal of Educational Research, 36*(4), 275–287.

Martin, C. D., Heller, R. S, & Mahmoud, E. (1992). American and Soviet children's attitudes toward computers. *Journal of Educational Computing Research, 8*(2), 155–185.

McMahon, J. (1997). Factors associated with student computer usage in higher education, unpublished PhD thesis, The Queen's University of Belfast.

Meredith, A., Helen, J., & Woodcock, L. (1998). Women can do I.T. – but why don't they? In *Conference Proceeding: Winds of change – women and culture of universities* (pp. 762–766). Sydney, Australia: University of Technology.

Morahan-Martin, J. (1998a). The gender gap in Internet use: why men use the Internet more than women – a literature review. *CyberPsychology & Behavior, 1.1*(1), 3–10.

Morahan-Martin, J. (1998b). Males, females, and the Internet. In J. Gackenbach (Ed.), *Psychology and the Internet: intrapersonal, interpersonal, and transpersonal implications* (pp. 169–191). New York: Academic Press.

Morahan-Martin, J. (1999). Women and Internet: promise and perils. *CyberPsychology & Behavior, 3*(5), 683–696.

Murphy, C. A., Coover, D., & Owen, S. V. (1989). Development and validation of the computer self-efficacy scale. *Educational and Psychological Measurement, 49*, 893–899.

NetSmart America (1/12/1999). 'Computer, Internet use up among Americans', retrieved 21 March, 2000 from http://cyberatlas.Internet.com/big_picture/demographics/article/0,1323,5901_218471,00.html.

Nua (1999). Gender gap has almost disappeared in US, retrieved 17 February, 2000 from http://www.nua.ie/surveys/index.cgi?f=VS&art_id=905355546&rel=true.

Nua Internet survey (2000). Nua Analysis, retrieved 17 February, 2000 from http://www.nua.ie/surveys/analysis/index.html.

Odell, P. M., Korgen, K. O., & Schumacher, P., et al. (2000). Internet use among female and male college students. *CyberPsychology & Behavior, 3*(5), 855–862.

Omar, M. H. (1992). Attitudes of college students towards computers: a comparative study in the United States and the Middle East. *Computers in Human Behaviour, 8*, 249–257.

Pelgrum, W. J., & Polmp, T. (1991). *The use of computers in education worldwide: Results from the IEA computers in education survey in 19 educational systems*. Oxford: Pergamon Press.

Popovich, P. M., Hyde, K. R., Zakrajsk, T., & Blumer, C. (1987). The development of the attitudes toward the computer usage scale. *Educational and Psychological Measurement, 47*, 261–269.

Ropp, M. M. (1999). Exploring Individual characteristics associated with learning to use computers in preservice teacher preparation. *Journal of Research on Computing in Education, 31*(4), 402–424.

Savicki, V., & Kelley, M. (2000). Computer mediated communication: gender and group composition. *CyberPsychology & Behavior, 3*(5), 817–833.

Schott, G., & Selwyn, N. (2000). Examining the "male, antisocial" stereotype of high computer users. *Journal of Educational Computing Research, 23*(3), 291–303.

Schumacher, P., & Morahan-Martin, J. (2001). Gender, Internet and computer attitudes and experiences. *Computers in Human Behavior, 17*, 95–110.

Scragg, G., Smith, J., & Geneseo, S. (1998). *A study of barriers to women in undergraduate computer science*. Atlanta, GA, USA: SIGSCE 98, pp. 82–86.

Shade, L. R. (1998). A gendered perspective on access to the information infrastructure. *The Information Society, 14*, 33–44.

Shashaani, L. (1993). Gender-based differences in attitudes toward computers. *Computers & Education, 20*, 169–181.

Shashaani, L. (1997). Gender differences in computer attitudes and usage among college students. *Journal of Educational Computing Research, 16*(1), 37–51.

Sherman, R. C., End, C., & Kraan, E., et al. (2000). The Internet gender gap among college students: forgotten but not gone?. *CyberPsychology & Behavior, 3*(5), 885–899.

Siann, G., Macleod, H., Glissov, P., & Durndell, A. (1990). The effect of computer use on gender differences in attitudes to computers. *Computers & Education, 14*(2), 183–191.

Silva, E. B. (2000). The cook, the cooker and the gendering of the kitchen. *The Sociological Review, 48*(4), 612–629.

Somekh, B. (2000). New technology and learning: policy and practice in the UK: 1980–2000. *Education and Information Technology, 5*(1), 19–37.

Torkzadeh, G., & Koufteros, X. (1994). Factor validity of a computer self-efficacy scale and the impact of computer training. *Educational and Psychological Measurement, 54*(3), 813–821.

Torkzadeh, R., Pflughoeft, K., & Hall, L. (1999). Computer self-efficacy, training effectiveness and user attitudes: an empirical study. *Behaviour & Information Technology, 18*(4), 299–309.

Weil, M. M., & Rosen, L. D. (1995). The psychological impact of technology from global perspective: a study of technological sophistication and technophobia in university students from twenty-three countries. *Computers in Human Behaviour, 11*(1), 95–133.

Weiser, E. B. (2000). Gender differences in Internet use patterns and Internet application preferences: a two-sample comparison. *CyberPsychology & Behavior, 3*(2), 167–177.

Zhang, Y., & Espinoza, S. (1998). Relationship among computer self-efficacy, attitudes toward computers, and desirability of learning computer skills. *Journal of Research on Computing in Education, 30*(4), 420–436.