Gender, Internet Identification, and Internet Anxiety:
Correlates of Internet Use

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ABSTRACT

This paper reports a study that investigated the effects of gender, Internet anxiety, and Internet identification on use of the Internet. The study involved 608 undergraduate students (490 females and 118 males). We surveyed the students’ experience with the Internet, as well as their levels of Internet anxiety and Internet identification. We found a number of gender differences in participants’ use of the Internet. Males were proportionally more likely to have their own web page than were females. They used the Internet more than females; in particular, they were more likely to use game websites, to use other specialist websites, and to download material from the Internet. However, females did not use the Internet for communication more than males. There was a significant positive relationship between Internet identification and total use of the Internet, and a significant negative relationship between Internet anxiety and total use of the Internet. Controlling for Internet identification and Internet anxiety, we found a significant and negative correlation between gender and use of the Internet. In total, all three of our predictors accounted for 40% of the variance in general Internet use: with Internet identification accounting for 26%, Internet anxiety accounting for 11%, and gender accounting for 3%.

INTRODUCTION

E-learning has the power to transform the way we learn and to bring high-quality, accessible learning to everyone—so that everyone can achieve his or her full potential.”1 This quote is a great ideal, but what it ignores is the range of socioeconomic and cultural inequalities that mediate access to and use of the Internet. In the mid 1990s, a number of surveys reported that males were more likely to have access to the Internet than females.2–4 More recently this gender difference in access was thought to be diminishing5 or disappearing.6–9 A recent report from the UCLA World Internet Project,10 however, suggests that gender difference is more resistant than previously thought. In the United States, 73.1% of males reported using the Internet compared to 69% of females. Similarly, in the UCLA study, 63.9% of males reported using the Internet compared to 55% of females in the United Kingdom, which was comparable to a recent UK survey11 (males 62% and females 49%). In Italy, 42% of males reported using the Internet compared to only 22% of females.
Not only are there differences in access, there are a number of gender differences in usage. Researchers have reported that males use the Internet more for information searching and entertainment, whereas females use it more for communication purposes. Female students tend to use the Internet primarily for interpersonal communication, while male students used the World Wide Web for entertainment and leisure activities. Similar findings are reported in Europe by Colley, who examined gender differences in what girls and boys liked best and least about Information Communication and Technology (ICT) in three schools in the United Kingdom. She found that girls preferred e-mail, whereas boys preferred computer games. Teo and Lim have reported similar findings in Singapore, and Ho and Loo for students in Hong Kong, suggesting that gender differences are cross-cultural. Not only are there gender differences in the type of activities that male and female students use the Internet for, there are also gender differences in attitudes towards the Internet. Females have less positive attitudes towards the Internet than males. They are more disoriented and disenchanted with the World Wide Web. They are less confident in their abilities in using the Internet and are more anxious using the Internet.

Jackson et al. argue that this gender difference can be explained in terms of cognitive, motivational, and affective factors, and that “psychology has an important role in advancing understanding of why people choose to use or not to use the Internet.” Cooper and Weaver have developed a model of computer use, which enables the relations between these factors to be examined. The main focus of this model is the individual, and there are four interrelated factors that influence an individual’s use of, and attitudes towards, computers. These factors are computer identification, computer anxiety, performance attributions, and expectations. While these factors are related to each other in several ways, Cooper and Weaver recommend thinking of the processes operating within the individual as somewhat distinct, with each contributing to attitudes towards and uses of computers and technology in direct and distinct ways. The crux of this model is that any-thing that increases a person’s computer anxiety, leads them to doubt their ability, or causes them to disidentify with computers will lead the individual to form negative attitudes about computers and technology. Negative attitudes in turn, will mean that the individual is more likely to avoid activities, contexts and careers involving computers. The current study extends this model of computer use to explore attitudes towards and uses of the Internet, and investigates the extent to which these two factors can account for gender differences in Internet use.

Internet anxiety

One important factor for explaining people’s use of the Internet is Internet anxiety. It is closely related to computer anxiety, which is defined as “the irrational anticipation of fear evoked by the thought of using (or actually using) computers, the effects of which result in avoiding or minimising computer usage.” Computer anxiety has long been found to be negatively related to computer use and attitudes towards computers, with females generally reporting higher levels of computer anxiety than males. Recently, there have been a number of studies that have explored the relationship between computer anxiety and Internet use. Jackson et al. conducted a study with a group of Anglo-American undergraduates. They found that computer anxiety was negatively related to students’ use of the Internet. Similarly, Durndell and Haag surveyed a group of Romanian university students and reported that computer anxiety was inversely proportional to the students’ self-reported use of the Internet. Barbiete and Weiss, using an Internet sample, found that the number of years spent using the Internet was lower for students who scored high on computer anxiety than for students who scored low on the same measure. Cody et al. surveyed a group of older adults (average age 80) and found that computer anxiety predicted time on-line.

Recently, a number of researchers have argued that the Internet has changed the nature and range of applications available on the computer, and thus computer anxiety has to change accordingly. They have introduced the notion of Internet anxiety, and although still very new, a number of studies have investigated this topic. Chou has investigated the relationship between Internet anxiety and Internet experience amongst Taiwanese school teachers. She reported that the number of hours spent using the Internet in a week was significantly and negatively related to Internet anxiety, and female students had significantly higher Internet anxiety than male students. Other studies have also reported that females have higher Internet anxiety than males.

Internet identification

Another important factor that influences people’s use of the Internet is identification with the In-
Research in this area conceptualizes this concept in a number of ways. Facer et al. conceptualize it in terms of consumption, whereas Holloway and Valentine focus on social identity. Following our previous research on Internet use among university undergraduates, the current study does not focus on identity per se, but instead focuses on domain identification. Derived from the research of Steele et al., this approach provides a link between social identity and the performance of some skill or ability. It is therefore highly suited to the study of Internet use.

A domain is defined as a performance context. It is a context in which one can put a skill or a set of skills into practice. To identify with a domain is to have one’s self-esteem bound up with one’s ability to perform successfully in that domain. Examples of domains include mathematics, sports, and computers and technology. We use the term “Internet identification” to refer to the extent to which an individual’s self-concept is bound up with his or her perceived ability to use the Internet. One of the aims of the current study is to examine the relationship between Internet identification and actual Internet use.

Identification with a domain serves a variety of functions. First, it serves as a means of self-definition or self-esteem, making the person feel better about themselves. Second, it may be a means of interacting with others who share the same values and goals, and thereby provide a reference group orientation and shared activity. Third, it serves as a means of defining oneself in contrast to others who identify with other domains. Thus, identification has implications for behavior; indeed, the strength of identification has been found to be positively related to behavior to act. The extent to which an individual defines him- or herself in terms of a particular domain affects the way that he or she behaves and differentiates those who identify with other domains. Recent research has shown that identifications have a strong influence on an individual’s behavior in a variety of domains. The stronger the identification, the stronger the influence.

Internet identification is defined as the importance of an individual’s ability to use the Internet for their self-concept. Cooper and Weaver argue that identification is an important factor in understanding people’s attitudes towards and uses of technology. Someone with a high degree of Internet identification will need to be able to use the Internet effectively to maintain their self-esteem. Consequently, they are likely to have a high degree of experience using the Internet; will have positive attitudes towards the Internet; will be motivated to spend time learning how to use it; and may take courses on using the Internet. If they perform badly using the Internet, this is likely to make them feel anxious because it threatens their self-esteem.

A number of recent studies have examined the relationship between identification with the Internet and use of the Internet. Holloway and Valentine report an empirical study of the use of ICT by British children aged 11–16. They identified a group of 14-year-old boys who had a shared identification in ICT. This identification provided them with a social network and defined them as “geeks” and “boffins” for other members of their class. In contrast, a group of girls disidentified with the Internet. They were not concerned about their ability to use the Internet, had negative attitudes towards the Internet, were not motivated to spend time learning how to use it more effectively, and were less likely to enrol in courses concerning the Internet. If they performed badly, they were not concerned and were unlikely to feel anxious, because it did not threaten their self-esteem. In fact, disidentification may have made them actively avoid using the Internet. Facer et al. reported an in-depth research project on children’s use of computing at home and school. They identified a diversity of meanings that ICT had in young people’s lives. For some children, it was central to their identity. They “lived” through the computer. Other children were technologically literate, but ICT was marginal to their lives. Still others saw ICT as either irrelevant or in opposition to their identity.

In sum, gender differences have been reported in the use of the Internet. Psychological, affective, and social factors are thought to be important explaining these differences. Internet anxiety and Internet identification are two important factors that have been found to relate to people’s use and attitudes towards the Internet. Thus, the aim of this paper is twofold. First, we investigate if there is a gender difference in the use of the Internet, as the research above suggests, and second, we examine to what extent these differences can be explained in terms of Internet identification and/or Internet anxiety.

**MATERIALS AND METHODS**

**Participants**

The participants were 608 first-year psychology undergraduate students from the Universities of Bath, Greenwich, Glasgow Caledonian, Kingston,
and Loughborough, and the University of the West of England. There were 490 females and 118 males, and the average age was 23 years. The sample consisted of psychology undergraduates in the six departments of psychology, and this gender breakdown is consistent with psychology departments across Europe and the United States. The minimum age was 17 years old, and the maximum was 55 years old.

Procedure

The questionnaire was handed out during the first week of the academic year and was used to survey the students’ attitudes and uses of the Internet at school, prior to beginning university. The questionnaire contained the following sections: (i) students’ ownership of a computer; (ii) ownership of a personal e-mail account (i.e., not their university e-mail account); (iii) ownership of a web page; (iv) a measure of general Internet experience; (v) an Internet anxiety scale, and (vi) an identification with the Internet scale.

Measures

The questionnaire measured students’ general use of the Internet. This measure had eight items concerning (i) e-mail, (ii) chat, (iii) newsgroups, (iv) web games, (v) other specialist web sites (e.g., sports web sites, TV web sites etc), (vi) shopping, (vii) downloading or listening to music, and (viii) listening to radio stations over the World Wide Web. Students were asked to estimate the number of times they used the above applications in an average week at their previous school. They answered using a five-point scale (0 = never; 1 = once a week; 2 = several times a week; 3 = once a day; and 4 = several times a day). We checked the reliability of this scale using Cronbach’s alpha and using test re-test reliability on an equivalent sample of 32 participants. Both showed reliability was more than adequate (Cronbach alpha = 0.90; test re-test reliability, Spearman Rho = 0.83).

Students then completed an Internet anxiety scale, consisting of six questions answered using a five-point Likert Scale (Cronbach alpha = 0.80; test re-test reliability, Spearman Rho = 0.77):

1. I always feel anxious when using the Internet.
2. I go out of my way to avoid using the Internet.
3. It is easy for me to use the Internet.
4. It is important for me to be able to use the Internet.
5. My anxiety about using the Internet bothers me.
6. I am more anxious about using the Internet than I should be.

The final part of the questionnaire was an Internet identification scale. The students responded to 10 statements using a five-point Likert Scale. Reliability was found to be adequate on this measure (Cronbach alpha = 0.77; test re-test reliability Spearman Rho = 0.78):

1. I would describe myself as an Internet user.
2. I am very similar to other Internet users.
3. Other Internet users are very like me.
4. I am very different from Internet users.
5. I feel very emotionally attached to other Internet users in general.
6. I feel a part of an Internet users community.
7. When there is an opportunity, I always get involved in using the Internet.
8. Whenever I can, I tell people I am an Internet user.
9. I like people who use the Internet frequently.
10. Using the Internet is a very important aspect of being a student.

Statistical analysis

Descriptive analysis of the data revealed that it was highly positively skewed. Therefore, we employed nonparametric statistics throughout the statistical analysis.

RESULTS

The first aim of the study was to investigate if there were any gender differences in participants’ use of the Internet. We first examined the number and percentage of males and females who owned a computer, had a personal e-mail address, and had their own web page. There were no gender differences in these variables.

Overall male’s total use of the Internet was higher than female’s (Mann-Whitney, z = 3.0, df = 481, p < 0.01). There were also a number of gender differences in participants’ general use of the Internet (Table 1). Males were significantly more likely to use game web sites (Mann-Whitney, z = 3.5, df = 545, p < 0.01) and other specialist web sites (Mann-Whit-
ne, \( z = 4.5, \) \( df = 545, \) \( p < 0.01 \), and to download material from the Internet (Mann-Whitney, \( z = 5.6, \) \( df = 560, \) \( p < 0.01 \)). We found no gender differences in participants’ use of the Internet for communication. There were no significant differences between male and female students in terms of Internet anxiety or Internet identification.

The second aim of the study was to examine the extent to which these gender differences could be explained in terms of differences in Internet identification and/or Internet anxiety. There was a significant and positive relationship between Internet identification and total Internet use (Spearman Rho = 0.50, \( p < 0.01 \)); a significant and negative relationship between gender and total Internet use (Spearman Rho = −0.13, \( p < 0.01 \)); a significant and negative relationship between Internet anxiety and total Internet use (Spearman Rho = −0.33, \( p < 0.01 \)), and a small but significant negative relationship between Internet identification and Internet anxiety (Spearman Rho = −0.08, \( p < 0.05 \)).

We then conducted a Spearman partial correlation between gender and total number of times using the Internet controlling for Internet identification and Internet anxiety. There was a significant and negative correlation (Spearman Rho = −0.16, \( p < 0.01 \)) between gender and total Internet use, even after controlling for Internet identification and Internet anxiety. Furthermore, Spearman partial correlations revealed the following: (i) Internet identification was positively correlated to total Internet use controlling for gender and Internet anxiety (Spearman partial correlation Rho = 0.51, \( p < 0.01 \)) and (ii) Internet anxiety was negatively correlated with total Internet use controlling for Internet identification and gender (Spearman partial correlation Rho = −0.33, \( p < 0.01 \)). Therefore, gender, Internet identification and Internet anxiety account for 40% of the variance in total Internet use.

**DISCUSSION**

The first aim of this study was to examine whether gender differences in Internet use still exist. The findings indicate gender differences in some areas of Internet use, with a few notable exceptions. We found a number of gender differences in participants’ use of the Internet. Males were proportionally more likely to have their own web page than were females. They used the Internet more than females; in particular they were more likely to use game websites, other specialist websites and to download material from the Internet. However, females did not use the Internet for communication more than males. Controlling for Internet identification and Internet anxiety, we found a significant and negative correlation between gender and use of the Internet.

We found that males were more likely to use the Internet for leisure activities (e.g., game websites, other specialist websites, and downloading material) which is consistent with findings reported in the literature.\(^{12,15,16,18}\) In fact, the correlation between gender and Internet use was −0.16, which is almost

<table>
<thead>
<tr>
<th>E-mail</th>
<th>Males</th>
<th>SD</th>
<th>Females</th>
<th>M</th>
<th>SD</th>
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<tbody>
<tr>
<td>Chat (e.g., MSN, ICQ)</td>
<td>2.9</td>
<td>1.1</td>
<td>2.8</td>
<td>1.1</td>
<td></td>
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<tr>
<td>Newsgroups/discussion groups</td>
<td>2.0</td>
<td>1.3</td>
<td>1.9</td>
<td>1.2</td>
<td></td>
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<tr>
<td>Game web sites</td>
<td>1.2</td>
<td>0.7</td>
<td>1.1</td>
<td>0.5</td>
<td></td>
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<tr>
<td>Other specialist web sites (e.g., sports web sites, TV web sites)</td>
<td>1.5</td>
<td>0.8</td>
<td>1.3</td>
<td>0.6**</td>
<td></td>
</tr>
<tr>
<td>Surfing the web with no set purpose</td>
<td>2.3</td>
<td>1.0</td>
<td>1.9</td>
<td>0.8**</td>
<td></td>
</tr>
<tr>
<td>Shopping</td>
<td>2.2</td>
<td>1.1</td>
<td>2.0</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Downloading (e.g., pictures, games, music, videos, animation, text software)</td>
<td>1.5</td>
<td>0.7</td>
<td>1.5</td>
<td>0.7</td>
<td></td>
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<tr>
<td>Listening to radio stations over the World Wide Web</td>
<td>2.4</td>
<td>1.2</td>
<td>1.7</td>
<td>0.9**</td>
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<td>Total</td>
<td>16.02</td>
<td>5.60</td>
<td>14.08</td>
<td>3.98**</td>
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**p < 0.05.
identical to the correlation of −0.17 between gender and Internet use reported by Jackson et al.12 Unlike previous research, however, we did not find that females used the Internet more for communication than males. The literature on this issue is inconsistent. A number of studies have found females use the Internet more for communication,12–18 whereas similar research has found no difference.26,47,48 One possible reason for this difference is methodological. Those studies which reported a difference used at least a six point scale for measuring the use of the Internet for communication purposes, whereas those that did not find a difference used either a two-point,26,47 or three-point scale.48 In the study reported in this paper, we used a five point scale and this could be one reason why we did not find the expected gender difference. Further research needs to be conducted to resolve this inconsistent finding.

The second aim of our study was to investigate whether gender differences in Internet use could be explained in terms of Internet anxiety and Internet identification. On the whole, they could not. We did find that Internet anxiety and Internet identification were related to Internet use, thus offering support for our previous research on similar populations and supporting an extension of Cooper and Weaver’s model of computer use to the domain of the Internet. These relationships did not explain the observed gender difference in Internet use, however, and combined, they only explained 40% of the variance in Internet use: Internet identification accounting for 26%, Internet anxiety accounting for 11%, and gender accounting for 3%. One explanation for these findings is that our measures were not accurate measures of Internet identification and Internet anxiety. Although we would argue this explanation is unlikely because they were reliable measures and related, as predicted, to Internet use. The fact that it only explained 40% of the variance also raises the question of what explains the other 60%. There are a number of possible candidates. Computer self-efficacy and Internet self-efficacy have been found to be related to use of the Internet.12 Similarly, expectancy of success may be another candidate. Cooper and Weaver12 reviewed the literature on the relationship between expectancy and the use of computers, and suggested that similar findings may have been the result of the self-efficacy in relation to e-learning.

In conclusion, we found a gender difference in Internet use and also found that Internet identification, Internet anxiety, and gender were related to Internet use. The reported gender difference in Internet use, however, was not explained by differences in Internet identification or Internet anxiety, which explained less than half of the variance in Internet use.

REFERENCES

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