Computer Anxiety, Computer Self-efficacy and Attitudes towards the Internet of First Year Students at a South African University of Technology

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COMPUTER ANXIETY, COMPUTER SELF-EFFICACY AND ATTITUDES TOWARDS THE INTERNET OF FIRST YEAR STUDENTS AT A SOUTH AFRICAN UNIVERSITY OF TECHNOLOGY

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ABSTRACT

Notwithstanding the benefits that information and communications technology (ICT) offers to learning processes, the majority of learners in rural and township areas in South Africa either do not have access to computers and the internet, or they lack sufficient skills to exploit the benefits of ICT. This lack of skills and access to computers may lead to computer anxiety and low computer self-efficacy among undergraduates entering higher education. Low computer anxiety and high computer self-efficacy levels are important factors in assisting students to be academically successful in the present technological era. This article reports on a study that assessed the computer anxiety, computer self-efficacy and attitude towards the internet among first year students at a South African university of technology. Data collection was done through a five section survey. The research revealed that students suffer from moderate computer anxiety; they have a moderate compute self-efficacy; and their attitude towards the internet is positive. The results, research contributions, and limitations are discussed, and implications for future studies are suggested.

Keywords: computer anxiety; computer literacy; computer self-efficacy; internet attitude; higher education

INTRODUCTION

Educational technologies such as computers play a pivotal role in education. With rapid changes in computer applications, students are facing continuous challenges in learning and adapting to these applications. With its current and advanced features, it has become impossible for students not to use applications such as the internet, e-mailing, word processing, excel spreadsheets and presentation applications (Grant, Malloy and Murphy 2009). Being computer literate has become essential for all students at university level to advance academically. Students on a daily basis need to execute academic tasks and research by employing this critical skill.

Despite the benefits that information and communications technology (ICT) offers to learning processes, learners from rural and township areas in South Africa often either do not have access to computers and the internet, or they lack sufficient skills and relevant programs to exploit the benefits of ICT. The only two computer subjects offered in South African schools are Computer Applications Technology (CAT) and Information Technology (IT). In 2014, a mere 7.9 per cent of all candidates who enrolled for the final Grade 12 examinations were enrolled for CAT or IT (DBE 2015). This may be one of the reasons why it is reported that the ICT skills shortage in South Africa is of a national concern and industry is increasingly relying on higher education institutions (HEIs) to address these skill shortages (Sanchez 2013). According to Henson (2014), one of the most commonly reported skills necessary for higher education, is proficiency with computers. Thus, to fully integrate computers in higher education, researchers have proposed that positive attitudes towards computers, higher computer self-efficacy and lower computer anxiety levels could be important factors in helping students learn computer skills and use computers effectively (Sam, Othman and Nordin 2005).

The South African Department of Trade and Industry (DTI 2008) stated that the overall computer literacy in South Africa is low. The latest available statistics show that at the beginning of 2006, only 57 per cent of schools had computers and only 28 per cent had used computers for teaching purposes. This is a long way from the 2003 White Paper commitment that every learner should be computer literate by 2013 (DTI 2008).

The overall aim of the study was to indicate whether the computing skills of students at the participating university of technology were at an acceptable level. The specific objectives included the assessment of the computer anxiety, computer self-efficacy and attitude towards the internet among first year students at a South African university of technology. Subsequently, the following hypotheses were formulated:

1. There is no statistical significant difference amongst male and female students with regard to computer anxiety.
2. There is no statistical significant difference amongst male and female students with regard to computer self-efficacy.
3. There is no statistical significant difference amongst male and female students with regard to their attitude towards the internet.

Fancovicova and Prokop (2008) maintain that students who use ICT achieve better results in communication, cooperation and solving problems. It is expected of students to use a word processor; make use of software for classroom presentations; use spreadsheet software to prepare charts and graphs; navigate the internet for research; and have the ability to learn and participate in online classrooms using various kinds of software. However, many students do not have the knowledge or expertise to assess what they do and do not know or what they need to learn to succeed in higher education. Because they essentially "don't know what they don't know", they are unable to recognise the exact level of competence required. A vital influence in assisting students to acquire much needed computer skills are high computer self-efficacy, low computer anxiety levels and a positive attitude towards the internet (Sam, Othamn and Nordin 2005).

Taking the above views into consideration, HEIs should take note of problematic situations that are possibly faced by students. In the current research, therefore, a review on the current research on the individual factors computer anxiety, computer self-efficacy and attitude towards the internet was examined.

LITERATURE REVIEW ON COMPUTER ANXIETY, COMPUTER SELF-EFFICACY AND ATTITUDE TOWARDS THE INTERNET

Computer Anxiety

Large numbers of people are hindered in their attempts to acquire computer skills because they suffer from a condition called computer anxiety. Computer anxiety is a concept specific anxiety since it is associated with students' interaction with computers (Agbatogun 2010; Beckers Wicherts and Schmidt 2007; Sam, Othman and Nordin 2005; Simsek 2011; Tuncer 2012; Ursavaş and Karal 2009). The literature in the field suggests a number of words that are used interchangeably with computer anxiety, such as, computer stress, computer phobia, technostress and technophobia. In the current study, computer anxiety was used.

In particular, Celik and Yesilyurt (2013) maintain that students with computer anxiety will typically only briefly use computers, whilst taking excessive caution when doing so. If students feel confident about their computer knowledge or their ability to use a computer easily, their computer anxiety will resultantly be lower. Likewise, Tuncer (2012) as well as Saadé and Kira (2009) outline computer anxiety as a definite kind of anxiety with several experiences, such as feelings of frustration, potential of embarrassment, disappointment and fear of the unknown. Computer anxious students may display the following characteristics:

- resisting to learn new technology that might assist them in doing research;

- fearing that they are the only ones not familiar with computers – therefore they experience feelings of embarrassment;

- feeling frustrated because the computer does not perform a function as quickly as they think it should – for example, when students want to retrieve information from the internet, leaving them frustrated – this leaves students feeling discouraged;

- experiencing a feeling of helplessness. (Tuncer 2012)

However, students' attitudes towards technology can change for the better when they realise that computers and technology can be useful in their studies (Heinecke and Adamy 2010). Simsek (2011) argues that computer anxiety may be a severe barricade when attempting to learn how to use a computer effectively. Research conducted in the field of computer anxiety amongst students has identified two consequences: firstly, low academic performance, and secondly, avoidance of computer use for academic purposes (Mooney 2007). Similarly, Saadé and Kira (2009) confirm that students with high computer anxiety levels will be at a significant disadvantage compared to students with low or no computer anxiety.

A number of factors can influence computer anxiety amongst undergraduate students. Studies done by Chien (2008) have shown that experienced computer users have lower computer anxiety. It was also found that individuals, who have computers at home or have used computers before, have lower computer anxiety than those who do not have computers at home. Rosen and Weil (2010) add to the above by stating that students' socio-economic background can have an influence on their computer anxiety, thus, students who are socio-economically privileged have lower computer anxiety. They further argue that students from a higher socio-economic status, are more likely to have a computer at home and to attend schools with better computer equipment, thus lowering their computer anxiety.

Lower computer anxiety and self-confidence in computer use may be important factors in acquiring computer skills and employing these skills efficiently for academic success. These two concepts, which have both negative and positive ends, are directly related to the concept of self-efficacy (Simsek 2011). Thus, it is not surprising that computer anxiety has a reverse effect on computer self-efficacy (Hauser, Paul and Bradley 2012).

Computer Self-Efficacy

Computer self-efficacy (CSE) is a term that originated from the wide-ranging concept of self-efficacy. Bandura (1982) proposes that perceptions of self-efficacy regarding a task (such as a computer task) can influence the individual's choice to engage in that task; the effort that will be expended in performing it; and the persistence that will be shown in accomplishing the task. This can be illustrated by students' capability to apply

computer technology to specific tasks (e.g. send an electronic file to a friend or prepare an electronic presentation). In other words, CSE is students' individual belief in their ability to use technology in order to solve problems, make decisions and gather and use electronic information (Hagger and Chatzisarantis 2005).

Hauser, Paul and Bradley (2012) maintain that certain antecedents can have an impact on students' levels of self-efficacy, namely: social influences (e.g. encouragement, lecturer support); demographic variables (e.g. experience, age, gender); and beliefs (e.g. they cannot do something). Similarly, Burkhard and Roldan (2009) highlight that previous computer experience has a positive impact on CSE as well as students' intentions towards future use of computers. Similarly, Grant, Malloy and Murphy (2009) maintain that students' opinion of their ability based on past performances or experiences, will determine their future aims/intentions. Likewise, Ristianti and Sukoharsono (2014) explain that students' CSE influences their opinion of ICT, suggesting that students with high CSE tend to use ICT more often and willingly in comparison to students with a low CSE; thus influencing their academic performance. Another point to consider is that students who use the internet more often may not necessarily feel more comfortable using computers. Sam, Othman and Nordin (2005) mention that the type of application used (e.g. word processing, spreadsheets, internet); the purpose for using the computer; and individual satisfaction can also influence students' CSE and computer anxiety. In contrast, research has shown that undergraduates who are enrolled for computer related courses/degrees appear to have a higher CSE and a positive attitude towards the internet (Tuncer 2012).

As expected, students' attitudes towards technology can be an indicator of whether they will use technology. Evidence suggests that the absence of a relationship between computer anxiety and computer performance is due to the fact that CSE controls the relationship (Saadé and Kira 2009). In fact, anxiety predicts self-efficacy, which in return predicts performance (Morony, Kleitman, Lee and Stankov 2013). More specifically, students with low self-efficacy are more inclined to abandon a task after less effort; while those with high self-efficacy are more inclined to persist until completion (Feltz and Őncű 2014). Stephens (2006) states that the perception students have of their own capabilities may influence their future learning. If students mistakenly believe that they are proficient in computer skills when this is clearly not the case, this may impact negatively on their CSE and could interfere with their academic progress.

Attitude towards the Internet

According to Agut, Lozano and Peris (2014), attitude refers to a student's positive or negative judgement about an existing subject, such as (in this case) the internet, and significantly, Abedalaziz, Jamaluddin and Leng (2013) claim that these attitudes can be learnt. Attitude holds cognitive (beliefs, knowledge and expectations), affective (motivational and emotional) and performance (behaviour and actions) components.

Masrek, Abdul and Johare (2012) consider internet attitude as students' evaluation, feelings and tendencies toward the internet. Tuncer (2012) and Joyce and Kirakowski (2013) share the opinion that internet attitude refers to students' feelings, likes and dislikes about the internet. This is in contrast with internet self-efficacy which focuses on the way students evaluate their capabilities to achieve goals whilst using the internet.

A world without the internet is unimaginable and in terms of education, the internet is an indispensable tool to support various activities at higher education institutions (HEIs) ranging from research, teaching and administrative tasks. The internet has become one of the first places where lecturers and students will collect data on almost any subject, whether at home or at school or university (Hunjra, Safwan and Ahmad 2010). Tuncer (2012) claims that students view the internet as a primary source for obtaining information or conducting research, therefore, it is important to know about the factors that affect students' internet attitudes.

Kimmins and Stagg (2009) point out that those students who enter higher education often have a very high opinion of their online skills, although they do not necessarily have an understanding of the difference between information technology literacy and information literacy. Information literacy provides students with the opportunity to explore how information and knowledge shape their lives, their community, and the world, while information technology literacy is the integration of technology to explore information and knowledge (Ezziane 2007). Sam, Othman and Nordin (2005) are of the opinion that, while internet usage levels may not have any influence on CSE, higher usage of the internet does seem to reduce levels of computer anxiety amidst first year students.

With the above as background, the research had two objectives: firstly, to ascertain whether computer anxiety and CSE are related to the use of and attitudes toward the internet among undergraduates at the participating institution; and secondly, to establish whether there are any gender differences in computer anxiety, CSE, and attitudes toward the use of the internet.

RESEARCH, DESIGN AND METHODS

The study employed a survey research design to investigate undergraduates' computer anxiety levels, CSE levels and attitudes towards the internet. The 2015 first year cohort of students (at a university of technology in South Africa) were measured on all the relevant variables (computer anxiety, CSE and attitude towards the internet) at a specific time (within the first three weeks of the first semester) as advised by Maree and Pietersen (2014). The questionnaire was distributed to students during class time. Two hundred and fifty-one (251) first year students in the Faculties of Humanities and Management Sciences participated in the study. First year students were selected as many of them were not exposed to regular computer usage at secondary school level. A questionnaire consisting of five sections was used to obtain the relevant data from the students:

- Section 1 collected the students' demographic characteristics, such as gender, age, school background, and computer and internet availability at home.
- Section 2 required students to indicate for which purposes they find the internet useful.
- Section 3 consisted of a 19-item Computer Anxiety Rating Scale (CARS) that was developed and validated by Heinssen, Glass and Knight (1987). This questionnaire assessed the students' cognitions and feelings about their abilities to use computers. An example from the CARS is: "I look forward to using a computer for my studies." The participants responded to a 4-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Agree and 4 = Strongly agree).
- Section 4 was the Internet Attitude Scale (IAS) that was developed and validated by Zhang (2007). The IAS is a 40-item scale, rated on a 4-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Agree and 4 = Strongly agree).
- Section 5 was the 29-item Computer Self-Efficacy Scale (CSES) of Murphy, Coover and Owen (1989). The students responded to a 5-point Likert scale (1= Not at all, 2 = A little, 3 = A fair amount, 4 = Much and 5 = Very much).

In the three standardised questionnaires (sections 3–5), the Likert scales were converted into new categories for analysis purposes. The CARS and SCES were recoded into low, medium/moderate and high, while the IAS was recoded into Negative, Neutral and Positive (see Table 1).

Reliability of the three rating scales was first assessed by examining the Cronbach's alpha reliability coefficients for internal-consistency. The overall reliability of the questionnaire was high.

Table 1:   Reliability statistics

Various standardised tests	Cronbach's alpha	Number of items
Computer Anxiety Rating Scale (CARS)	.566	19
Computer Self-Efficacy Scale (CSES)	.953	29
Internet Attitude Scale (IAS)	.905	38

The data was analysed using the Statistical Package for Social Sciences (SPSS) version 22 for Windows. In order to analyse the data in line with the research questions, both descriptive and inferential statistical techniques were used in the study.

The ethical measures included obtaining permission from the ethical committee at the institution where the study was carried out (Creswell 2014). Likewise, the informed consent of all the prospective participants (students) in the study was obtained, after their having been informed of the purpose of the study, the procedures to be followed,

the risks, benefits, and the measures implemented to ensure confidentiality (Johnson and Christensen 2011).

The findings are depicted in the relevant tables, followed by interpretations in the corresponding paragraphs.

RESULTS AND DISCUSSION

Both descriptive and inferential statistical techniques were used in the study. The findings produced with these techniques are portrayed in the applicable tables and their interpretations are presented in the corresponding paragraphs. The findings are organised in line with the titles of the dependent variables of the study (i.e. computer anxiety, CSE and attitude towards the internet) but start with the participants' biographical information.

Personal Data and Internet Experience

Table 2 provides the participants' relevant personal data and internet experience from sections 1 and 2 of the questionnaire.

Table 2: Personal and school data

		N	%
Gender	Male	94	37.5
	Female	157	62.5
School where students matriculated from	Town	48	21.1
	Township	180	78.9
Where the school was located	Urban area	115	56.4
	Rural area	89	43.6
Computer at home		74	29.8
Internet at home		90	36.4

More females than males took part in the research (more female students registered). Their ages were between 17 and 40 years, and the mean age was 20.80.

The majority of the students were from township schools and most of these township schools are situated in urban areas. In South Africa, township schools refer to schools situated in previously racially segregated areas (mainly black labourers) within a town or a city. The majority of these schools are no-fee schools and lack resources, such as working computers, internet connectivity and interactive whiteboards (Mampane and Bouwer 2011). Many of the students attended a school in a rural area and these schools

are more disadvantaged with regard to technology than urban area schools (Tire and Mtlitwa 2008).

In this technological age where computers, the internet and technology are assumed to be general knowledge to all, the research findings revealed that the majority of students who start higher education do not have a computer or internet access at home. This was expected in light of the disadvantaged backgrounds of the majority of students. More students, however, have access to the internet at home and a possible reason for this can be that students use their cell phones/smartphones to gain access to the internet. It is thus important that there should be sufficient facilities at HEIs for students to use to complete electronic assignments and research projects in order to advance academically.

A non-parametric test (Chi-square) was conducted for different types of internet usage by students and the inferential analysis is displayed in Table 3.

Table 3:   Internet usage

I have used the internet for …	N	%	Chi-square	Sig.
Downloading software and games	131	52.2	.48	.487
Shopping	28	11.2	151.49	.000
Research	224	89.2	154.62	.000
Newsgroups	104	41.6	7.06	.008
Games	137	55.7	3.19	.074
Product and service information	138	55.6	3.16	.075
Entertainment	163	66.3	26.02	.000
Education (electronic papers, etc.)	172	69.1	36.24	.000
E-mail	140	43.1	4.70	.030
Social networking	200	20.3	88.45	.000

Internet activities that obtained a *p*-value of less than 0.05, had statistical significance. It is evident from the descriptive statistics provided in Table 3 that most undergraduates use the internet for research, social networking and education. It is very promising that students also use the internet for research and education. Although this corresponds with findings from other studies which suggest that undergraduates tend to use the internet extensively for educational purposes such as research (Sam, Othman and Nordin 2005), it is important to determine how students use the internet, for example, are they merely copying and pasting? Since a high percentage of the participants indicated that they use the internet for research, it is necessary to investigate the academic use of the internet for research among undergraduate students. The use of internet for social networking is to be expected, as young people are constantly on Facebook and other social media. The survey indicated that newsgroups as an internet activity is almost not used by students.

Although most students send and receive e-mails, it would be expected that more students would use this communication method. A lack of e-mail usage can be problematic as students may be required to communicate with lecturers and other students.

The activities that obtained a score higher that the significant value, were indicative of non-statistical significance (i.e. Downloading software and games; Games; and Product and service information).

The inferential analysis in Table 4 is based on the participants' responses. A non-parametric chi-squared test was conducted to test for the significant relationship between use of internet for various activities and gender at 5 per cent level of significance.

From the 10 internet activities subjected to statistical testing, four indicated statistical significances, which included: using the internet for downloading software and games; online gaming; entertainment and e-mail purposes. These four activities are indicated in Table 4.

Table 4:   Different internet activities

Internet activities			Gender		Total	Chi-square value	Df	p-value
			Male	Female				
Down-loading software and games	Yes	Count	64	67	131	15.214	1	0.000
		% within downloading software and games	48.90	51.10	100.00			
Games	Yes	Count	64	73	137	12.542	1	0.000
		% within games	46.70	53.30	100.00			
Entertainment	Yes	Count	72	91	163	8.329	1	0.004
		% within entertainment	44.20	55.80	100.00			
e-mail	Yes	Count	60	80	140	4.135	1	0.042
		% within e-mail	42.90	57.10	100.00			

From Table 4, it can be concluded that the statistical tests revealed that there was a statistical significant relationship between using internet for downloading software and games and gender at p-value less than 0.05, Chi-square (1) = 15.214, p-value = 0.000. However, more female students (67; 51.1%) use the internet for software and games than male students (64; 48.9%). There was also a statistical significant relationship between using internet for games and gender at p-value less than 0.05, Chi-square (1) = 12.542, p-value = 0.000. It is evident that more female students (73; 53.3%) use the internet for games than male students (64 = 46.7%). There was also a statistical

significant relationship between using the internet for e-mail and gender at p-value less than 0.05, Chi-square (1) = 4.135, p-value = 0.042). Lastly, there was a statistical significant relationship between using the internet for entertainment at p-value less than 0.05, Chi-square (1) = 8.329, p-value = 0.004. The descriptive statistics highlighted that more female students (91; 55.80%) use the internet for entertainment than male students (72; 44.20%).

There was no further evidence found for statistical significance between the other internet activities and gender at p-value less than 0.05. These activities included: Shopping (Chi-square (1) = 1.085, p-value = 0.298); Research (Chi-square (1) = 0.219, p-value = 0.640); Newsgroups (Chi-square (1) = 0.311, p-value = 0.577); Product and service information (Chi-square (1) = 0.353, p-value = 0.552); Education (electronic papers, etc.) (Chi-square (1) = 1.237, p-value = 0.266); and Social networking (Chi-square (1) = 0.001, p-value = 0.974). The findings, amongst others, correlate with those of a study done by Makhitha (2014), who found that although students do not shop online, they do access the internet for other purposes. The researcher depicted a common occurrence from the statistical data in the study. Male students mainly use the internet for downloading software and games, games, entertainment and social networking which corresponds with the findings of Hartmann and Klimmt (2006). Neither male nor female students are particularly interested in using the internet for shopping.

The data pointed out that more female students are users of the internet than male students in general for the internet activities tested in the study.

LEVELS OF COMPUTER ANXIETY, CSE AND ATTITUDES TOWARDS THE INTERNET

Table 5 represents the recoded responses of the different levels of computer anxiety, CSE and attitude towards the internet. The frequency statistical procedure was applied in calculating the proportions (%) for low, medium and high levels.

Table 5:   Different levels of computer anxiety, CSE and attitudes towards the internet

	Computer anxiety	Computer self efficacy	Attitude towards the internet
Low	0.40%	9.20%	
Medium/Moderate	85.70%	57.20%	
High	13.90%	33.60%	
Negative			0%
Neutral			40.80%
Positive			59.20%

Computer Anxiety

Based on frequencies run on recoded indexes, scores ranged from 19 (low level of computer anxiety) to 79 (high level of computer anxiety). Thus, based on the responses to the CARS, undergraduate students showed moderate computer anxiousness (85.7%). There was a small portion of students with a high level of computer anxiety (13.9%). One of the reasons contributing to the computer anxiousness of undergraduates may be the fact that 74.6 per cent of students, who attended township schools, do not have a computer at home (see Table 2). The research of Zeidner and Matthews (2011) shows that these students will have an increased resistance to technology and this anxiety will represent a barrier to the student's involvement with computers. During their actual computer interaction, these students might experience poorer performance and debilitating thoughts.

The large number of students with computer anxiety, although moderate can probably be attributed to their backgrounds with regard to their previous schools (townships and rural) and the lack of computer facilities at home (see Table 2).

The results of the study showed that students with high computer anxiety levels tend to restrict their use of the internet to research and education. It is therefore imperative that computer anxiety should be brought down to the minimum amongst undergraduate students to enable them to use technology to their advantage in furthering their studies.

The CARS questionnaire revealed that the majority of undergraduates (69.3%) are very eager to use a computer for their studies and that they are confident (66.9%) that they will be able to learn the necessary computer skills. This is a very promising finding, particularly given the fact that 57.4 per cent are hesitant or frightened to use a computer. The general assumption here is that with enhanced computer familiarity and improved computer skills, computer anxiety might lessen. This assumption is in line with research conducted by Chien (2008), who found that computer knowledge and experience can reduce computer anxiety. However, Hauser, Paul and Bradley (2012) warn that repeated computer exposure without the assistance of anxiety-reducing tools would cause a feedback loop that could result in increasingly higher computer anxiety levels.

Computer Self-Efficacy

The CSE levels are explained in terms of results of the CSES. Based on frequencies run on recoded indexes, responses on the CSES ranged from 29 (low CSE) to 145 (high CSE). In Table 5, it is seen that 57.2 per cent of students have a moderate CSE based on their responses to CSEC, while a small group of students have a low CSE.

Lecturers expect high quality assignments/projects from students with information. It is however not always possible for students to deliver on this expectation. It is therefore important that lecturers should guide students regarding the format, font and font size of an assignment. The quality of work may be influenced by the following CSES results. Only 29.9 per cent of students are confident in handling/using a memory

stick. This implies that first year students are ignorant when saving and retrieving work. The implications are predictable in terms of the effect this may have on the quality of assignments they have to complete. It deprives them of the opportunity to work on their assignments gradually and at different places and times in order to edit, work and effect changes where and when needed. Having limited access to a single work station can be a frustrating experience, since it also has implications for the quality of their work.

Spreadsheets are an inevitable part of technology which students are likely to use for future projects, in their careers and also in their personal lives. Spreadsheets enable students to do simple calculations, draw graphs and do high quality presentations when reporting research findings. Only 17.6 per cent are confident in working with numeric data such as a spreadsheet. It is therefore vital that undergraduate students get assistance in working with a simple spreadsheet.

The results of the CSES showed that only 32.3 per cent of students feel that they can use a word processor for creating a document. A mere 30.3 per cent of students are comfortable with moving the cursor around on the screen. Both these skills can influence the efficiency and quality of work that students will present. A mere 29.3 per cent of students feel confident about making a printout of a document. This is a basic function which can create problems when submitting hard copies of printed assignments. Thus is it important that lecturers give clear guidelines with regard to printing of a document.

When internet research is done and students work with large amounts of data, it is crucial that the data is kept organised and systematic. Just 20.8 per cent of students indicated that they can organise files and data on a computer and on a memory stick.

Another factor that can lead to lower CSE levels is that only 25.9 per cent of students are confident in using the help function. Therefore, they have to rely on fellow students or other people to assist them when they encounter a computer problem or if they do not have the skill to do a certain function. This can compromise their problem-solving skills.

Attitudes towards the Internet

On re-coded indexes where scores ranged from 38 (negative attitude towards the internet) to 152 (positive attitude towards the internet), it is clear that no student displays a negative attitude towards the internet. The majority of students (59.2%) display positive attitudes towards the internet based on their responses to the IAS. There may be two reasons for this: mobile technology such as smart phones are available to most of the students, and the availability and accessibility to computers and the internet on campus.

Comparing students' confidence in working on the internet and working on a personal computer, led to apparently contradicting results. Almost a similar percentage of students (33.9% and 31.1%) strongly agreed that they have confidence in working on the internet and on a computer. However, only 16.5 per cent of students were not confident with internet surfing, whilst 39.9 per cent of students were not confident in working with

a computer at all. This seemingly contradicting figures raise a question as to the role of other technologies such as smart phones. Students who have access to a smart phone, have immediate access to the internet, thus surfing is not a "new" experience to these students. The results from this study indicate that undergraduate students with positive internet attitudes prefer to use the internet for activities such as downloading software and games, to obtain product and service information, entertainment, education, e-mail and social networking.

A concern is the neutral attitude towards the internet. This can be an indication that students do not have adequate basic knowledge of the internet and that these students do not value the use of the internet to promote learning. This can be overcome if the university starts to promote the internet for teaching and learning.

GENDER DIFFERENCES IN COMPUTER ANXIETY, CSE AND ATTITUDES TOWARDS THE INTERNET

Table 6 includes both descriptive and inferential statistics and it reveals the differences in computer anxiety, CSE and attitude towards the internet based on gender. Inferential statistics were done by means of a parametric test (Anova).

Table 6:   Differences based on gender

	Gender	N	Mean	Std deviation	T	p-value	Df	Mean difference	Std error difference
Computer anxiety	Male	94	52.98	4.39	−0.846	0.399	249	−0.53392	0.6313
	Female	157	53.51	5.09					
Attitude towards the internet	Male	94	118.05	15.26	0.447	0.655	249	0.88018	1.96807
	Female	157	117.17	14.99					
Computer self-efficacy	Male	91	105.14	26.99	1.271	0.205	246	4.844	3.81046
	Female	157	100.30	29.98					

An independent sample *t*-test was conducted to test for the significant difference between male students and female students with respect to computer anxiety, attitude towards internet and CSE at 5 per cent level of significance (alpha = 0.05). The following conclusions are made from Table 6:

- There was no statistical significant difference between male students and female students with regard to computer anxiety at p-value greater than 0.05, $t(249)$ = –0.846, p-value = 0.399. Therefore, the hypothesis is not rejected. It is evident that female students (mean = 53.5134) seem to have more computer anxiety than male students (mean = 52.97949).

- There was no statistical significant difference between male students and female students with regard to internet attitude at p-value greater than 0.05, $t(249)$ = 0.447, p-value = 0.655. Therefore, the hypothesis is not rejected. Male students (mean = 118.05168) have a slightly better attitude towards the internet than females (mean = 117.17150). This can be directly contributed to females' lower CSE.

- Lastly, CSE was more prominent with male students (mean = 105.14317) than female students (mean = 100.29918). There was no statistical significant difference between male students and female students with regard to CSE at p-value greater than 0.05, $t(246)$ = 1.271, p-value = 0.205. Therefore, the hypothesis is not rejected. This finding is consistent with findings by Ong and Lai (2006) and Huffman, Whetten and Huffman (2013). This may be related to gender stereotypes, since it is generally believed that males are better at computing than females. In the current study, female students exhibited lower CSE, therefore female students require greater motivation and self-confidence to use computers. Female CSE can be more positive if they provided with details on computing tasks (Bao, Xiong, Hu and Kibelloh, 2013). However, additional research is needed to confirm the above statement.

CONCLUSION

Low computer anxiety and high CSE levels are important factors in assisting students to be academically successful in the present technological era. A lack of computer access and skills may lead to computer anxiety and low self-efficacy among undergraduates entering higher education.

The study results suggest that the participants display moderate levels of computer anxiety and CSE, but positive attitudes towards the internet upon starting their higher education. The findings emphasise the value of addressing student computer anxieties as part of their learning experience in higher education. Thus, the study findings embrace the value of CSE to lessen students' computer anxiety. Therefore, based on the study findings, it may be suggested that meaningful computer courses that include computer literacy (such as handling memory sticks, moving a cursor, using the help function, file organisation); learning of computer applications (such as word processing, spreadsheets and presentations); and using the internet will improve students' CSE and result in lower computer anxiety, especially in the first year of study. It is therefore proposed that in addition to computer courses, HEIs should regularly offer a series of informal, practical

workshops and demonstrations during which undergraduates can be given individual attention to address computer anxiety and CSE problems.

High CSE will be fostered with more computer experience and usage, and it is imperative that students be exposed to computers on a regular basis. The study results must be considered in light of its limitations. The questionnaire was not free of subjectivity in the responses. The questionnaire was administered to a group of students coming from different socio-economic backgrounds with a wide range of English skills. Not enough studies have been done to prove the relationship of various backgrounds (socio-economic) on computer anxiety. More studies need to be done in this area. This will be helpful to enable curriculum developers to design and develop programmes and techniques that address the unique computer related needs of different groups of students.

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