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Computer usage and the validity of self-assessed computer competence among first-year business students

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Abstract

This study evaluates the reliability of self-assessment as a measure of computer competence. This evaluation is carried out in response to recent research which has employed self-reported ratings as the sole indicator of students' computer competence. To evaluate the reliability of self-assessed computer competence, the scores achieved by students in self-assessed computer competence tests are compared with scores achieved in objective tests. The results reveal a statistically significantly over-estimation of computer competence among the students surveyed. Furthermore, reported pre-university computer experience in terms of home and school use and formal IT education does not affect this result. The findings call into question the validity of using self-assessment as a measure of computer competence. More generally, the study also provides an up-to-date picture of self-reported computer usage and IT experience among pre-university students from New Zealand and South-east Asia and contrasts these findings with those from previous research.

Keywords: Self-assessment; Computer competence; Home; School; Business

1. Introduction

When devising the computing component of undergraduate degree programmes, educators at tertiary level should bear in mind that the increasing use of technology by pre-university students,

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both as a curricular and extra curricular activity, could have a significant impact on curriculum design. By taking account of university entrants' computer competence, educators could ensure that, on the one hand, valuable resources are not squandered providing the more computer literate students with skills and knowledge which they already possess, while on the other, they could also devote more resources to developing programmes for entrants who lack basic computer competence skills. From the students' point of view, those who are more computer literate would not become frustrated covering material which is already familiar to them while those who are less computer literate would not feel constantly disadvantaged by their more knowledgeable peers. In short, by recording and assessing computer competence among entry-level students, educators could allocate limited resources more effectively throughout the degree programme (Stoner, 1999).

A mechanism which has been used extensively in the literature to assess computer knowledge and skills among students is self-assessment (see for example Hakkarainen et al., 2000; Karsent & Roth, 1998; Nurjahan, Lim, Foong, Yeong, & Ware, 2000; Stoner, 1999; van Braak, 2004). However, while self-assessment is useful in facilitating the derivation of attitudinal data which can feed effectively into course design (Karsent & Roth, 1998), its accuracy in providing information on knowledge and competence is much more problematic. Numerous research studies have reported significant leniency bias among subjects who were asked to self-assess (see Boud & Falchikov, 1989 for a review of these studies). In particular the tendency towards leniency has been much more evident among the less able subjects, with those of greater ability and experience demonstrating greater accuracy in their self-assessment. However, despite this widely reported fundamental flaw in self-assessment, it is still being relied upon in current studies as an indicator of computer competence among university students (van Braak, 2004).

The objective of this study is to explore self-assessment further and, in particular, to determine whether students' previous computing experience, gained through frequent use of computers at home and at school and formal information technology (IT) study prior to commencing university, has led students to assess their computer competence more accurately. The research was carried out among first-year undergraduate students studying business at a university in New Zealand.

The research objective is twofold. First, statistics regarding the levels of computer usage at home and at school among pre-university students are reported and contrasted with findings from previous research in the area to provide an up-to-date picture of computer usage among pre-university students in New Zealand and South-east Asia. Second, data collected in the study are analysed to evaluate the reliability of self-assessment as a measure of computer competence. The results reveal a statistically significant over-estimation of computer competence among the students surveyed. Furthermore, reported pre-university computer experience in the form of home use, school use and formal IT education does not affect this result.

2. Computer experience at home and at school

Much of the educational literature which examines students' use of computers at home confirms that the domestic computing environment makes a positive contribution to students' general computer competence (see for example Mumtaz, 2001; Papert, 1980, 1993; Selwyn, 1998; Shoffner, 1990; Subrahmanyam, Greenfield, Kraut, & Gross, 2001). This positive correlation between computer proficiency and experience gained using the computer at home is particularly significant since the consensus in the literature is that students make greater use of computers at home than they do at school.

Despite the passage of time, school use of computers still appears to lag well behind home use. The educational literature proffers a number of explanations for this phenomenon. First, Hollingsworth and Eastman (1997) report that the computer technology available to students at home is often superior to that available at school. While this is undoubtedly a direct consequence of financial investment in hardware and software, it may also reflect the age of many school properties which are restricted in terms of space to accommodate new technologies and structure to permit the incorporation of high speed cabling (Eadie, 2001). Therefore, students may prefer to work at home because their own computer system is technologically superior to the one available at school (Mumtaz, 2001). While this may be the case, there is no evidence, however, in the literature to suggest that children living in households which are better endowed with computer technology than their schools go on to third level education. The apparent superiority of home computer systems over those available in schools suggests that, for the time-being at least, school computer systems in most countries are 'playing catch-up' with domestic systems. Second, students working at home probably find themselves in a less restrictive environment (Downes, 1996, 1999). Subject to parental consent, they are free to choose an application, determine the time spent using the computer and work as individuals rather than having to share with another pupil. Third, students may not find applications used at school as stimulating and challenging as those they choose to use at home (Underwood, Billingham, & Underwood, 1994). For example, word processing appears to be the most popular application at school (Davis, 1990; Moffatt & Greenman, 1995; Mumtaz, 2001). Yet students find it a time-consuming and boring activity (Buckingham, 1999). This contrasts with the most popular activity in home computing, namely playing games (see for example Cunningham, 1994; Hakkarainen et al., 2000; Mumtaz, 2001; Underwood et al., 1994). Yet there are also educational benefits to be derived from playing computer games. The important role played by computer games in developing cognitive skills was explored in a study by Subrahmanyam et al. (2001). They reported that 'the suite of skills children develop by playing such games can provide them with the training wheels for computer competence, and can help prepare for science and technology' (Subrahmanyam et al., 2001, p. 13).

Notwithstanding the general agreement in the literature that domestic computer use appears to be popular among school children of all ages, it is of course generally accepted that frequency of home use and the choice of application differs between males and females. The consensus is that male students appear to be more frequent users of computers at home than their female counterparts (see for example Busch, 1996; Durndell & Thomson, 1997; Harris, 1999; Levin & Donitsaschmidt, 1995; Volman, van Eck, Heemskerk, & Kuiper, 2005). Indeed, Selwyn (1998) considers gender to be a 'divisive factor in students' use of home computers' (Selwyn, 1998, p. 225). Janssen Reinen and Plomp (1997) report similar results in their trans-national study, covering 10 countries. Males generally appear to have greater access to computers than females throughout the 10 countries included in their study. However, it is worth noting that the extent of gender equality did differ among countries. On the one hand, significant equality in home computer usage between male and female students is reported in the US while significant inequality is found in Austria, Germany and Latvia. A possible explanation for gender inequality in home computer use is parents' attitude to buying computers for their children. There would appear to be a greater willingness among parents to buy a computer for their son rather than for their daughter (Newton & Beck, 1993). Furthermore, the choice of applications used at home also appears to differ between the sexes with boys reporting a preference for games and girls opting for word processing packages (Harris, 1999) and communication software (Mumtaz, 2001; Selwyn, 1998; Volman et al., 2005). Interestingly, Subrahmanyam et al. (2001) suggest that greater use of communication software among females may help to equalize the gender imbalance in computer use in general.

However, while the majority of studies confirm that male students use computers at home more than their female counterparts, a number have reported contrary findings. Roberts, Foehr, Rideout, and Brodie (1999) reported that, among 14–18 year-olds in the US, girls appeared to be using computers at home on a daily basis more often than boys. Another US-based study by Schumacher and Morahan-Martin (2001) reported that while males admitted to playing more computer games and writing more computer programs than their female counterparts, gender differences did not occur in reported home use and high school use of computers. In fact their 1997 survey, reported in 2001, was a follow-up to an identical survey undertaken seven years earlier. By comparing the findings from both studies, they concluded that over time gender differences in most areas had diminished. In the UK, Harris (1999) confirmed that while 14 year-old boys reported more frequent use of home computers than 14 year-old girls, there were no significant gender differences in the length of time spent actually using the computer during each period of use.

In respect of gender equality in computer use at school, a number of studies have revealed conflicting results. Roberts et al. (1999) reported greater use of computers at school by male students. However, Mumtaz (2001) found no significant difference in the frequency with which primary school boys and girls make use of the computer at school. A similar finding was reported by Janssen Reinen and Plomp (1997) with respect to students in the USA and Bulgaria. They went on to suggest that having female IT teachers as role models was a possible factor in contributing to the popularity of computer use at school among female students in these countries. They applied the same theory, i.e., fewer female role models, to explain why fewer female students than male students reported using computers at school in countries such as Austria, Germany and Latvia.

The current study builds on and updates this body of knowledge by gathering information on computer use at home and at school, as well as on the extent of formal IT study, among a cohort of students prior to commencing studying business at a university in New Zealand. As well as comparing statistics with those of the aforementioned studies to present an up-to-date picture of computing experience among pre-university students in the New Zealand, South-east Asia area, this information, together with the students' marks from subjective and objective tests, forms the basis for determining whether computing experience at home and at school has impacted on students' ability to self-assess their own level of computer competence accurately.

3. Evaluating self-assessment accuracy

Educational research has examined the reliability of self-assessment as an indicator of students' knowledge across a variety of disciplines (see Douchy, Segers, & Sluijsmans, 1999, for a review of the literature). While a number of these studies report convergence between students' self-ratings and either teachers' ratings or objective measures (Hakkarainen et al., 2000; Sharma, 1991;

Stefani, 1994), the majority reveal some degree of leniency bias among the students (see for example Boud & Falchikov, 1989; Longhurst & Norton, 1997; McCourt Larres, Ballantine, & Whittington, 2003; Mowl & Pain, 1995; van Vliet, Kletke, & Chakraborty, 1994).

Agreement between self-evaluation and alternative measures of assessment has been reported in a number of studies. For example, Stanton (1978) and Stefani (1994) observed that self-ratings awarded by students were as reliable as those awarded by teachers. Stefani's (1994) results led her to conclude that students have a realistic perception of their own abilities. As a result she advocates the use of self-assessment as a reliable means of both summative and formative assessment. Further studies carried out in an educational context have also found agreement between self-evaluation and other methods of assessment. For example, in a study involving recruits to a prestigious military college, Fox and Dinur (1988) found that self-ratings among the participants were significantly related to evaluations by supervisors and peers. Similarly, Sharma's (1991) research into self-assessment among psychology students at an Indian technology college revealed a satisfactory match between the marks which the students expected to achieve in a test and those which they actually obtained. The results led the author to conclude "that self-assessment can be effective and meaningful" (p. 77).

However, despite the body of research which reports convergence between student self-ratings and ratings from other sources, the vast majority of studies into self-assessment in education have found disagreement. In particular, the tendency to over-estimate knowledge appears to be more pronounced among less able and less experienced students. For the most part, their more able and more experienced counterparts display greater self-assessment accuracy (Boud & Falchikov, 1989; Longhurst & Norton, 1997; McCourt Larres et al., 2003; Mowl & Pain, 1995; Orsmond, Merry, & Reiling, 1997; Sullivan & Hall, 1997; van Vliet et al., 1994). Furthermore, Boud and Falchikov (1989), in their critical review of the literature, also reported that where more experienced students' self-ratings differed from those of their teachers, the students tended to err on the side of under-estimation of knowledge and competence. Research carried out by Stanton (1978), based on earlier work by Mueller (1970), and included in Boud and Falchikov's (1989) review, suggests that these students' wider experience produces a more realistic assessment of their own abilities in relation to their studies. Their experience makes them aware of knowledge and skills which they lack and therefore leads them to self-assess more strictly (Grigg & Stephens, 1999). Brown, Bull, and Pendlebury (1997) put forward a similar proposition saying that increasing in experience and knowledge enables one to assess one's own ability more accurately.

Following on from the consensus in the literature that accuracy in self-assessment increases with experience, this research explores the possibility that the high level of computer usage at home and at school and formal study of IT among today's post-secondary education youth provides sufficient experience to permit a relatively accurate self-assessment of computer competence at university entrance level.

4. Methodology

To evaluate the accuracy of self-assessment with respect to computer competence, it was decided to follow the methodology adopted by McCourt Larres et al. (2003) and van Vliet et al. (1994) and compare a self-evaluation score with an objective score returned by entry-level undergraduate business students and test for agreement across a number of areas of computer competence. The six areas of core computer competence tested were general computing, spreadsheets, word processing, database knowledge, internet/communications technology and presentation software. The first four correspond with the core areas of computer competence for business majors identified by van Vliet et al. (1994) in their seminal work in the area. The inclusion of internet/communications technology reflects the pervasive use of this technology in a domestic, educational and business setting (McCourt Larres et al., 2003). Finally, the importance of transferable skills in education (Ballantine & McCourt Larres, 2004) is acknowledged by including presentation software. These six categories of computer competence also correspond with the core areas of the European and International Computer Driving Licence (ECDL, 2000) and reflect the areas of computer competence employed by van Braak (2004).

A questionnaire devised by McCourt Larres et al. (2003) was used to collect the data for analysis. The structure of this research instrument is as follows. First, section one comprised general questions to elicit background information on the subjects such as gender, whether they had studied IT before and the frequency with which they used a computer at home and at school prior to commencing university. When describing frequency of use at home and at school respondents were invited to choose from a five point Likert scale with verbal anchors, i.e., 'daily' and 'never'. Section two of the questionnaire consisted of 38 questions covering the six areas of computer competence. There were six questions each covering general information technology awareness, spreadsheets, word processing, databases and presentation software and eight questions in respect of e-mail/internet. Students were required to respond to statements such as 'I feel comfortable opening and saving spreadsheet files' by selecting from a five-point Likert scale with a high positive anchor point at one end of the scale (5 representing 'strongly agree') and a low negative anchor point at the other end (1 representing 'strongly disagree'). Their responses represented their perceived level of knowledge in each of the areas of computer competence. Section three of the questionnaire set out 18 multiple-choice objective tests. To be consistent with section two, multiple-choice objective tests represented each of the six areas of computer competence. Each of the multiple-choice questions had five possible answers, namely one correct, three deflectors and a fifth choice worded 'I don't know'. This fifth choice had been included to avoid the situation where respondents might be tempted to guess the answer to the questions (see Curtis, Gardener, & Litzenberg, 1986). Multiple-choice tests are ideal for assessing knowledge for a number of reasons. Apart from being quick to mark, 'they provide for ready analyses and comparisons between groups. Further features are that they reward only precision and consequently do not reward partial knowledge' (Hibberd, 1996, p. 377).

The research instrument was distributed among entry-level students to a business degree at Lincoln University (LU), New Zealand, during the first week of the academic year before computer instruction of any kind had been given. The purpose of the study was indicated on the front of the research instrument and was reiterated by the researchers during distribution. The instructions also included a guarantee of confidentiality of the results. Additionally, students were encouraged not to guess the answers to the multiple-choice questions and to select the 'I don't know' option where appropriate. They were reassured that there was no disadvantage in not knowing the answer since the marks obtained from the survey would in no way affect their course marks.

5. Preliminary statistics

In total 147 responses were received from the students at Lincoln University. Of these, 24 proved unusable for analysis, resulting in an effective response rate of 84%. Set out below is Table 1, a table of preliminary statistics and demographic characteristics of the respondents.

In total, 62% of the respondents are male and 38% female. The majority of the students (45%) were educated in New Zealand. However, almost as many, i.e., 42%, were educated in China. The remaining students received their pre-university education in a variety of countries, all of which are in South-east Asia. Panel A of Table 1 provides a list of countries where at least two respondents received their most recent pre-school education. Panels B, C and D provide statistical information regarding the students' previous formal and informal computing experience, at home and at school. Overall, in terms of frequent use, 59% of students report using a computer at home daily whereas only 41% claim to have used it at school on a daily basis. The predominance of reported home use over school use highlighted in panels B and C, corresponds with that reported by Mumtaz (2001). She recorded figures of 33% for daily home use as opposed to a staggeringly low 2% for daily school use, though only at primary school level. The statistics in the current study provide strong support for the proposition put forward by Selwyn (1998) that 'many students are more likely to come into contact with IT at home than they are at school' (p. 212).

Table 1
Preliminary statistics and demographic details of respondents

	Male		Female		All	
	No.	%	No.	%	No.	%
Panel A: Country of most recent education						
New Zealand	37	48.8	18	38.3	55	44.7
China	31	40.8	21	44.6	52	42.3
Malaysia	2	2.6	3	6.4	5	4.1
Hong Kong	1	1.3	1	2.1	2	1.6
Papua New Guinea	1	1.3	2	4.3	3	2.4
Other	4	5.2	2	4.3	6	4.9
Total	76	100.0	47	100.0	123	100.0
Panel B: Daily use of a computer at home						
Yes	41	53.9	31	65.9	72	58.5
No	35	46.1	16	34.1	51	41.5
Total	76	100.0	47	100.0	123	100.0
Panel C: Daily use of a computer at school						
Yes	29	38.2	21	44.7	50	40.6
No	47	61.8	26	55.3	73	59.4
Total	76	100.0	47	100.0	123	100.0
Panel D: Previous IT study						
Yes	15	19.7	7	14.9	22	17.9
No	61	80.3	40	85.1	101	82.1
Total	76	100.0	47	100.0	123	100.0

An interesting aside, not included in Table 1, is the level of reported home and school use among New Zealand-educated students relative to China-educated students. When analysed according to country of most recent education, the statistics reveal that a higher percentage of New Zealand-educated students use a computer at school on a daily basis (50%) than is the case among students who were educated in China (35%). The particularly high usage of computers at school in New Zealand may reflect the fact that 'primary as well as lower secondary schools in…New Zealand…seem to be very well equipped in terms of quantity of hardware' (Pelgrum, 2001, p. 166). The same pattern emerges with respect to daily home use with 65% of New Zealand-educated students using the computer at home on a daily basis as opposed to only 55% for those who were educated in China. However, 55% is still a relatively high percentage for daily home use in a country where a computer in the home is not nearly as commonplace as it is in many western countries. The fact that so many of these Chinese respondents reported daily home use of a computer may be indicative of their relative status and wealth within their society given that they can afford to study for a degree abroad. This position would not appear to be reflected across the country. 'Throughout the summer, Xu's [a student from south China's Guangxi Zhuang Autonomous Region] house was crowded with villagers eager to see what a computer was like and how it worked. Some even came from the other side of the mountain to see the novelty' (People's Daily, 2002).

Panel D reports the figures for students who have formally studied IT prior to commencing the business degree programme. The figures overall are very low with only 18% having studied IT. Again, when these figures are analysed according to country of previous study, they reveal that 21% of New Zealand-educated students had studied IT before university whereas the number fell to 14% among China-educated students.

When the data are analysed according to gender, there is both agreement and conflict with previous research. First, 66% of female as opposed to 54% of male students use home computers daily. If these figures are analysed further, according to country of most recent education, the gender differential among New Zealand-educated students is sustained with 72% of female compared with 62% of male students using a computer on a daily basis. This finding contrasts with previous research which reports that male students use a home computer on a much more frequent basis than female students (see for example Comber, Colley, Hargreaves, & Dorn, 1997; Durndell & Thomson, 1997; Mumtaz, 2001; Selwyn, 1998). However, there is greater gender equality among the students who were educated in China with 54% of boys and 57% of girls claiming that they use the computer at home on a daily basis. This finding is similar to those of Schumacher and Morahan-Martin (2001) who reported equal use of home computers by boys and girls.

6. Research questions

The data collected from the questionnaire distribution were used to address two major research questions. First, the study focussed on determining whether self-assessed levels of computer competence returned by all of the students corresponded with levels of computer competence attained in objective tests. Second, to examine the theory established in the literature that more experienced subjects deviate towards greater accuracy in self-assessment than less experienced subjects, the subjective and objective measures of computer competence were compared between two groups of students, namely those with computer experience and those without. Three separate variables were used to represent computer experience, namely, *studying IT before entering university*, *daily use of a computer at home* and *daily use of a computer at school*. The research questions devised to address the objectives of the study were as follows:

RQ1: Are there any significant differences in the subjective and objective assessment scores of entry-level business students' computer competence across six core areas of computer competence?

RQ2: Are there any significant differences in the subjective and objective assessment scores of computer competence across six core areas of computer competence between students who have studied IT and those who not studied IT prior to commencing an undergraduate business degree?

RQ3: Are there any significant differences in the subjective and objective assessment scores of computer competence across six core areas of computer competence between students who used a home computer daily and those who did not use a home computer daily prior to commencing an undergraduate business degree?

RQ4: Are there any significant differences in the subjective and objective assessment scores of computer competence across six core areas of computer competence between students who used a school computer daily and those who did not use a school computer daily prior to commencing an undergraduate business degree?

7. Data analysis and findings

To address the research questions highlighted in the study, the data collected from the questionnaire distribution were analysed as follows. Relative scores were calculated for the self-assessment test (section B) and for the objective test (section C) to facilitate a comparison between data measured on two different scales, namely ordinal data for the self-assessment test and binary data for the objective test (1 representing a right answer and 0 if otherwise). This involved totalling the score achieved by the respondents in each of the areas of computer competence and expressing it as a percentage of the maximum score possible in that area (McCourt Larres et al., 2003; van Vliet et al., 1994). Since some of the data are on an ordinal scale of measurement, a nonparametric statistical test was considered to be the most appropriate analytical tool (Siegel & Castellan, 1988). To this end, the *Wilcoxon* matched-pairs signed-ranks test, a non-parametric version of the paired-difference *t*-test, was considered the most appropriate test. The relative scores for the objective and subjective questions were paired within subjects and the differences analysed across all six areas of computer competence. The results of the test are presented in Table 2.

With respect to the first research question, *RQ1*, the results of the *Wilcoxon* test reveal that there are significant differences between the students' self-assessed levels of computer competence and

Table 2
Wilcoxon matched-pairs signed-ranks test of the computer competence of entrants to an undergraduate business course using subjective and objective tests

	Mean ranks[c]		Relobj[a] > Relsub[b]	Relobj[a] < Relsub[b]	Ties	*Z* score	*P*
	Relobj[a]	Relsub[b]					
General computing[d]	24.79	64.99	12	109	1	−8.778	0.000*
Spreadsheets	15.00	62.48	5	115	3	−9.313	0.000*
Word processing[e]	22.44	61.65	16	95	10	−8.092	0.000*
Databases	8.90	63.75	5	117	1	−9.475	0.000*
E-mail/Internet[f]	27.90	63.80	20	94	2	−7.690	0.000*
Presentation software[g]	33.16	63.88	22	93	2	−7.273	0.000*

[a] Relative score achieved in objective test
[b] Relative score achieved in subjective test.
[c] Unless otherwise stated, $N = 123$.
[d] $N = 122$.
[e] $N = 121$.
[f] $N = 116$.
[g] $N = 117$.
* Indicate that differences are significant at the 1%.

their objectively determined levels of computer competence across all six of the core areas identified. The self-assessed scores are significantly greater than the scores achieved in the objective tests. Further, all of the differences between the two sets of scores are statistically significant at the 1% level. These findings confirm the theory that, when asked to assess their computer competence, subjects are pre-disposed towards leniency (Jawahar, 2001; Longhurst & Norton, 1997; McCourt Larres et al., 2003; Mowl & Pain, 1995; van Vliet et al., 1994). The inference to be drawn from these findings is that when evaluating computer competence among undergraduates, educators at tertiary level should treat self-assessment instruments with extreme caution and that these questionnaires should only be used as an adjunct to an alternative more objective measure. To rely solely upon students' self-assessed measures as an indicator of computer competence (see for example Stoner, 1999; van Braak, 2004) appears to be educationally naïve.

For the purpose of testing *RQ2*, *RQ3* and *RQ4*, two additional procedures were applied to the data. First, the relative scores achieved across all of the objective questions and the relative scores achieved across all of the subjective questions were totalled to arrive at an aggregate objective measure and an aggregate subjective measure of computer competence for each student. Second, the difference between these two relative measures was calculated. This relative difference in the total subjective and objective scores was compared between two groups of students identified as having more and less computer experience. The Mann–Whitney *U* (M-W U) test of independence was then applied to test the data. To address *RQ2*, *RQ3* and *RQ4*, the M-W U test was repeated three times using a different variable each time to represent computing experience, namely *having studied IT before entering university*, *daily use of a computer at home* and *daily use of a computer at school*. The results of the test are presented in Table 3.

The results of the tests confirm that there is no significant difference between the two groups with respect to all three measures of computer experience. Students who have studied IT before

Table 3
Mann–Whitney U test of differences between the relative subjective and relative objective scores (for the overall computer competence) of *more experienced* and *less experienced* entrants to an undergraduate business course

Overall computer competence	Mean ranks		Test statistics		
	More experienced	Less experienced	Mann–Whitney *U*	*Z*	Asymp. sig. (2-tailed)
IT before[a]	55.24	51.89	755.5	−0.437	0.662
Home daily[b]	54.45	52.21	1314.5	−0.371	0.711
School daily[c]	58.44	49.99	1146.5	−1.395	0.163

[a] More experienced is represented by having studied IT before entering university whereas less experienced is represented by not having studied IT before entering university.

[b] More experienced is represented by daily use of a computer at home whereas less experienced is represented by not using a computer on a daily basis at home.

[c] More experienced is represented by daily use of a computer at school whereas less experienced is represented by not using a computer on a daily basis at school.

entering university are not any better at assessing their computer competence than are their colleagues who have not studied IT before. Likewise students who use a computer daily at home are every bit as likely to over-estimate their computer competence as are students who do not use the computer daily at home. The same conclusion can be drawn with respect to students who use the computer daily at school. Indeed, the tests revealed that students who have more experience, as defined in each of the three cases, appear to be more inclined to over-estimate their computer competence than their less experienced colleagues, though not significantly.

As an aside, the data were analysed further to determine whether there was a significant difference in over-estimation of computer competence between students who were educated in China and those educated in New Zealand. The results of the M-W U test revealed that there is a significant difference in the leniency of Chinese students relative to their New Zealand counterparts. While both groups significantly over-estimated their computer competence, the students educated in China demonstrated significantly greater leniency bias than those educated in New Zealand ($\alpha = 0.01$). This finding is supported by Littlewood (1999) who suggests that self-assessment may be particularly problematic for Chinese students who expect the educator to be responsible for assessing their learning. Indeed, Patri (2002) recommends that Chinese students require more training and experience in self-assessment for it to be effective. This view is supported in a recent study by Sung, Chang, Chiou, and Hou (2005) which found that students engaged in progressive self-assessment procedures demonstrated greater objectivity in their self-assessment.

The self-assessment leniency bias reported in the current study clearly contradicts the theory that pre-disposition to self-rating leniency is more pronounced among less experienced students and provides no support for the conclusion reached by van Vliet et al. (1994) that leniency bias in self-assessment significantly decreases as expertise increases. However, they provide an interesting comparison with findings from a study carried out at Warwick University, UK in which students' scores in an objective test of computer competence were used to determine students' computer competence. The Warwick study revealed that the students with higher scores, i.e., the more computer competent students, were as likely as those with lower scores to over-estimate their ability (McCourt Larres et al., 2003).

8. Conclusion

Two areas of educational research are addressed in the current study. First, an up-to-date picture of reported computer usage and general IT experience among pre-university students from New Zealand and South-east Asia is provided. The findings from the current study confirm those of earlier studies that students are still more likely to use a computer at home than at school despite the passage of time and reported investment in technology in schools (Pelgrum, 2001). A further analysis of the data reveals that, within this figure, more girls than boys use a home computer on a daily basis. This finding contradicts most of the earlier studies in this area and may reflect a general change in parental attitude whereby a son is no longer thought to be more deserving of a computer than a daughter simply because he is male (Newton & Beck, 1993). An alternative explanation could be proffered to defend the findings in the current study when compared to those reported in Volman et al.'s (2005) recent work. They reported that girls use the computer less at home than boys. However, Volman et al.'s (2005) study included a significant number of students from Islamic ethnic minority groups who may not necessarily believe in equality between the sexes. The current study, on the other hand, surveyed students from ethnic backgrounds where gender equality is probably much more widely accepted.

Despite the high numbers of students in the survey who reported daily use of a computer at home and/or at school, the number of students who had formally studied IT prior to commencing university was relatively low. This finding may provide evidence for the general thesis proffered in the computer education literature that while recreational use of computers among students is fairly wide-spread, the academic side of computing for most students is rather dull and lacks stimulation (see for example Underwood et al., 1994). This is an important issue for academics to address if students are to be encouraged to study IT at school to prepare them for a world dominated by technology.

The second major objective of the study was to assess the reliability of self-evaluation as a measure of computer competence. The findings reveal a significant self-assessment leniency bias in respect of computer competence among entry-level undergraduate business students. Furthermore, contrary to a significant body of earlier research, the tendency toward self-assessment leniency was no less pronounced among more experienced students than among their less experienced colleagues. The three separate measures applied to represent computer experience were studying IT before entering university, using a computer at home on a daily basis and using a computer at school on a daily basis. All three variables returned the same result that both less experienced and more experienced students have a tendency to significantly over-estimate their computer competence.

The proposition that information on entry-level computer competence could feed successfully into undergraduate syllabi and ensure a better allocation of resources across the complete degree programme (Stoner, 1999) is accepted as valid by the researchers involved in this study. However, careful consideration should be given to the method of evaluation used to assess computer competence. While self-assessment does have merits such as providing attitudinal data to gauge computer confidence (van Braak, 2004) and thereby feed back into the design and development of courses (Karsent & Roth, 1998) or encouraging a self-monitoring approach to learning as a prelude to effective lifelong learning (McCourt Larres et al., 2003), the findings from this research call into question the efficacy of employing a self-assessment questionnaire in isolation to evaluate undergraduate students' computer competence (see for example Stoner, 1999; van Braak, 2004). Furthermore, the grave doubt concerning the reliability of self-assessment as a solo measure of computer competence extends to students with relevant computer experience. Their ability to self-assess appears to be every bit as inaccurate as that of their less experienced colleagues. The simple conclusion to be drawn from this study is that while a self-assessment questionnaire can be used to collect attitudinal data on computer confidence among entry-level students (van Braak, 2004) the data collected from such a distribution should not be used to assess computer competence. This finding must call into question the research methodology adopted by Stoner (1999) and van Braak (2004) in their studies into computer competence.

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