Attitudes and confidence towards computers and books as learning tools: a cross-sectional study of student cohorts

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Abstract

Students today comprise a very diverse group, and this will be reflected in their attitudes towards learning. This study set out to examine four different cohorts of UK students during the same time period. Contrary to expectations, it was found that attitudes towards books and computers, as measured by separate but matched scales, were equal, even though experience of the two media varied considerably. A key predictor for computer attitude was found to be confidence for learning from computers rather than general computer confidence. Further, attitudes and confidence towards books and computers as learning tools varied significantly across the four cohorts.

Keywords: attitudes, confidence, books, computers, human–computer interaction

Introduction

Woodrow (1994) stated that the primary goal behind the implementation of computers in education is the utilisation of them by the student population. If one accepts this as the goal, it is key to find out more about the circumstances in which individuals function effectively and productively with information and communications technology (ICT). Previous research has found small to moderate relationships between computer confidence and computer attitudes (eg, Smith, Caputi, Crittenden, Jayasuriya & Rawstorne, 1999) and between experience, use, and confidence levels (eg, Levine & Donitsa-Schmidt, 1998).

In the educational context, feeling confident when using ICT should lead to more positive attitudes towards computers. This in turn will enhance learning and associated activities. As an example, Gardner, Dukes & Discenza (1993, p. 427) measured confidence by asking participants to indicate their level of confidence on eight different computer-related tasks, eg, using a computer to type a letter. They found that ‘computer
confidence positively affected computer attitudes’ in a large group of primary level students.

Computer-based learning material has gradually challenged the supremacy of books in education. Thus, it appears a logical step to consider attitudes towards computers and books rather than computers in isolation. A search of the attitudes literature indicates a neglect of material on attitudes towards books. This is surprising given the huge literature on computer attitudes and the role that books have to play in learning.

The aim of this study was to consider the views of four cohorts of current students: school pupils (all prospective Psychology undergraduates), Level 1 undergraduates, and mature student undergraduates divided into full-time and distance learners. The associations between attitude, confidence and experience as reported in the literature suggest that different student cohorts will vary in their approach and use of computers for learning. This in turn could be expected to lead to differences in performance outcomes.

Method
Design and participants
A total of 178 unpaid volunteers participated in the questionnaire survey, all of whom were studying psychology. The sample comprised four cohorts, namely school pupils (studying at Advanced Level), and undergraduates from three UK universities, who were divided into Level 1 students, mature, full-time students and mature, distance learning students (see Table 1 for demographic details). Students studying the same subject were specifically targeted in order to reduce confounds. However, the drawback is the imbalance in the sex composition of this group.

<table>
<thead>
<tr>
<th></th>
<th>School pupils</th>
<th>Level 1 undergraduates</th>
<th>Mature students (full-time)</th>
<th>Mature students (distance learners)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males—n</td>
<td>18</td>
<td>13</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>mean age (SD)</td>
<td>17.07 (0.86)</td>
<td>19.80 (0.68)</td>
<td>27.06 (9.19)</td>
<td>43.21 (11.56)</td>
</tr>
<tr>
<td>Females—n</td>
<td>42</td>
<td>47</td>
<td>25</td>
<td>17</td>
</tr>
<tr>
<td>mean age (SD)</td>
<td>17.55 (0.81)</td>
<td>19.72 (0.70)</td>
<td>38.43 (9.82)</td>
<td>34.03 (7.49)</td>
</tr>
<tr>
<td>Overall—n</td>
<td>60</td>
<td>60</td>
<td>34</td>
<td>24</td>
</tr>
<tr>
<td>mean age (SD)</td>
<td>17.41 (0.85)</td>
<td>19.73 (0.69)</td>
<td>35.42 (10.79)</td>
<td>36.71 (9.60)</td>
</tr>
</tbody>
</table>

Materials and procedure
The Books and Computers Questionnaire (BAC) was used (see Appendix). This attitude scale was developed by the authors from an earlier instrument (Levine & Donitsas-Schmidt, 1998) to examine both book and computer attitudes. The BAC comprised 40 statements in two matched sets, with 20 worded to relate to computers and 20 to examine book attitude. Prior use of the scale (see, Garland & Noyes, 2004) had demon-
strated a reasonable level of reliability. Internal consistency showed alpha at 0.66 for the computer items and 0.74 for the book items. Coefficients of stability of 0.71 and 0.86 were found, respectively, for the scales when retested after some 3 weeks (Garland & Noyes). Responses provided were in the form of a 5-point Likert scale (from ‘strongly agree’ to ‘strongly disagree’). The matched book and computer items were not presented together. Negative attitudes were reversed for scoring purposes. Respondents were also asked to rate their levels of confidence with computers, and their confidence for learning with computers and books.

All respondents were asked, in their educational setting, to complete the questionnaire. The response formats were explained and participants were asked to work through the questions in their own time. All responses were anonymous.

Data analyses
All statistical analyses are reported with two-tailed levels of significance (unless otherwise stated), and with alpha set at 0.05. Note that in some instances the use of means and parametric analyses have been adopted for scales that provide, what are strictly ordinal data. There were no significant sex differences for attitudes towards books and computers, and given this finding, the literature on sex differences has not been presented or investigated further.

Results
Book and computer attitudes
A paired samples t-test found the ‘mean’ book attitude score (55.08, SD = 9.99) did not differ from the ‘mean’ computer attitude score (55.85, SD = 6.88). Mean scores for individual cohorts are given in Table 2.

One-way ANOVAs (one-tailed) were conducted on both attitude scores. A significant effect of cohort was found for book attitude scores, $F (3,174) = 28.751, p < 0.001$. Post hoc tests (using the Bonferroni adjustment) indicated significantly lower scores for distance learning, mature students compared with all other cohorts ($p < 0.001$); undergraduates rated books less favourably than school students and full-time mature students ($p < 0.05$). There was no difference between book attitude scores for school and full-time, mature students. There was a significant effect of cohort for computer attitude scores, $F (3,174) = 7.987, p < 0.001$. Post hoc tests indicated significantly lower attitude scores for distance learning, mature students than all other cohorts (Level 1 students = $p < 0.05$, others = $p < 0.001$).
The 20 book and 20 computer items individually showed internal consistency levels (measured by Cronbach’s alpha) of 0.68 and 0.44, respectively. Removal of ‘Books are smarter than people’ and ‘Computers are smarter than people’ would increase alpha to 0.75 and 0.53 for the book and computer attitude scales, respectively.

Confidence—ratings and relationships
The ‘mean’ general computer confidence rating was 7.35 (SD = 1.93), while confidence for learning from books and computers gave means of 8.36 (SD = 1.47) and 6.89 (SD = 1.90), respectively. The confidence for book learning was significantly higher than that for computer-based learning, *t*(171) = −8.037, *p* < 0.001 (paired samples *t*-test). Mean ratings for the three confidence ratings, by cohort are given in Table 3.

One-way ANOVAs (one-tailed) were conducted on the three confidence ratings. There was a significant effect of cohort for general computer confidence, *F*(3,171) = 5.959, *p* = 0.001. Post hoc tests (using the Bonferroni adjustment) indicated significant differences between full-time, mature students and all other groups ( *p* < 0.05 for first years, others = *p* < 0.01). No significant effect was found for cohort for confidence for learning from books. There was a significant effect of cohort for computer learning, *F*(3,173) = 6.075, *p* = 0.001. Post hoc tests indicated significant differences between full-time, mature students and all other groups ( *p* < 0.01).

Spearman’s correlation analyses were conducted to examine relationships between the various confidence ratings and between these and attitude scores. Computer and learning from computer, confidence ratings showed a positive, significant relationship (ρ = 0.669, *p* < 0.001), while computer confidence was unrelated to computer attitude score. A significant association showed that as confidence for learning from computers increased, respondents’ computer attitude scores reduced (ρ = −0.296, *p* < 0.001). In addition, book attitude was significantly related to computer attitude (ρ = 0.355, *p* < 0.001). These relationships were maintained after controlling for the effect of cohort.

Computer use
The data showed that years of computer use ranged from 1.0 to 25.0 years (*M* = 8.43, *SD* = 4.05). Total hours of computer use ranged from 2.0 to 80.0 hours each week (*M* = 15.68, *SD* = 12.74. Table 4 shows the levels of use for each cohort.
One-way analysis of variance (ANOVA) tests (one-tailed analyses) were carried out for all four variables across the four cohorts. Years of computer use showed a significant effect, $F(3,172) = 12.753$, $p < 0.001$. Post hoc tests (using the Bonferroni adjustment) indicated significant differences between distance learning, mature students, and all other groups (all $p < 0.01$), and between school pupils and Level 1 undergraduates ($p < 0.05$). Total hours of weekly computer use showed a significant effect, $F(3,174) = 12.199$, $p < 0.001$ (one-tailed). Post hoc tests indicated significant differences between distance learning, mature students, and all other groups (all $p < 0.01$).

**Prediction of computer attitude scores**

A hierarchical multiple regression analysis was conducted to examine the ability of computer experience measures to predict the dependent variable: computer attitude. The model entered general computer confidence as the first predictor, confidence for learning from computers as the second predictor, and the two use measures (number of years used and hours of use each week) were entered at the third level of analysis. General computer confidence did not significantly predict computer attitude score (explaining only 1.5 per cent of the variance in scores). However, confidence for learning from computers explained a further 9.7 per cent of variance (significant at $p < 0.01$), and the addition of the use measures increased the variance explained to 14.6 per cent in total (overall significant at $p < 0.01$).

**Discussion**

Attitudes to books and computers were not significantly different. This finding is encouraging given the use of computers in educational programmes today, since it suggests students from a variety of backgrounds are now equally favourable towards computers. Unlike previous research on attitudes, our study considered books as well as computers; hence, we are able to draw conclusions about computers relative to other tools. Ratings across cohorts did not differ apart from the distance learners who rated both books and computers significantly lower than the other cohorts. There is no obvious explanation for this.

Two confidence measures were examined. In terms of general confidence, the mature students were found to exhibit significantly lower levels. Likewise, their confidence for learning from computers was also lower. Computer confidence and confidence for learning from computers were found to have a strong positive relationship. This is as expected but, because it is not a perfect relationship, it suggests some other aspect is
reflected in the second measure, namely, experience in using computers as a learning medium. This suggests that training in an education setting needs to be more geared to learning using computers, rather than computers, per se.

Computer confidence and computer attitude were found to be unrelated and with no cohort effect. This is consistent with our previous findings (Garland & Noyes, 2004). The low reliability of the computer attitude scale is surprising in view of earlier and, indeed, subsequent data. It is possible that the relatively lower number of respondents might offer an explanation. The predictive model reinforced our earlier findings, namely, that general computer confidence is a poor predictor of computer attitude (Garland & Noyes, 2004). This is in contrast to confidence for computer learning, which significantly explained computer attitude. The addition of computer confidence did not significantly improve the model, and this provides some support for the suggestion given above relating confidence to learning. Likewise, computer use also appears to have little bearing on students’ attitudes towards computers. Again this is consistent with earlier findings.

These are important findings. If attitudes towards computers are being considered in a learning situation, then the questions asked in order to assess the attitudes will need to reflect this. Most studies have not teased out this difference and have studied attitudes towards computers in general as opposed to attitudes towards computers for learning purposes. For example, the Loyd and Gressard (1984) computer confidence questions cited by Busch (1995) and Woodrow (1994).

In summary, there are three main findings from this study. First, attitudes towards books and computers are similarly positive notwithstanding considerable variation in experience/use. Secondly, confidence for learning from computers appears to be a better measure when considering attitudes towards computers and learning in education. Thirdly, findings vary between learner groups, in particular the mature, distance learners in comparison with the other cohorts. It could tentatively be suggested that attitude towards computers appears to be based more on the nature of the experience rather than on readily quantifiable measures of experience.

References

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**Appendix. Relevant sections of the BAC Questionnaire**

1. For how many years have you used a computer?
2. For how many hours in a week do you use a computer at home?
3. Computer Confidence—Responses on scales from 0 (ill at ease)—10 (Total confidence).
   - How at ease do you feel using a computer?
   - How confident do you feel about using computers for learning?
   - How confident do you feel about using books for learning?
4. Book/Computer Attitude – Strength of agreement (5 point Likert scale) with following statements:
   - A book/computer is like a good friend.
   - A book/computer is like a private tutor.
   - A book/computer stops me from being bored.
   - Books/Computers are fascinating.
   - Books/Computers are smarter than people.
   - Every home should have a book/computer.
   - I find using a book/computer easy.
   - I hope I never have a job that requires me to use books/computers.
   - I learn more rapidly when I use a book/computer.
   - I use a book/the computer when I have nothing else to do.
   - Interacting with a book/computer is a good way to pass the time.
   - One can learn new things from a book/computer.
   - People managed in the past without books/computers, so they are not really necessary now.
   - People who like books/computers are often not very sociable.
   - People who like books/computers are the types who enjoy science.
   - The book/computer is an educational tool.
   - The book/computer is an effective learning tool.
   - The world would be better off without books/computers.
   - Using books/computers broadens your horizons.
   - You can get on in life without knowing about books/computers.