

**AN EXPLORATORY STUDY OF THE IMPACT OF INNOVATION EDUCATION ON
STUDENT ATTITUDES TOWARD BOOKS AND COMPUTERS AS LEARNING
TOOLS**

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ABSTRACT

Use of computers as an educational tool has risen significantly in higher education. A 2007 study by Educause shows that students are engaged in the use of technology for the purpose of learning. According to the study the majority of students liked learning through Internet searches, video games and simulations-all tools used in courses engaged with innovative learning. But many courses still use the book as the primary learning tool. This exploratory study compares attitudes between books and computers as learning tools by using data from 2007 through 2009 and collecting data across majors and across different program types. The results find that despite the continued growth in online learning technologies and other supplemental digital learning environments, student attitudes towards books and computers, as measured by separate but matched scales, were basically equal; even though experience of the two media varied considerably based on the type of program enrollment.

Keywords: attitudes, human-computer interaction

INTRODUCTION

The use of computers has become an integral part of education; its reputation as being a tool for the innovative learning environment as well as its impact on teaching and learning is widely accepted (Teo et al 2008, Mitra et al, 2000). The successful integration of computers in educational environments depends, to a great extent, on students' attitudes towards them (Garland and Noyes, 2005, Palaigeorgiou et al 2005). Computer attitude is been defined as “a person's general evaluation or feeling of favor or antipathy towards computer technologies and specific computer-related activities” (Smith, Caputi & Rawstone, 2000). Several variables have been associated with computer attitude including but not limited to user confidence, perceived importance of the computer, perceived usefulness of the computer and ease of use of the computer, Woodrow (1994). These variables tend to measure people’s attitudes in general. For faculty, an additional desired goal may be for students to perceive the use of the computer as an educational tool or a tool for learning, much the same way books are perceived (Garland and Noyes 2005).

While there have been previous studies on student attitudes towards computers and books, there have not been a major study comparing attitudes across learning environments. The two most recent related studies on students and technology were conducted in 2007 by Salawar, which focused primarily on the use of technology; and in 2005 by Garland et al which compared attitudes towards computers and books as an educational tool. Salawar et al (2007) produced a study for Educause that showed the tremendous growth in the ownership of technology by students as well as their perceptions of use of computers as a learning tool. They found that 60.9% of students felt that using computers improved their learning (Salawar et al, 2007). They also found that almost 99% of students owned some type of computer (laptop, desktop, smartphone) and used it for learning even if it was as limited as participating in an online discussion forum on Facebook or searching the Internet for information. These studies indicate the tremendous growth in the use of computers and technology and education leaving one to consider that perhaps computer-based learning material has gradually challenged the supremacy or even necessity 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 limited research comparing books and computers as learning tools despite the fact that many faculty members still use books as a primary tool for learning in higher education. Garland and Noyes measured confidence by asking participants to indicate their level of confidence on eight different computer-related tasks, e.g., using a computer to type a letter. They found that 'computer confidence positively affected computer attitudes' in a large group of primary level students (2005).

Research prior to the Garland and Noyes study found small to moderate relationships between computer confidence and computer attitudes (e.g., Smith, Caputi, Crittenden, Jayasuriya & Rawstorne, 1999) and between experience, use, and confidence levels (e.g., Levine & Donitsa-Schmidt, 1998). The Garland and Noyes study found that though students rated computers high as a learning tool, the difference was not significant from that of books as a learning tool. In a 2007 study, Garland and Noyes found that the reason for this preference for books within the undergraduate population was more respondents expected to learn more from books than computer-based material, and preferred to learn from books than computers. Reasons for these preferences included practical usability issues, media-related usability, experience and aesthetic values. However, the Garland and Noyes study was limited to psychology students for whom a preference might be to reference books or limited accessible material online.

Therefore, this study examines a wider range of students to achieve several goals and adds to the learning literature in the following ways. First, the data is collected across disciplines and focuses on three learning environments: online only programs, technology intensive campuses (e.g., highly wired/high technology-use campuses or in the specific program of study), and low technology campuses (low wired/low technology-use campuses or in the specific program of study). The definitions of the types of campus were based on the 2005 PC Magazine study of most wired campuses (Rhey 2006). Secondly it is a multiyear study comparing data from 2007 through 2009. However, the study remains exploratory in that although the number of respondents overall is significant at a 95% confidence level for all students enrolled, the individual breakdowns by semester and learning types are not. Thus the results can not necessarily be generalized. Since the data was collected using an online survey instrument, the data may also be biased towards heavier computer users although that data was collected and not supported by the responses.

The primary goal of this study was to compare the attitudes toward books versus computers as learning tools of students in the three types of educational environments over a three year period. 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. (Garland 2005).

METHODOLOGY

Design and participants

A total of 7,518 unpaid volunteers participated in the questionnaire survey. The participants by years and type of learning environment are shown in Table 1: *Participants by Learning Environment and Semester*. Although schools were targeted based on their ranking in the PC Magazine ratings of most wired schools, participants were asked to classify their enrollment in

their particular program as online only, hybrid (online and face-to-face mix), and face-to-face only.

Year	<i>Type of Learning Environment</i>			Totals
	<i>Online</i>	<i>Hybrid</i>	<i>Face-to-Face</i>	
2007	126	751	251	1128
2008	221	1299	464	1984
2009	476	2952	978	4406
Totals	823	5002	1693	7518

Table 1: Participants by Learning Environment and Year

The questionnaire was given electronically using the surveymonkey.com online survey tool although students received both written and verbal explanations of the purpose of the survey and the response format. Random students were selected from campuses based on the two online only program campuses, two highly wired campuses and two low wired campuses. Students were asked to complete the Books and Computers Questionnaire (BAC) developed by Garland and Noyes (2004). The instrument was developed from an earlier instrument by Levine & Donitsa-Schmidt (1998) to examine both book and computer attitudes. Four questions based on subjectivity of interpretation were eliminated leaving sixteen matched questions. Prior use of the scale (see, Garland & Noyes, 2004 and 2005) had demonstrated a reasonable level of reliability. Following the Garland and Noyes study, the responses for the 16 questions provided were in the form of a 5-point Likert scale (from 'strongly agree' to 'strongly disagree'). Negative attitudes were reversed for scoring purposes.

Hypotheses

Because the literature suggests that there students still preferred books to computers for learning, the hypotheses for each group was established as:

H1. Students in online programs would have no differences in attitude towards computers than books.

H2. Students in hybrid programs would have no differences in attitude towards computers than books.

H3. Students in face-to-face programs would have no differences in attitude towards books than computers.

The approach allows for t-testing with two-tailed significance. The results are reported in the next section.

Data Analyses

All statistical analyses are reported with two-tailed levels of significance, and with alpha set at 0.05. The first step was to develop a composite score for computer attitudes and for book attitudes. The minimum for each attitude was 16 and the maximum was 80. Since the scale was 1 for strongly agree and 5 for strong disagree, a lower score represents a more positive attitude.

The analysis was to compare the means by program type, e.g., online, hybrid, and face-to-face. Table 2, Table 3 and Table 4 show the results for the programs. As shown in the tables, online only participants had the most positive attitude scores for both books and computers but hybrid students were the only ones that rated computers higher than books. Only hybrid had a significant correlation between the two means but there were no significant differences between the mean differences. Online program participants had computer and book attitudes lower than that of hybrids, and hybrids were lower than the face-to-face students. So although within groups there is no significant difference, there is an improvement in perceived benefits based on program type.

Type of Program	Variable Comparisons	Mean	N	Std. Deviation
Online Only	Computer	26.89	823	3.376
	Book	26.65	823	3.317
Hybrid	Computer	34.54	5002	7.386
	Book	34.60	5002	7.378
Face-to-Face	Computer	39.14	1693	4.945
	Book	39.05	1693	4.975

Table 2: Paired Sample Statistics by Program Type

Type of Program	Paired Variables	N	Correlation	Sig.
Online Only	Computer & Book	823	.020	.564
Hybrid	Computer & Book	5002	.644	.000
Face-to-face	Computer & Book	1693	-.008	.745

Table 3: Paired Sample Correlations by Program Type

Type of Program	Paired Differences					t	Sig. (2-tailed)
	Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference			
				Lower	Upper		
Online Only	.241	4.685	.163	-.080	.561	1.473	.141
Hybrid	-.060	6.229	.088	-.233	.113	-.681	.496
Face-to-face	.093	7.042	.171	-.242	.429	.545	.586

Table 4: Paired Sample Statistical Differences for Computer and Book Attitudes

RESULTS

Table 5 shows the results from the original hypotheses. Based on the sample tests, all the hypotheses are accepted. None of the groups showed a significant preference for

Number	Hypothesis	Reject/Accept
H1	Students in online programs would have no significant difference in attitude towards computers than books.	Accept
H2	Students in hybrid programs would have no significant difference in attitude towards computers than books.	Accept
H3	Students in face-to-face programs would have no significant difference in attitude towards books than computers.	Accept

Table 5: Hypotheses Result

CONCLUSIONS AND NEXT STEPS

Overall, attitudes to books and computers were not significantly different. This finding is encouraging given the use of computers in educational program today, since it suggests students from a variety of backgrounds and enrolled in various types of educational programs are equally favorable towards computers as books and is consistent with the results Kolikant (2009) found among k-12 students, specifically that no current *strong* bond has been made between younger students and technology as a better educational tool than books. However there are slight indications that computers may be edging books in the 2009 college data. But this data analysis is by no means complete. Preliminary analysis of the detailed data shows that students in general rated computers more positively than books for the following four question pairs:

- 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.

Further, when business program students are compared with non business program students, there is a significant difference in the means for computer attitudes and book attitudes regardless of learning environment and/or year. Preliminary results also suggest that younger students in 2009 rated computers more positively than books overall, and even more so for the above four question pairs. Also, as time spent on the computer for activities other than school increases, the more positive the score becomes for computers than books. Thus, further analysis needs to be done by age, gender, ethnicity, frequency of use of computer, comfort level and if the student is enrolled part-time or full time. And lastly, no distinction was made between traditional/physical books versus electronic books in this study. Gregory (2008) found that 66% of the students in her survey preferred e-books to regular books. Is the e-book considered a computer learning tool? This is yet another venue that needs to be investigated to strengthen the understanding of the data.

REFERENCES

- Gardner, D. G., Dukes, R. L. & Discenza, R. (1993). Computer use, self-confidence, and attitudes: a causal analysis. *Computers in Human Behavior*, 9, 427-440.
- Garland, K. J. & Noyes, J. M. (2004). Computer Experience: A poor predictor of computer attitudes. *Computers in Human Behavior*, 20, 823–840.
- Garland, K. & Noyes, J. (2005) Attitudes and confidence towards computers and books as learning tools: a cross-sectional study of student cohorts, *British Journal of Educational Technology*. 36:1 pp 85-91
- Garland, K. and Noyes, J. (2007) Explaining students' attitudes toward books and computers, *Computers and Human Behavior*, 22: 3, pp 351-363
- Gregory, C. (2008) "But I Want a Real Book": An Investigation of Undergraduates Usage and Attitudes toward Electronic Books. *Reference & User Services Quarterly*. 47:3, pp 266-273,
- Kolikant, Y. (2009) Digital Students in a Book-Oriented School: Students' Perceptions of School and the Usability of Digital Technology in Schools. *Journal of Educational Technology & Society*. 12: 2. pp 131-143
- Levine, T. & Donitsa-Schmidt, S. (1998). Computer use, confidence, attitudes and knowledge: a causal analysis. *Computers in Human Behavior*, 14. pp 125-146.
- Mitra, A., Lenzmeier, S., Steffensmeier, T., Avon, R., Qu, N. & Hazen, M. (2000). Gender and computer use in an academic institution: report from a longitudinal study. *Journal of Education Computing Research*, 23, 1, 67–84.
- Palaigeorgiou, G. E., Siozos, P. D., Konstantakis, N. I. & Tsoukalas, I. A. (2005). A computer attitude scale for computer science freshmen and its educational implications. *Journal of Computer Assisted Learning*, 21, 330–342.

Rhey, E. (2006) Top Wired Colleges, PC Magazine (at PCMag.com, accessed September 12, 2010)

Smith, B., Caputi, P., Crittenden, N., Jayasuriya, R. & Rawstorne, P. (1999). A review of the construct of computer experience. *Computers in Human Behavior*, 15, pp 227-242.

Teo, T. (2008) Assessing the computer attitudes of students: An Asian perspective. *Computers in Human Behavior*, 24, 4, pp 1634-1642

Woodrow, J. E. J. (1994). The development of computer-related attitudes of secondary students. *Journal of Educational Computing Research*, 11, 307-338.

This study aims to reveal the obstacles to achieving quality in distance learning during the Coronavirus (COVID-19) pandemic and was based on a large sample of professors and students of universities in the Arab world (Algerian, Egyptian, Palestinian, and Iraqi). The primary aim of this research was to investigate the various ways in which students pursued their studies at home during the university suspension as a result of COVID-19. In this paper, the researchers use an exploratory descriptive approach through a questionnaire with a conveniently selected sample of 400 professors and students. An Exploratory Study of the Obstacles for Achieving Quality in Distance Learning during the COVID-19 Pandemic. by. Zohra Lassoued. Access outside of school affects impact The relationships between in-class student computer use, out of class student computer use and student achievement are unclear. However, students in OECD countries reporting the greatest amount of computer use outside school are seen in some studies to have lower than average achievement (the presumption is that high computer use outside of school is disproportionately devoted to computer gaming). Many studies that find positive impacts of ICTs on student learning rely (to an often uncomfortable degree) on self-reporting (which may be open to a variety of positive biases). Applicability to LDC/EFA context. What is the gender impact of ICTs in education on access, use of, attitudes toward, and learning outcomes? Using technology in education could help students and teachers address learning challenges posed by specific times and locations. Students can access their class from different places and at any time (Terry & Doolittle, 2006). What attitudes do IAFU students have toward Edmodo? The next section addresses the research methods and the data-collection process. R. This experimental study measures the impact of using the Edmodo network within the IAFU students. 322. Alqahtani. Many students opt for distance education or education classes which are also called correspondence courses, at community colleges and universities which are situated far from their location. After enrolling in course of this style, the students receive the course document in the mail and mail the assignments to their teachers at educational institutions to check their progress. This emailing process can be quite long and complicated, but all thanks to technology, who makes a continuation to our studies and take over the course on intent at their convenience. Distance Education. Current stats a... This survey dove into the way learning occurs inside and outside of the classrooms in many schools. Students' attitudes toward learning and their own self-concept improved consistently when computers were used for instruction. Inconclusive Findings Conclusion on Impact and Effectiveness These studies show that in over 700 empirical research studies, in the study of the entire state of West Virginia, in a national sample of fourth- and eighth-grade students, and in an analysis of newer educational technologies that students with access to (a) computer assisted instruction, or (b) integrated learning systems technology, or (c) simulations and software. that teaches higher order thinking, or (d) collaborative networked technologies, or (e) design and programming technologies, show positive gains in achievement on researcher constructed test