

**Evaluating the Impact of a Mandatory Computer Class
on Male and Female Student Attitudes toward Use of Computer Learning Technology
in a Saudi Baccalaureate Nursing Education Program**

Osama A. Samarkandi, Ph.D.

Adel S. Bashatah, Ph-D.

Daifallah M Alrazeeni, PhD.

Sulatn A Amutairi, PhD.

Nabeel F Abdulqader, BSBA

Majid Alqahtani, BSc. EMT-P

Mohammed Al-Gabgab, BSc. EMT-P

Abdullah G Alqarni, BSc. EMT-P

King Saud University

Riyadh, Saudi Arabia

Abstract

Computer knowledge and skills are becoming essential components technology in nursing education. Saudi nurses must be prepared to utilize these technologies for the advancement of science and nursing practice in local and global communities. Little attention has been directed to students' attitudes about computer usage in academic communities in Saudi Arabia. Their attitudes about the use of computers for the enhancement of learning are relatively

unknown. Few research studies have been identified that explicate Saudi Arabian nursing students' attitudes toward computer usage for the acquisition of knowledge and skills.

Males and females matriculate at King Saud University (KSU), but attend classes in gender-specific groups. This descriptive correlation study will contribute to the body of knowledge related to nursing students' attitudes toward computer usage in their baccalaureate education at KSU. The research included all students enrolled in the College of Nursing at KSU in Riyadh, in the summer semester of the academic year 2009-2010. The total number of undergraduate nursing students were 600; 195 were males and 405 were females (KSU, 2008).

The findings ($n = 335$; $n_m = 133$ & $n_f = 222$) suggest that females were more anxious about computer usage (Mean=31.5; 32.7) than males. None of the independent variables explained the variance in the dependent variable, computer usage. Findings did indicate that students had less anxiety if they had access to a computer at home or at school; their anxiety was even less if they had computer exposure at both home and school. Implications of these findings are presented with regard to educating future nurses at KSU for complex roles in health care systems. The study also raises issues about the possibility of planning intervention studies for future research about computer learning, possibly using simulation-based approaches and virtual systems. Issues regarding gender, socioeconomic status, age, learner attitudes, and other variables will need to be systematically investigated. Future studies should assist with the unraveling of traditional cultural issues, including gender-specific roles and expectations for computer usage in nursing and health care delivery.

Introduction

Saudi Arabia is the fastest growing developing country in the Arab world. It is ranked 20th in the global economy and has an economic base that sustains its development. This overall development was created by the discovery of oil in the late 1930s (Marrone, 1999). In the early 1940s, the Saudi government began planning for the creation and development of the country's infrastructure and proceeded to address the most fundamental concerns of its people. Included in its strategies for development were key areas that could impact the nation's people: education, health, transportation, agriculture, and industry were the topics of greatest concern.

As a result of the overall development of the country and the insight to implement the use of computers in daily life, the Saudi government explored the utility of this novel technology. Over the years, Saudi society has been increasingly supportive of and transformed by a wide variety of computer technologies that it uses. As a result of the government's emphasis on technology, Saudi Arabia has become a technologically oriented nation, where computers can be found almost anywhere including the homes of the Saudi people. As computer technology has grown and developed, the Saudi government has also realized the potential benefits of computer technology in education. Hence, all schools in Saudi Arabia are being equipped with computers, and children and youth are beginning to master the available technology. School systems are developing and enhancing computer literacy programs that will help teachers, students, and others to utilize this technology in a variety of educational settings.

It is crucial that Saudi nurses be prepared with the knowledge and skills that are essential for providing quality care in Saudi Arabia and the world community. Computer knowledge is fast becoming an essential work-related skill. The use of technology in nursing education is a relatively new and novel phenomenon. From the beginning of the high technological orientation in health care in the 1970s to the personal computer in the 1980s and the Internet boom of the

1990s, technology usage has impacted nursing education dramatically (Mallow & Gilje, 1999). In response to this trend, the College of Nursing at King Saud University (KSU) has initiated a requirement that all students must successfully complete an introductory computer class (Tech 227). This requirement began in the mid-1990s. This mandatory two-credit-hour course consists of face-to-face classroom lectures and additional laboratory-based practice with computers. To accommodate the needs of students, and, at the same time, facilitate their acquisition of skills, the college has equipped two laboratories with 40 computers.

Statement of the Problem

The attitudes toward computers in the academic community in Saudi Arabia are largely unknown. More specifically, no studies that explicate Saudi Arabian nursing students' attitudes toward computer usage for the acquisition of knowledge and skills have been identified in literature. A major consideration that must be articulated in this study is that the Saudi Arabian educational system has produced few gender-specific schools of nursing for males (Saudi Ministry of Health, 2002). As is the current practice, the educational system tends to be gender specific. That is, males and females do not, as a rule, attend the same academic institutions. However, over the years, the Saudi government has not established many male-dominated schools of nursing.

The College of Nursing at KSU has been selected as the setting for this research because it is the first and only school of nursing in Saudi Arabia that awards a baccalaureate degree in nursing (BSN) to both sexes (KSU, 2008; Saudi Ministry of Higher Education, 2008). This practice began in 2004. In Saudi Arabia, male and female nursing students in the same educational milieu represent a new and novel approach in nursing education. The future of this

policy change (gender-integrated learning) will be evaluated over the next few years (Tumulty, 2001).

King Saud University's College of Nursing now requires that all students successfully complete a computer course (Tech 227). This is a mandatory two-credit-hour class in which students spend 2 hours in the classroom where didactic learning occurs and an additional hour in the learning laboratory where skills are acquired. To accommodate the needs of students, the College of Nursing is equipped with laboratories that house state-of-the-art computer technology (KSU, 2008).

Research Question

The research question explored in this study was the following: Do gender, age, grade-point average, and a mandatory computer class predict attitudes about computer usage in academic learning among baccalaureate students at the College of Nursing at King Saud University?

Theoretical and Operational Definitions of Study

Computer, Theoretical Definition

Computer: An electronic device that is capable of storing, manipulating, and retrieving information as designed through the use of precise mathematical instructions that are guided by software (Merriam-Webster, 2007). An example of software that manages data is Excel, a spreadsheet program.

Computer, Operational Definition

In this study, a Dell Inspiron computer (electronic device) will be used to manipulate several software programs including Word, Excel, and Statistical Package for the Social Sciences – SPSS 18.

Attitude, Theoretical Definition

Attitude is an enduring view regarding a person, object, or activity that consists of a cognitive element (perceptions and beliefs) and an emotional element (positive or negative feelings). It is also conceptualized as a positive or negative mental state of readiness, learned and organized through experience that influences the individual's response/reaction to people, objects, places, and situations (Ajzen & Fishbein, 1975). Attitudes affect the behaviors of people toward objects, events, and individuals (Scarpa, Smeltzer, & Jasion, 1992).

Student's attitude toward computers is defined as the total score on the four subscales as measured by the Computer Attitudes Scale (CAS): computer anxiety, computer confidence, computer liking, and computer usefulness (Loyd & Gressard, 1985; 1987).

Anxiety, Theoretical Definition

Computer anxiety is defined as the sense of fear or negative feelings toward computers and a reluctance to learn or manipulate the computer in the academic environment. Computer anxiety involves an array of emotional reactions including fear, apprehension, uneasiness, and distrust of computer technology in general (Loyd & Gressard, 1987). It can also be defined as hesitation or self-doubt in one's own ability to learn about and use computers in the academic environment. This type of anxiety is related to one's sense of self-efficacy about learning and mastering the use of computers (Loyd & Gressard, 1987).

Anxiety, Operational Definition

The CAS questionnaire will be used to determine the level of computer anxiety that the students manifest. Specifically, items 1, 5, 9, 13, 17, 21, 25, 29, 33, and 37 on the CAS measure will be used to determine computer anxiety levels among the students (Loyd & Gressard, 1987).

Computer Confidence, Theoretical Definition

Computer confidence is associated with the inherent belief in one's ability to master the use of computers in the academic environment and to use this technology to enhance individual and group learning (Loyd & Gressard, 1987).

Computer Confidence, Operational Definition

Items on the Computer Attitudes Scale will be used to measure computer confidence. As indicated on the questionnaire, an expression of computer confidence (or lack thereof) may include statements like "I am sure I could do work with computers," "I'm not the type to do well with computers," and "I could get good grades in computer courses." Questionnaire items 2, 6, 10, 14, 18, 22, 26, 30, 34, and 38 are concerned with computer confidence on CAS (Loyd & Gressard, 1987).

Computer Liking, Theoretical Definition

Computer liking is defined as the internal feeling of enjoyment and stimulation, or the desire to learn about, think about, or converse with others about the characteristics and advantages of the computer and its multiple uses (Loyd & Gressard, 1987).

Computer Liking, Operational Definition

Computer liking will be measured by statements such as “I would like to work with computers,” or “Once I start to work with the computer, I would find it hard to stop,” or “I don’t understand how some people can spend so much time working with computers and seem to enjoy it.” Items 3, 7, 11, 15, 19, 23, 27, 31, 35, and 39 on the Computer Attitudes Scale will be used to measure this concept (Loyd & Gressard, 1987).

Computer Usefulness, Theoretical Definition

Computer usefulness is the extent to which a person believes that using a computer system could/will enhance his or her job performance and improve his/her knowledge and skills (Loyd & Gressard, 1987).

Computer Usefulness, Operational Definition

Computer usefulness, in this study, will be measured by computing items 4, 8, 12, 16, 20, 24, 28, 32, 36, and 40 on the Computer Attitudes Scale.

Computer Attitudes Scale (CAS)

The Computer Attitudes Scale is an instrument adapted from Loyd and Loyd (1987) to assess the attitudes of individuals toward computers. The CAS is 40-item instrument divided into four 10-item subscales: anxiety, fear, or phobia; confidence in using a computer; enjoyment of computer use; and usefulness of computers.

Research Methods***Design***

The study utilized a descriptive correlation design, appropriate for the investigation of the relationships of demographic characteristics (age, gender, socioeconomic status, previous exposure to computers, years of study at KSU, successful completion of a computer class [Tech 227], and students' attitudes toward computer usage at KSU). The independent variables in the study were gender, age, socioeconomic status, academic classification, grade point average, length of previous computer experience before enrolling at KSU, access to computers outside of KSU, number of household members who use the household's computer, marital status, geographical region of the nation that is considered to be the students' home, and completion of the mandatory computer classes (Tech 227). There were four dependent variables that were derived from the subscales on one instrument, the CAS measure. These subscales include computer anxiety, computer confidence, liking of computers, and computer usefulness. Collectively, they were used to describe the nursing students' attitudes toward computer use at KSU.

Sample

The researcher invited all officially enrolled students at the College of Nursing at KSU in Riyadh, Saudi Arabia in the summer semester of the academic year 2009 who met the criteria to participate. Recent (2007-2008) statistical data revealed that there were a total of 63,315 undergraduate students at KSU: 38,092 males and 25,223 females. More specifically, the total number of undergraduate nursing students was 600: 195 males and 405 females (KSU, 2008). From these data, it was hypothesized that the majority of the study sample might be females.

The inclusion criteria for participation in the study were: (a) both sexes (males and females), (b) all educational levels at the university (freshman, sophomore, junior, and senior),

(c) 18 years of age or older, (d) enrolled as full-time students at KSU, (e) a Saudi citizen, and (f) willingness to participant in this study as evidenced by the signed Informed Consent Form that was completed by each participant before he/she could enter the research study. Other students who did not fit these criteria were not invited to participate in this research study. A clear explanation was provided to the students.

Instruments

Demographic Questionnaire

The Demographic Questionnaire was used to collect data about the personal characteristics of the enrolled students in the sample. This questionnaire has 13 items that query the subjects about variables such as age, gender, family income, number of years of previous exposure to computer usage, perceived level of expertise in computer usage, years of matriculation at KSU, marital status, and geographical region of the nation that is considered to be home. The instrument was developed by the researcher and was administered in the Arabic language.

Computer Attitude Scale (CAS)

The Arabic Version of the Computer Attitude Scale (CAS) was used in this study to describe the students' attitudes toward computer usage. The CAS was developed by Loyd and Loyd in 1984 and was modified 1985. It is a four-point Likert-like scale consisting of 40 items distributed among four 10-item subscales that measure computer anxiety, computer confidence, liking of computers, and perceptions of the usefulness of computers. The total CAS score can range from 40-160; higher scores correspond to more positive attitudes about computer usage.

Subscales measuring variable constructs included: Computer Anxiety, Computer Usefulness, Computer Liking, and Computer Confidence. This study used the revised version of the CAS by Loyd and Gressard (1987). The CAS has been employed by a diverse group of researchers in numerous global communities, including Israel (Francis, Katz, & Jones, 2000), China (Chin, 2001), South Africa (Burger & Blignaut, 2004), and Saudi Arabia (Abanmie, 2002; Alsebil, 2004).

Reliability and validity of the instrument have been well-established. The reliability coefficient for the Arabic version is 0.91 for the total scale. Validity has been evaluated by Loyd and Gressard (1987), and the measure was found to be an effective tool for differentiating learners' attitudes based on varying degrees of computer experiences. Each of the subscales was able to stand alone and produce their own psychometric properties, including validity and reliability. Total instrument Cronbach *alphas* ranged from .78 in Arabic (Alsebil, 2004), to .89 in English (Burger & Blignaut, 2004), and .95 in English (Loyd & Gressard, 1987), to a high of .95 in Hebrew (Francis, Katz, & Jones, 2000). Subscale alphas ranged from .71 (Computer Liking; Alsebil, 2004, in Arabic) to .95 (Computer Liking; Burger & Blignaut, 2004, in English).

Data Collection and Analysis

This study was approved by institutional review boards at both the participating university in the U.S. and by King Saud University. Data were collected from students at KSU who volunteered to participate in the study. The researcher emphasized to prospective student participants that the data collection process was confidential and that no one at the school, or any place else, would have information about their responses to the demographic data form and the

CSA questionnaire. Students were informed about their rights to refuse to participate in the study or to withdraw from the study at any time during the process of data collection without reprisals or disapproval. They were also told that there were no foreseeable risks associated with participating in this study. SPSS 18 was used to compute and analyze the data. The study sample was described by mean, median, range, standard deviation, and frequency statistics. Missing data were delineated by the numbers 9999. Pie charts and bar graphs were created to visually describe the demographic variables and the distribution of the subscales of students' attitudes toward computers.

Research Question and Data Analysis Plan

Research Question

Do gender, age, GPA, and a mandatory computer class predict attitudes about computer usage in academic learning among the baccalaureate students at the College of Nursing at KSU?

Data Analysis Plan for the Research Question

Multiple regression was used to predict the influence of the independent variables on the dependent variable, computer usage attitude.

Results

The purpose of this study was to examine the attitudes of baccalaureate-degree seeking student nurses' attitudes toward computer usage in the College of Nursing at King Saud University (KSU), Riyadh, Saudi Arabia. Specifically, the study was designed to investigate the influence of gender, age, grade point average, and mandatory computer classes on students' attitudes toward computer usage.

The data were collected at KSU during the summer of 2009. All data collection activities were done under the guidance of the researcher and the administrators of KSU. A total of 355 questionnaires were completed (males = 133 and females = 222). Twenty questionnaires were excluded because of missing values (males = 13; females = 7). The actual number of completed and accepted questionnaires was 335 (males = 120 and females = 215). This number reflects more than half of the total student body ($n = 600$) during the 2009 summer academic semester at the university. See Table 1 for a demographic profile of study participants.

Table 1: Demographic Profile of Study Participants

	Mean-Male	Mean-Female	Mean-Total	SD-Male	SD-Female	SD-Total
Age	21.98	21.20	21.47	1.98	1.72	1.84
GPA	3.08	3.38	3.27	0.85	0.89	0.89
Family Members	8.24	7.78	7.95	3.81	2.80	3.20
Income	8,000-9,999	8,000-9,999	8,000-9,999	4,877.56	5,067.53	4,977.51
Computer Experience	49.86	34.73	40.15	3.79	3.53	3.69
Anxiety Score	32.97	31.54	32.04	4.44	4.85	4.75
Confidence Score	31.63	30.77	31.08	4.84	4.94	4.88
Liking Score	29.28	29.61	29.49	3.82	4.20	4.07
Usefulness Score	33.21	32.87	32.99	3.30	4.25	3.93
Total Score	127.10	124.77	125.60	13.81	15.91	15.21

SD=Standard deviation

Source: O. A. Samarkandi, *Students attitudes toward computers at the College of Nursing at King Saud University (KSU)*, Table 11, p. 63. Ph.D. Dissertation, Case Western Reserve University, 2011.

Based on step-type regression analysis conducted to examine the research question, it was found that none of the independent variables (gender, age, GPA, and the mandatory computer class) adequately explained the variance in the dependent variable, attitudes about computer usage in academic learning among the baccalaureate students (see Table 2). This finding could be partially explained by changing attitudes about traditional male and female roles in Saudi Arabia.

Table 2: Multiple Regression Analysis of the Influence of the Independent Variables on Computer Attitudes

	Unstandardized Coefficients <i>Beta</i>	Standard Error	Standardized Coefficients <i>Beta</i>	<i>t</i>	Significance	95% Confidence Interval for <i>Beta</i>	
						Lower Bound	Upper Bound
(Constant)	79.68	.747		106.615	.000	78.22	81.25
Gender	3.62	.744	.071	4.925	.000	2.18	5.06
Age	-7.67	.769	-.143	-9.986	.000	-9.15	-6.21
GPA	1.64	.138	.171	11.882	.000	1.37	1.91
Mandatory Computer Class	3.92	.254	-.055	4.223	.000	2.44	2.89

SES=Socioeconomic status

Summary and Implications

Based on step-type regression analysis, none of the independent variables (gender, age, GPA, and the mandatory computer class) adequately explained the variance in the dependent variable, attitudes about computer usage in academic learning among the baccalaureate students. This finding could be explained by the changing attitudes about traditional male and female roles. For example, according to the Saudi Central Department of Statistics and Information (SCDSI), the Saudi workforce comprises 21.3% women. This statistic has changed the profile of the labor force in the country 5.3% within the last 5 years. More upward trends related to women in the workforce are anticipated (Murphy, 2007).

Age is also a variable of interest in Saudi Arabia. First, the population is young: more than 54% are 15-64 years of age and, of this group, 48.2% are males (SCDSI, 2010). Saudi Arabia's population, when compared to that of the United States, constructs a pyramid that reveals a young and growing population, in contrast to an aging population in the United States. The mean in the sample, the males and females were about equal in age and relatively young (21.5 years old). To further explore the question about gender, which, in the past, has been a dominant topic in Saudi Arabia, computer anxiety was explored from a psychological perspective. According to Chu et al. (1991), computer anxiety is "not an inherent emotion." Instead, it is presented as a "state" condition or a "state anxiety" that can be identified and remediated. The approach to the remediation rests with identifying the predictors of computer anxiety and then providing structured methods for reducing and eliminating them. Faculty

members, researchers, and clinical supervisors will be better able to structure learning modules to assist students without the deleterious effects of computer anxiety.

Chu's finding does not support previous studies by researchers such as Todman (2000), Broos (2005), and Tsai et al. (2001). These researchers reported that users with longer Internet usage had more positive attitudes toward the technology. That is to say, the longer the students had had experiences with the Internet and computers, the more positive were their attitudes.

The grade point average among the two groups was similar. Since the GPA's were similar for both groups, it appears that traditional roles and expectations of men and women are beginning to be readjusted and renegotiated. Over time, it is anticipated that Saudi women will continue to gain footholds in academic institutions and the workplace. Data suggest that women are entering colleges and universities in the nation and graduating with impressive degrees in the sciences, architecture, education, and a plethora of other disciplines.

Few studies have focused on computer anxiety among KSU nursing students. One study explored learning among (only) females at KSU. The results of the current study provide insight into male and female students' attitudes about computer-based learning and anxiety among nursing students. However, additional studies are needed to help clarify the utility of computer-based learning for nursing students at KSU. For example, both males and females attend the institution; however, they do not attend classes together, and their socialization is limited. The impact of computer-based learning in single-gender and mixed-gender learning could be a beginning point for exploration.

Recommendations for Nursing Research

1. Enhance research on the relationships among GPA, perceptions about quality patient care, confidentiality issues, competency acquisition, self-efficacy in practice, cultural competency, and simulation-based (computer) learning,
2. Investigate use of computers in education across multiple regions of Saudi Arabia,
3. Determine whether computer based-learning at KSU helps to enhance nurses' sense of competency, self-efficacy, and professional empowerment.

Issues around culture and computers could also be explored, and themes such as females having “computer-phobia” could be unraveled and scientifically considered (Bennett & Glover, 2008). The influence of variables such as Internet experience, years in college, gender, and socioeconomic status, region of the country, professional aspirations, and clinical specialty could provide the gateway for scientific investigation into the attitudes of males and females about computers. These studies should be considered with a sense of urgency.

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