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**Assessing the Impacts of Anxiety and Gender on Student Attitudes toward**

**Computer Learning Technology in a Saudi Nursing Academic Environment**

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***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***

As computer technology becomes a common component in educational institutions, its pedagogical use will continue to gain status and notoriety (Oblinger & Rush, 1997). Core curricula in many colleges and universities now include computer literacy as a basic requirement and for faculty and students. At some institutions, computer literacy is mandatory. Young (1997) listed a number of institutions ( $n = 8$ ) that had begun mandatory computer literacy programs for their students. Beginning in the fall of 1998, these institutions required that all of their students either own or have access to a computer. Functionally, computers are used in education for three

types of activities: management; instruction and learning; and educational research (Forcier, 1996). The use of computers for management activities includes school and classroom applications in budgeting, accounting, record keeping, printed and electronic communication, and information retrieval. These management activities are essential for nurse leaders who are responsible for planning and implementing health programs in a variety of settings. Budgeting and accounting is activated at the unit level in many hospitals and clinics throughout the world.

Nurses are now responsible for nursing care and for financial management. Computer usage is essential in both instances. In addition, use of computers for instruction and learning involves teacher-centered interactions as well as student-centered learning. Teacher-centered instruction provides teachers with greater control in the design, development, and delivery of instructional materials. Student-centered learning gives the individual more freedom to construct activities that would lead to learning, and this method could help the learner to acquire a sense of competence about the acquisition of knowledge and skills. Computers are also used in research, evidence-based practice, statistical analysis, and information retrieval and synthesis. Collectively, these activities contribute to the learning process and help to foster competency among nurses and others (Forcier, 1996; Freedman, 1996; Teo & Lim, 1996).

Technology usage is an important component of health care planning and delivery in Saudi Arabia and throughout the Middle East. Its use is expanding at a phenomenal rate. Technology will impact Saudi society in a way that is similar to its influence on other world communities. Specifically, technology will help the Saudis to increase their research efforts at the molecular levels of scientific investigations, such as in genetics. It is an essential tool for conducting epidemiological research and for implementing community-based research in large populations. Computer technology will enable Saudi scientists and clinicians to participate in

research on the world stage and reduce costs by utilizing resources for implementing health care that are available in other global communities.

Importantly, the use of technology will enable the Saudi people to generate and utilize evidence-based practice approaches to health care, expand research, and generate new knowledge that is specific to the Saudi people. These novel approaches that are available because of technology also have challenges. The Saudi government, like other governments in the world community, will need to give in-depth consideration to technology-related issues such as confidentiality and ethical decision making. Nevertheless, the advantages of technology in Saudi Arabia have been embraced by the society and government. All health care providers are expected to become computer literate and utilize technology in their practice, research, and education and training (McLaughlin et. al, 2008).

It is anticipated that teaching and learning at all levels in society will be impacted by innovations that are associated with computer technology. The profound potential that is related to the use of computers will overlap all aspects of human life. Computer technology will also link Saudi Arabia to other Arab countries as well as every country in the global community (Al-Farsi, 2001; Mufti, 2002).

These technological advances have assisted the students by enhancing their learning. One practice, however, remains constant. Although King Saud University in Riyadh, the nation's capital and largest city, invites males and females to its campus, the religious and cultural practices that dictate that males and females will be educated in different classrooms remains a strong basic value within Saudi culture. Hence, although the KSU male and female students share all resources, they continue to learn in separate classroom environments (KSU, 2008; Saudi Ministry of Higher Education, 2008; Moshaikeh, 1992).

## *Computer Usage in Nursing Education in Saudi Arabia*

The Saudi Arabian School System adopted a gender-dual education system that is separate and different for males and females. The male education system was established in 1953 by the Ministry of Education, which is responsible for the development of a national educational policy that focuses on Saudi male learners. These institutions are located throughout the nation and are the hallmarks of education for the Saudi male learner (Al-Farsi, 2001). On the other hand, the female educational system was established in 1960 under the Presidency of Girls Education, a government body that was created specifically to handle educational matters for women (Al-Farsi, 2001). Females are required to attend the female gender institutions, and they, too, can matriculate in nursing at the baccalaureate level at the institutions that have been created for them.

## *Statement of the Problem*

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, 2007).

Attitudes toward computer use among Saudis have not been systematically studied. Attitudes are consistent opinions that are shaped by experiences, worldviews, cognition, and emotions that determine an individual's opinion about computers, or people, or events (Ajzen & Fishbein, 1975). This perspective suggests that attitudes influence the reactions that people have toward computers, others, and events that occur over time. Furthermore, it suggests that students who are exposed to computers in their academic programs might have some preexisting opinions about the use of computers as an enhancement for the acquisition of knowledge and skills in nursing.

### ***Research Question***

The research question explored in this study was the following: Does anxiety about computer usage in academic learning vary among males and females at King Saud University College of Nursing?

### ***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).

## ***Attitude, Operational Definition***

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.

## *Research Methods*

### *Design*

The study utilized a descriptive correlation design, appropriate for the investigation of the relationships of demographic characteristics (e.g., 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 participate 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. 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.

## *Instrumentation*

### *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 et al., 2000), China (Chin, 2001), South Africa (Burger & Blignaut, 2004), and Saudi Arabia (Abanmie, 2002; Alsebail, 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 (Alsebail, 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, Alsebail, 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

# **International Journal for Research in Health Sciences and Nursing**

the demographic variables and the distribution of the subscales of students' attitudes toward computers.

## ***Data Analysis Plan for the Research Question***

### ***Research Question***

Does anxiety about computer usage in academic learning vary among males and females at KSU College of Nursing?

### ***Data Analysis Plan***

Summary measures including mean, standard deviations, and variance along with *t*-tests were used to determine the difference between the two groups (males and females).

### ***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, socioeconomic status, academic classification, 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.

An independent  $t$ -test was used to examine the research question. The results of the  $t$ -test demonstrated that females were significantly more anxious about computer usage in their academic programs than were their male counterparts ( $\text{mean}_f = 31.53$  vs.  $\text{mean}_m = 32.97$ ). This research helps to support the latter view. However, given the ubiquitous use of computers in health systems and the recent requirement in Saudi Arabia that health records be in electronic format, nurses, regardless of gender, will need to become proficient in computer use. Table 1 depicts the differences in scores between the males and females.

**Table 2: Mean Anxiety Difference for Gender; Male and Female**

Anxiety Scores	Gender	$N$	Mean	$\sigma$	Standard Error Mean
	Male	120	32.967	4.436	0.405
	Female	215	31.526	4.854	0.331

Source: O. A. Samarkandi, *Students attitudes toward computers at the College of Nursing at King Saud University (KSU)*, Table 12, p. 64. Ph.D. Dissertation, Case Western Reserve University, 2011.

### ***Summary and Implications***

The findings suggest that female students were somewhat more anxious about computer usage than were male students. Gender has been associated with computer anxiety (King et al., 2002), though results have been mixed. Whereas some researchers have reported that male students have lower levels of anxiety (Colley et al., 1994; Okebukola, 1993) than do female



students, others posit that females have lower levels of computer anxiety than do males (Loyd et al., 1987; Siann et al., 1990). Still other studies have not reported any gender differences (Colley et al., 1994; Kay, 1992; King et al., 2002). What is clear is that the pervasive presence of technology, for both male and female students and later as clinical practitioners, is quickly becoming a way of life and the use of the computer as a communication device dominates the psyche of both males and females (King et al., 2002). Yet there is another perspective. According to Hass et al. (2002), women have traditionally been considered to be less “computer savvy” than men primarily because of the linkage between mathematics and computers. This was an early assumption that existed but appears to be changing. This research helps to support the latter view. However, given the ubiquitous use of computers in health systems and the recent requirement in Saudi Arabia that health records be in electronic format, nurses, regardless of gender, will need to become proficient in computer use.

The results can also be interpreted through the lens of academic expectations within the context of societal norms and the changing roles of women in academic settings (Henrion, 1997; Otomo, 1998). Perhaps if academic learning is delivered using computers at KSU, female students will become less anxious as their computer knowledge and skills increase. Finally, as demands in health-service-delivery systems for computer-literate nurses increase, nurses will, out of necessity, become more proficient with computers in general as well as in their application for the acquisition of knowledge and skills.

According to the findings of this study, males and females can learn through the use of computers even though females in the College of Nursing at KSU are more anxious than their male counterparts. Giving students access to computers in school would also help with their learning and provide an opportunity to increase their usage time and decrease their anxiety.

## ***Recommendations for Nursing Education***

1. Strengthen and continue to build computer knowledge and skills among the students at KSU School of Nursing,
2. Provide opportunities for additional computer-based learning in various segments of the curriculum,
3. Increase public awareness of and support for the use of computer-based learning for advancing nursing knowledge.

Nurses who are expected to use computers during their undergraduate learning experiences would be better prepared to utilize computers in their practice and for their continuing learning needs. Given the growing frequency of the use of computers in educational settings and in practice systems, nurses will be expected to utilize computers for their personal learning and for quality patient care and safety (Kilbridge & Classen, 2008).

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120

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# International Journal for Research in Health Sciences and Nursing

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