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Students' perceptions of the use of technology: Does students' gender make a difference in their perceptions of using technology in teaching?

Karam Adibifar

Minnesota State Community and Technical College

Karam.adibifar@minnesota.edu

Abstract

A quasi-experimental design was used to examine students' perceptions of the use of technology in teaching and whether those changes were related to students' gender. Surveys were used to collect data. The sample (N= 445) used in this study was drawn from six classes, two each from three different fields of study from a mid-size public university in the Midwest. Pairs of classes were selected with similar enrolments, similar class levels and with varying amounts and types of technology used in the classes. Using analysis of variance and covariance, the findings of the data revealed that students had positive perceptions of the use of technology in teaching. The findings also indicated that males and females differ in their perceptions of the use of technology in teaching.

Review of Literature

The extensive use of information technology in our everyday life, and specifically in the academic arena, makes it impossible to ignore its importance (Katz, 1999; Christiansen, 1999). According to Cuban (2001) and Katz, 1999), people live in a technological world and are socialized in a world of images, sound graphics, and very fast movement. Consequently, technology use in the classroom is necessary to prepare students to face their future, particularly in work places. Christiansen (1999) argued that in a world of increased competition, students and parents expect the use of technology in education. According to Christiansen, familiarity with technology can be a major factor in employment after graduation.

The findings on the impact of technology and its effectiveness in teaching and learning are disparate. A national faculty survey from University of California at Los Angeles Higher Education Research Institute (Epper and Bates, 2001:6) reported that 87 % of faculty believed that the use of computer technology enhanced students' learning. Patton, Santos, and Nowaczyk (1998) stated that college students can effectively process the information through visual presentation. They argued that long term retention appears to be better with visual aids such as video than with verbal information alone. Ericksen (1984) argued that visual aids such as films, slides, videotapes, and overhead may not enrich learning, but these visual aids promote understanding of particular points. They add to clarity and meaning of conceptual objects. Although there are many research reports on the use of technology and its impact, very little is known about the relationship between students' characteristics, such as gender; and their perceptions of instructional technology use in teaching.

The purpose of this study was to examine students' perception of the use of technology and whether students' gender makes a difference in their perceptions of the use of technology in teaching.

Students' Gender

Several scholars have argued that males and females come from two distinct sets of experiences, and therefore, gender may make differences in their expectations and perceptions. Although change has occurred, it is still the case that males and females grow up and are socialized differently (Bandura, 1965; Basow, 1995; 2000). The differences in socialization of the genders influence many aspects of their lives, from their interactions with each other to their choice of majors when they enter college. For example, from an early age parents buy their sons tools and toys different from those they buy their daughters (Baumrind, 1996). According to McGlen, O'Connor, Assendlft, and Gunter (2002), this differential treatment from an early age has long-term effects. For example, they indicated that in a survey of university freshmen, 54 % of the males compared to only 37 % of the females rated themselves as above average in terms of mathematical ability.

In a study of gender differences in attitudes toward computers and instructional technology, Salameh (1993) found that male students scored higher in positive attitudes than females. Matthew (1997) also supported the idea that gender plays an important role when it comes to use of technology in the classroom. He found that male students are more likely than female to have a positive perception of classroom technology and taking Internet courses.

Beazley (2000) found that males have more self-rated computer knowledge and have a greater expectancy for success with computers, in general. However, according to Beazley (2000), there was no clear indication that women would be disadvantaged if more advanced technology were used in the academy. Kirkpatrick and Cuban (2000) argued that the effect of gender is changing. They stated that both female and male students will have similar experiences if they have the same amounts and types of opportunities and achievements.

Students' technological background may impact students' expectations and perceptions of using instructional technology. According to Necessary and Parish (1996) and Salameh (1993), unequal access to technological sources outside the classrooms, influence students' perceptions of use of technology. Those who have had previous experience with computers

had more positive perceptions of technology. Reynolds and Rucker (2002) also found that those who had positive experiences with computer and related technological tools developed positive perceptions toward technology; those who lacked experience or had negative experiences with technology would likely develop negative attitudes. Thus, positive past experience with technology, generally orients users to a higher expectation.

Previous computer experiences and attitudes toward computers is an important individual characteristic that students bring to the classroom. This characteristic relates to students' expectations and, in turn, relates to student perceptions of using technology in the classroom. Generally, the skills and experiences that students bring into the classroom do make a difference.

Theory

A theoretical perspective potentially useful in explaining students' gender as it relates to their perceptions of technology use in teaching is Expectation States Theory. This theory lays the groundwork for discussing how performances, social interaction, and definitions of situations can impact perceptions.

Applying Expectation States Theory enables us to relate findings on individuals to a broader sociological phenomenon. The theory suggests that individuals develop expectations on the basis of their own status characteristics. The individual status characteristics, which also used as the dependent variable in this research, include students' gender and their perceptions of technology. According to Expectation States Theory, individuals generate expectations for themselves and others on the basis of various kinds of information in the situation including cultural definitions, referential beliefs, specific personal evaluations, and so on. (Berger, Wagner, and Zelditch, 1989).

According to Berger and Zelditch (1998), an actor's status characteristic is associated with performance expectations—that is, with belief about how an individual possessing a given state of a characteristic is expected to perform. Status characteristic is the individual's characteristic such as gender, age, skills, and experience. The possession or expected possession of status characteristics is relevant to performance output, and outcome states. For example, if males are expected to do better in mathematics, then the status characteristic, gender, is relevant to expectations of mathematical ability.

In general, "if a set of states possessed by the actors is relevant to the outcome states in the situation or is a basis of discrimination in the situation, these states and those that are strictly relevant to the immediate situation will become salient" (Berger, Ridgeway, and Zelditch, 2002:164). For example, if gender, say, is the basis for evaluating males' and females' technological ability, and if males are assumed to be more technological adept than females, then expectation states are associated with the states of the status characteristic (Berger et al., 1998).

In summary, if male students consider themselves skilled and knowledgeable in technology, then they should have greater expectation and positive perceptions of instructional technology. On the other hand, if female students consider themselves less knowledgeable in technology because of their status characteristics, then they should have less positive

perceptions of instructional technology. Based on the empirical generalizations derived from review of the literature and the theoretical generalizations, the following hypotheses have been developed and are tested in this research.

Hypotheses

H_{O1}: There is no difference in students' evaluative perceptions of classes for using more or less technology in teaching.

H_{R1}: Students have positive perceptions of classes using more technology in teaching.

H_{O2}: There is no difference by gender in students' perceptions of technology use in teaching.

H_{R2}: Male students are more likely to have more positive perceptions of the use of technology in teaching than female students.

Method

A quasi-experimental design is used to examine the relationship between students' gender and their perception of the use of technology in teaching. Quasi-experiments are used when the subjects are not randomly assigned and the true experimental design cannot be implemented.

The subjects selected for this study were undergraduate students from a medium-size Midwestern public university. A survey was used to gather data. The sample in this study consisted of 445 students enrolled in six undergraduate courses in humanities, social sciences, and physical sciences. Of the total, 194 (43.6%) were males and 251 (56.4%) females. In terms of age, the mode for the sample (42%) was 19 years of age, with the sample mean of 19.93. The majority of the respondents were freshmen (56.4%) followed by sophomores (25.2%). Subjects were drawn from a variety of majors.

The six classes selected for this study were divided into "experimental and "control" groups. Experimental groups included students in the three classes where more technology was used while the control groups included those students who were enrolled in the classes where instructors used less technology. Out of the total sample (N=445), 201 (45.2%) were enrolled in the classes with more use of technology ("experimental group") and 244 (54.8%) in the classes where professors used less technology ("control group").

The experimental group consisted of 90 (44.8%) males and 111 (55.2%) females. The control group consisted of 104 (42.6%) males and 140 (57.4%) females. Table 1 summarizes demographic characteristics of the "Experimental" and "control" groups.

Table 1: Summary of demographics characteristics of experimental and the control groups

Characteristics

Students' gender: Experimental (N= 201), Control (N= 244), Group (N= 445)

Male	90 (44.8%)	104 (42.6%)
Female	111 (55.2%)	140 (57.4%)

Students' class level

Freshman	123 (61.2%)	128 (52.5%)
Sophomore	48 (23.9%)	64 (26.2%)
Junior/senior	30 (14.9%)	52 (21.3%)

The first part of survey contained questions relating to students' demographic characteristics such as class level and gender. The second part contained questions about overall students' opinion on the use of technology in teaching and their opinions on the use of technology in the course in which this survey was given. A four response Likert-type scale was used with items related to the research questions. Strongly agree indicating the highest level of agreement and the strongly disagree indicating the lowest scale of agreement. Students' responses are presented in Table 2.

Although there were variations in students' responses, the majority of the students, 230 (51.7%) agreed and 66 (14.8%) strongly agreed that technological tools should be extensively used in teaching. In response to the question whether the use of technology stimulated their thinking, 316 (71%) agreed and 89 (20%) strongly agreed that the use of technology stimulated their thinking. However, in response to whether the use of technology had impact on their learning, 372 (73.5%) reported that it did not while 116 (26.1%) indicated that the use of technology did enhance their learning.

Examining the data, particularly the questions pertaining to students' opinions on the types of technology, it was found that students had different perceptions and opinions on the methods and the kinds of technological tools that were used in teaching. Students reported the use of overhead as a less favorable tool and the use of PowerPoint follow by blackboards as a more favorable tool in teaching. The majority of the respondents indicated that that the use of web materials, use of films, videos, and DVD had little impact on their learning. Generally, students' responses expressed favorable opinions on the use of technology in teaching. However, traditional lecturing and the use of blackboards also remain positively rated methods of teaching.

Table 2. Students' opinions on the use of technology in teaching and learning

	SD	D	A	SA
Use of technology stimulates my thinking	.90%	7.6%	71.0%	20.0%
Technology makes materials interesting	.90%	5.2%	64.7%	29.2%
For me				
I learn better with PowerPoint	.90%	15.3%	47.4%	35.7%
Technology has little impact on my learning	4.0%	22.0%	63.6%	9.9%
I learn better with internet	4.3%	43.4%	42.3%	9.4%
I prefer traditional lecturing	7.9%	26.1%	55.1%	10.8%
I prefer extensive use of technology	2.0%	30.8%	51.7%	14.8%
I learn better with overhead	14.6%	52.8%	29.4%	2.5%
Film, videos, and DVD have little impact on my learning	4.7%	22.9%	59.8%	12.6%
Web materials do not help my learning	4.9%	25.4%	59.6%	9.0%
I learn better with blackboards	4.0%	24.3%	55.5%	16.0%
Extensive technology was used in the class	12.7%	21.3%	59.1%	16.9%

Using the statistical package for social sciences (SPSS), data from experimental and control group analyzed and compared. The means of experimental and control groups compared to see if there are differences between the two groups and whether students' gender makes a difference in their perceptions of the use of technology in teaching. Univariate analysis of variance is also used to test the null hypotheses based on comparing the between and within the group means. The alpha level used in this study in deciding whether to reject or accept the null hypothesis is set at 0.05 level of significance. The 0.05 level is generally acceptable for deciding whether or not to reject the null hypotheses in such a study. R2 is a measure of relationship for cases used in this study.

Analysis of data and findings

Two hypotheses are tested. The findings of the hypotheses are presented below.

H₀₁: There is no difference in students' evaluative perceptions of classes for using more or less technology in teaching.

H_{R1}: Students have positive perceptions of classes using more technology in teaching.

This hypothesis is tested with analysis of variance (GLM). The mean of students' perceptions for use of technology in classes is 9.1753. The mean score for students' perceptions where more technology is used ("experimental group") is 9.3980 and for students who were in classes, where less technology is used ("control group") is 8.9918 (Table 2). This difference in means is statistically significant at $p = .020$ ($F = 5.495$). The null hypothesis is rejected and

one can infer that classes where more technology is used are perceived as more positive by students than classes where less technology is used. Of course, the relationship is weak as only 1.2% ($r^2 = .0124$) of the variation in means of students' perceptions is accounted for by extent of using technology in classes.

Table 3. Means and standard deviation for perceptions of using technology

Group category	Mean	Std. Deviation	N
Experimental:	9.3980	1.75807	201
Control:	8.9918	1.86806	244
Total:	9.1753	1.82841	445

H_{O2} : There is no difference by gender in students' perceptions of using technology in teaching.

H_{R2} : Male students are more likely to have positive perceptions of the use of technology in teaching than female students.

This hypothesis is tested with analysis of covariance (GLM). As shown in Table 4, the perceptions of the use of technology given by male students (mean= 8.9742) is more positive than the perceptions given by female students (mean= 9.3307). The perceptions for classes where less technology is used do differ for males (mean= 8.8558) and females (mean= 9.0929); perceptions for technology for classes with high technology use also do marginally vary by gender (males= 9.1111; females= 9.6306). Therefore, the null hypothesis is rejected at $p= 0.036$ ($F= 4.993$, $r^2 = .022$); gender does significantly affect students' perceptions of the use of technology in teaching.

Table 4. Mean and standard deviation for perceptions of the use of technology in teaching by students' gender

Group category	Students' gender	Mean	Std. Deviation	N
Experimental:				
	Male	9.1111	1.75105	90
	Female	9.6306	1.73691	111
	Total	9.3980	1.75807	201
Control:				
	Male	8.8558	1.69762	104
	Female	9.0929	1.98518	140
	Total:	8.9918	1.86806	244
Total:				
	Male	8.9742	1.72286	194
	Female	9.3307	1.89479	251
	Total:	9.1753	1.82841	445

Summary and discussion

The demographic characteristic of students, gender was presented along with students' opinions on the use of technology in teaching. The data revealed that students regardless of their gender, generally perceive the use of technology in teaching positively. In regard to the types of technology used in teaching, it was found that the majority of the students indicated use of PowerPoint as a more useful teaching tool than other methods such as overheads and internet. Also, it should be noted that the uses of blackboards are still regarded as positive tools of teaching. The finding also indicated that students' class level does not influence their perception of the use of technology in teaching.

It was hypothesized that male students are more likely to have more positive perceptions of technology use in teaching. The finding of this research reveals that males and females are different in perceiving the use of technology in teaching, males are more positive in their perceptions on the use of technology in teaching. However, the relationship is weak. The findings for the descriptive analysis of data for this research support the idea that male students perceive the use of technology in teaching positively. One explanation is that male

and female students reported that they had unequal access and different skills and experiences with respect to computer and other technological tools from one another. It is also possible that the ways males and females have had grown up and socialized influence their perceptions as relate to the use of technology. In the society, where gender-role stereotype defines male and female expectations as different and opposite, they may not share the same traits or behaviors.

The finding of this research does not reject the idea that males perceive and value technology more positively than females. The difference in perceptions given by male and female students is consistent with the findings of Salameh (1993), Matthew (1997), and Beazley (2000) who claimed that male students are more likely to have a positive perception of the use of technology in the classroom.

Expectation state theory was adopted to guide this research. The findings of this study support the notion that technological skills are valued status characteristics that influence expectations and perceptions. Also, as it was predicted by the theory, gender did have a meaningful relationship regarding perceptions and expectations of the use of technology. Males' status characteristic was relevant to outcome states.

Limitations and recommendations

There are several limitations in this study. First the selection of the institutions may limit the generalizeability of this research because it is possible that students from other universities or colleges may have different perceptions and preferences of teaching methods. The second limitation may arise from the fact that "true" random sampling is not used. Although the issues of validity and reliability were addressed by using careful data gathering and analysis, the concept of nonrandom sample as it relates to generalizeability may limit the generalizeability of the findings. Finally, this study was conducted with students who were enrolled in lower level classes. Future research may re-explore the findings of this study with other college students in upper level classes. This would help determine if students' expectations, experiences, and perceptions remain constant or change.

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