

## **College Students' Perceptions of Aptitude and Attitude toward Social Media Technology and Technical Computer Technology**

**Kathleen R. Smith, Ed.D**

Assistant Professor, Apparel Studies  
University of Arkansas  
1 University of Arkansas, HOEC 118  
Fayetteville, Arkansas 72701  
USA

### **Abstract**

*The purpose of this study was to investigate college students' social and technical computer technology competencies based upon attitudes and perceptions of aptitude toward computers. A survey design method was used with 1,052 responses by college undergraduates majoring in apparel merchandising, production, business and other related and non-related majors. The study found that young female students tend have a higher affinity toward social technology aptitude than males while males tend to have a higher affinity toward technical technology aptitude than female students. There were differences between the age group of 18 to 25 year olds compared to older generations in computer aptitude, however no differences were found in attitudes of liking, confidence or anxiety toward computer technology.*

**Keywords:** attitude, aptitude, social technology, computer, college students, technology

### **1. Introduction**

Most careers today involve the use of computer technologies. College graduates with computer technology experience continue to be in high demand by industry professionals. Graduates with competencies in both social and office based computer technologies tend to make a smoother transition into a professional career (Dickerson, 2003).

Textile and apparel industries and higher education must make informed decisions regarding the direction and scope of the technology needed in the future. This specifically includes the implementation of industry based technology as well as office based computer software systems in the higher education curriculum. It has been widely assumed that undergraduates today have technological savvy well beyond that of their predecessors (Howe & Strauss, 2000). However, studies have shown millennial students show poorer knowledge application skills and are more self-reliant than older students. Older boomers represent the most socially-reliant learners, and are better at knowledge application. Active participation contributed to better knowledge application. Instructors teaching millennial-age students need to encourage active, meaningful participation in applying knowledge (Elam, Stratton & Gibson, 2007).

Students in higher education today have spent their entire lives surrounded by computers, video games, cell phones and other social, digital, communication technology devices (Prensky, 2001). In the early days of technology, students were often not able to keep up with the rapid advances of technology. Today, however, students come to colleges and universities already having developed advanced computer and technological skills (Olsen, 2000). Technology and the way it is used by students and higher education institutions has developed and changed rapidly over the past several years (Prensky, 2001). The college students of today are composed of several generations, each with various levels of technological skills. These generations include, but are not limited to, the Baby Boomers, born 1943 – 1960, the Generation Xer's, born 1961 – 1981, and the Millennial Generation, born 1982 – 2002 (Howe & Strauss, 2000). These generations have different backgrounds, experiences and expectations of technology and of higher education (Vailles, Phillips, Rosenblatt, & Vargas, 2005).

These young people are said to have been immersed in technology all their lives, instilling them with sophisticated technical skills and learning preferences for which traditional education is unprepared. Grand claims are being made about the nature of this generational change and about the urgent necessity for educational reform in response, however, the actual situation is far from clear (Bennett, Maton, & Kervin, (2008). Technology served as a liberating tool for the Boomers, a diversifying tool for the Gen Xers, and a unifying tool for today's teens or the Millennials (Howe & Strauss, 2000). Today's college students have technological proficiencies far greater than previous generations dating back 20-25 years. Ownership of technology tools has become a generational status symbol. Millennials are as familiar with computers as Baby Boomers were with television. However, the Millennials are using technology to do group projects and communicate among networks of friends. Equipped with Instant Messaging (IM) and 'buddy lists,' Millennials stay in almost uninterrupted contact with each other, far beyond anything the Boomers or Gen Xers ever experienced with the technologies of their own childhood or teen years.

Much has been written about the technological savvy of the Millennials and their entrance into college (Howe & Strauss, 2000). Assumptions have been made regarding the need for technology training for this generation including whether or not additional training is necessary. The communication or social technology of this generation far exceeds the abilities of earlier generations, including many faculty, however, the specialized, office based or technical technology skills seem to be lacking to the extent that it could impact the vocational success rate of college graduates if not addressed (Prensky, 2001).

As technology continues to change and as students continue to become more technologically advanced, administrators and instructors must recognize student limitations to different types of technology expertise and address those deficiencies in college curriculum. This research examined college student perceptions of aptitude and their attitude toward social (communication) and technical (office-based) computer technology with respect to age, gender, ethnicity, class standing, and academic major.

### **1.1. Statement of the Purpose**

The purpose for conducting the study was to explore college student's perceived capability regarding specific technical technology skills and knowledge. Specifically, the study explored the perceived aptitude and attitudes of university students majoring in apparel merchandising and design as well as other related and non-related majors toward social and technical computer technology.

Perceptions of aptitude and attitude toward social and technical computer technology were measured using a modification of an existing computer self-efficacy survey and a computer attitude scale to include the tendencies toward social as well as technical technology. The participants for the investigation were college undergraduate apparel merchandising and design students and students from other related and non-related majors. Once students completed the attitude and aptitude survey, independent samples *t*-tests, one way analysis of variance (ANOVA), and correlations as well as frequency and percentage distributions were used to analyze the data with respect to age, gender, ethnicity, class standing, and academic major to determine student tendency toward social or technical computer skills. This could help educators make better informed curriculum based decisions regarding course content of computer courses in higher education as well as possibly impact the success rate of college graduates in their chosen vocations.

Four research questions were addressed in the study: Research Question One: What was the (1) perceived aptitude of college students toward the dependent variables of (A ) social and (B) technical computer technology based upon the independent variables of (a) age, (b) gender, (c) ethnicity, (d) class standing, and (e) academic major?; Research Question Two: What was the (2) attitude of college students toward the dependent variables of (A) social and (B) technical computer technology based upon the independent variables of (a) age, (b) gender, (c) ethnicity, (d) class standing, and (e) academic major?; Research Question Three: Were there significant differences between social technology and technical technology perceptions of competency in college students?; Research Question Four: Was there a correlation between perceptions of (1) aptitude, (2) attitude and (A) social or (B) technical competencies of college students?

The underlying assumption of the study was that perceived college student aptitude and attitude of both social and technical technology can be measured.

Additional assumptions of this study included: Students come to college with an extraordinary amount of social technology skills and are confident in those skills; students surveyed are representative of the sample being studied; student's perception of aptitude and attitudes toward technology influence their use of that technology; perceptions of aptitude and attitude can be measured; a self-reporting of aptitude and attitude perception is a reliable indication of aptitude and attitude perception; reliable results can be obtained using a survey measurement tool; student perceptions of aptitude and attitude toward technology use influence the curriculum planning process as well as their future employment.

The limitations of studying college student perceptions of aptitude and attitude of both social and technical technology could result in changes in college curriculum. This study could impact not only student's academic careers but their professional careers as well by helping to ensure student success. The study could also impact employers by providing them with more competent and qualified graduates. Following is a list of accepted limitations to this study: the study was limited to the students attending a large, mid-south tier one research institution; the study was limited to apparel merchandising and design students and related and non-related majors; the study was limited to undergraduates according to age, gender, ethnicity, class standing, and academic major; the study did not take into account socio-economic differences; the study did not take into account computer anxiety differences; the study was limited to perceptions of social and technical computer technology aptitude; the study limited computer attitudes to social and technical experiences.

## **2.0 Methods**

The study used non-probability, purposive sampling techniques to obtain a sample from which data was collected. The participants for the investigation were college undergraduate apparel merchandising and design students and students from other related and non-related majors. Students enrolled in Apparel Studies, Nutrition, Hospitality, Family Relations, Interior Design, Agricultural Mechanization, Agricultural Education, Communication, Principles of Biology, Freshman Business Connection, Markets and Consumers, Enterprise Resource Planning Fundamentals, and Enterprise Resource Planning Configurations and Implementation classes at Mid-South Tier 1 research institution were asked to complete the survey instrument during class time. Participation was voluntary with no incentive given.

There were a total of 1270 students responding to the survey with 1052 usable surveys remaining after cleaning the data for missing entries. This constituted an 83% response rate. The sample size exceeded the maximum practical sample size of 1,000 according to Alreck and Settle (1985), which helped to ensure the reliability and validity of the sample. Table 1 shows the number of students participating in the study according to the classes surveyed in each department.

**Table 1: Number of students participating in the study**

Department	Number of Students
Apparel Classes	173
Other Human Sciences Classes	349
Agriculture	69
Business	254
Arts and Sciences	425
Total Surveys Collected:	1270
Total Surveys Included in Analysis:	1052
Response Rate:	83%

The research model selected for use in this study was the survey design method. The survey was designed to produce quantifiable statistics of the attitudes and perceived aptitudes toward social and technical computer technology.

The responses were collected in a questionnaire format from undergraduates making up a representative sample of the population. The responses constitute the data that was analyzed. The questions were stated in the instructions above the scale and respondents related their agreement or disagreement to each of the statements in the questionnaire. The statements were closed-ended with respondents choosing from a list of provided responses. The research questions posed in this study required the participant's opinion or attitude and their perception of their aptitude of social and technical technology. Demographics of age, gender, ethnicity, college level, and major were also collected through the questionnaire.

## 2.1 Instrumentation

Perceived aptitude and attitude toward social and technical computer technology was measured using a survey questionnaire with Likert-type statements of attitudes toward computers as well as perceptions of aptitude of computer technology. The survey was replicated from a combination of computer attitude and computer efficacy scales with slight modification to include perceived competency associated with social technology. Also included in the questionnaire was demographic information about the respondent.

The survey consisted of three distinct components: (1) attitude toward social and technical technology; (2) non-performance based, self-reported perception of aptitude toward social and technical technology; and (3) collection of demographic information from the students. Concrete facts such as laptop and desktop computers, iPods, cell phones, applications with common software such as word processing, spreadsheets, e-mail, and Internet browsers and web sites as well as more sophisticated tools for academic courseware, Web authoring, and graphic design made up the components of the aptitude portion of the survey. The technologies were presented in a randomly ordered list and the students responded to each item on the list using a 5-point Likert-type scale (1=very low, 2=low, 3=average, 4=high, 5=very high) that assessed perceived knowledge in using computers or software. Positively and negatively worded statements were included in the survey and were recoded prior to analysis.

Student attitude toward social and technical technology was measured using a modified computer attitude scale, which assessed students' attitudes toward computers. A 5-point Likert-type scale (1=do not agree, 2=slightly disagree, 3=neither disagree or agree, 4=slightly agree, and 5=agree) was used to rate the student's attitude towards computers and technology use. Students responded to a demographic data survey for information regarding age, gender, ethnicity, class standing, and academic major.

The specific questions for the attitude component of the questionnaire were adapted from The Computer Attitude Scale (CAS) developed by Loyd and Gessler (1984). The CAS is a Likert-type instrument consisting of 30 questions, which present statements of attitudes toward computers and the use of computers. Three main types of attitudes are represented in the questions: (1) anxiety or fear of computers; (2) liking of computers or enjoyment working with computers; (3) confidence in ability to use or learn about computers. In a study examining the reliability and factorial validity of the CAS and its three subscales, the data suggested that this instrument was an effective, reliable and convenient means of measuring student attitudes toward learning about and using computers, scoring a coefficient alpha reliability for the total test of .95 (Loyd & Gessler, 1984).

Harrison and Rainier (1992) conducted a study to examine the factor structures and validity of the Computer Self-Efficacy Scale (CSE) developed by Murphy, Coover and Owen (1989). The CSE is a 32 item, self-reporting computer self-efficacy scale which measures perceptions of students' capabilities regarding specific computer-related knowledge and skills, moderate computer skills, and advanced computer skills. The 1992 study by Harrison and Rainier found reliability coefficients for each component of the CSE: (1) CSE1 beginning skill = .97; (2) CSE2 moderate skill = .95; (3) CSE3 advanced skill = .98.

The final survey used for the study was a modification of the CSE and CAS measurement scales. The survey included additional modified statements of social technology skills and attitudes regarding laptop and desktop computers, iPods, cell phones, applications with common software such as word processing, spreadsheets, e-mail, and Internet browsers and web sites as well as more sophisticated tools for academic courseware, Web authoring, and graphic design.

### **3.0 Data Collection Results**

Students enrolled in Apparel, Nutrition, Hospitality, Family Relations, Interior Design, Agricultural Mechanization, Agricultural Education, Communication, Principles of Biology, Freshman Business Connection, Markets and Consumers, Enterprise Resource Planning Fundamentals, and Enterprise Resource Planning Configurations and Implementation classes at a Mid-South Tier 1 research institution were asked to complete the survey instrument during class time. Participation was voluntary with no incentive given. The research model selected for use in this study was the survey design method. The survey was designed to produce quantifiable statistics of the attitudes and perceived aptitudes toward social and technical computer technology. The responses were collected in a questionnaire format from undergraduates making up a representative sample of the population. The responses constitute the data that were analyzed. The questions were stated in the instructions above the scale and respondents related their agreement or disagreement to each of the statements in the questionnaire.

The statements were closed-ended with respondents choosing from a list of provided responses. The research questions posed in this study required the participant's opinion or attitude and their perception of their aptitude of social and technical computer technology. Demographics of age, gender, ethnicity, college level, and academic major were also collected through the questionnaire. Perceived aptitude and attitude toward social and technical computer technology was measured using a survey questionnaire with Likert-type statements of attitudes toward computer technology as well as perceptions of aptitude of computer technology. The survey was replicated from a combination of computer attitude and computer efficacy scales with slight modifications to include perceived competency and attitude associated with social technology. Demographic data were also collected from the respondents in the survey instrument. Students responded to each item on the instrument using a 5-point Likert-type scale of 1=very low; 2=low; 3=average; 4=high; 5=very high for the aptitude portion of the survey and 1=do not agree, 2=slightly disagree, 3=neither disagree or agree, 4=slightly agree, and 5=agree for the attitude portion of the survey. Prior to data analysis, positively and negatively worded statements included in the survey were recoded for analysis. The data were cleaned to remove all missing entries and a reliability test was performed on the items to determine instrument reliability.

Demographic data of age, gender, ethnicity, class and major were collected from the respondents and were statistically analyzed in the data analysis as independent variables. Demographic questions of age, class, and ethnicity were regrouped into fewer categories due to small numbers of students in some of the outlying categories. Age was regrouped from five categories to four categories of 18-19, 20-21, 22-25, and 26 and older. Ethnicity was regrouped from five categories to two categories to include White and Nonwhite respondents. Class was regrouped from five categories to four categories, including Freshmen, Sophomores, Juniors, and Seniors for the statistical analysis omitting 16 missing entries. This difference is noted in the statistical analysis. Students listed in Table 1 by departmental classes were not necessarily departmental majors as shown in the majors category of Table 2. Table 2 shows the demographic characteristics of students participating in the survey.

Table 2: Demographic profile of participating students

Demographic Characteristic	Frequency	Percent
<b>Gender</b>		
Female	712	67.7
Male	340	32.3
<b>Ethnicity</b>		
White	895	85.1
Non-White	157	14.9
<b>Age</b>		
18-19	503	47.8
20-21	347	33.0
22-25	146	13.9
25-older	56	5.3
<b>Class</b>		
Senior	191	18.2
Junior	237	22.5
Sophomore	266	25.3
Freshman	342	32.5
Other	16	1.5
<b>Academic Major</b>		
Agriculture	83	7.9
Apparel Studies	145	13.8
Arts and Sciences	187	17.8
Business	256	24.3
Other	381	36.2

#### 4.0 Data Analysis

The internal consistency estimates for the instrument were computed for the entire survey using Cronbach's Alpha ( $\alpha = .89$ ) and for the subscales of technical attitude/aptitude ( $\alpha = .85$ ) and social attitude/aptitude ( $\alpha = .74$ ). Using .7 or higher as the standard of measurement, the instrument was considered reliable for the data collected.

Individual and group means were compared using independent samples *t*-tests and one-way independent analysis of variance (ANOVA). Correlations were used to determine student tendency toward social or technical computer skills. Four major research questions were addressed in this study with data analysis conducted for each question.

**Research Question One:** What was the (1) perceived aptitude of college students toward the dependent variables of (A) social and (B) technical computer technology based upon the independent variables of (a) age, (b) gender, (c) ethnicity, (d) class standing, and (e) academic major? Technical aptitude data were collected from survey questions three through 23 and 36 through 42.

Social aptitude data were collected from survey questions 24 through 35 and 43 through 46. Demographic data were collected from survey questions 100 through 105.

Frequency and percentage distributions were applied to the data using means, percentages, standard deviations and standard error for all social aptitude, technical aptitude, and demographic questions. Group means were assessed using independent samples *t*-tests and one-way ANOVA to understand factors influencing perceived student social and technical computer aptitude.

Using the Statistical Package for the Social Sciences (SPSS), version 15 (Field, 2005) a *t*-test produced group statistics on perceptions of social and technical aptitude toward computer technology based upon gender and ethnicity. A one-way ANOVA produced group statistics on perceptions of social and technical aptitude toward computer technology based upon age, major, and class. Cronbach's alpha for internal consistency was .960 for the social and technical aptitude scale.

On average, using a scale of one to five with five being highest, females had a higher perception of social aptitude toward computer technology ( $M = 69.36$ ,  $SE = .36$ ), than males ( $M = 68.03$ ,  $SE = .59$ ). This difference was not significant for equality of means  $t(595.99) = 1.92$ ,  $p > .05$ . Males however had a higher perception of technical aptitude toward computer technology ( $M = 112.92$ ,  $SE = 1.03$ ), than females ( $M = 110.03$ ,  $SE = .69$ ). This difference was significant for equality of means  $t(1050) = -2.36$ ,  $p < .05$ .

Table 3 shows the frequencies and percentages for perceived social and technical aptitude toward computer technology of college students based on gender. Table 4 shows the results of the independent samples *t*-tests for perceived social and technical aptitude of college students toward computer technology based on gender (Huck & Cormier, 1996).

**Table 3: Frequencies and percentages for the independent variable gender for social aptitude and technical aptitude of college students toward computer technology**

Dependent Variables	Gender	N	Mean	SD	SE
Social Aptitude	Female	712	69.36	9.51	.36
	Male	340	68.04	10.83	.59
Technical Aptitude	Female	712	110.03	18.37	.69
	Male	340	112.92	18.98	1.03

**Table 4: Comparison of sample means by gender using independent samples *t*-tests for social aptitude and technical aptitude of college students toward computer technology**

Dependent Variables	Gender	<i>t</i>	<i>df</i>	Sig. (2-tailed)
Social Aptitude	Female vs. Male	1.921	595.000	.055
Technical Aptitude	Female vs. Male	-2.362	1050	.018*

\* $p < .05$

Using a scale of one to five with five being highest, Whites on average had a higher perception of social aptitude toward computer technology ( $M = 69.23$ ,  $SE = .33$ ), than Nonwhites ( $M = 67.24$ ,  $SE = .86$ ).

This difference was significant for equality of means  $t(203.44) = 2.16, p < .05$ . Whites also had a higher perception of technical aptitude toward computer technology ( $M = 111.07, SE = .62$ ) than Nonwhites ( $M = 110.37, SE = 1.52$ ) however this difference was not significant  $t(1050) = .44, p > .05$ .

Table 5 shows the frequencies and percentages for perceived social and technical computer technology aptitude of college students based on ethnicity. Table 6 shows the results of the independent samples  $t$ -tests for perceived social and technical aptitude of college students toward computer technology based on ethnicity (Huck & Cormier, 1996).

**Table 5: Frequencies and percentages for the independent variable ethnicity for social aptitude and technical aptitude of college students toward computer technology**

Dependent Variables	Ethnicity	N	Mean	SD	SE
Social Aptitude	White	895	69.23	9.79	.33
	Nonwhite	157	67.24	10.81	.86
Technical Aptitude	White	895	111.07	18.53	.62
	Nonwhite	157	110.37	19.07	1.52

**Table 6: Comparison of sample means by ethnicity using independent samples  $t$ -tests for social aptitude and technical aptitude of college students toward computer technology**

Dependent Variables	Ethnicity	$t$	$df$	Sig. (2-tailed)
Social Aptitude	White vs. Nonwhite	2.16	203.44	.032*
Technical Aptitude	White vs. Nonwhite	.44	1050	.663

\* $p < .05$

Analysis of variance procedures were performed for social and technical aptitude perceptions of college students toward computer technology based upon age, academic major and class. There was a significant effect for age on social aptitude perceptions toward computer technology,  $F(3, 1048) = 6.132, p < .05$  but no significant effect of age on technical aptitude perceptions toward computer aptitude,  $F(3, 1048) = .631, p > .05$ .

There was a significant effect for academic major on perceptions of both social aptitude toward computer technology,  $F(4, 1047) = 5.151, p < .05$  and technical aptitude toward computer technology,  $F(4, 1047) = 5.243, p < .05$  of college students. There was no significant effect for class on perceptions of either social aptitude,  $F(3, 1032) = .362, p > .05$  or technical aptitude,  $F(3, 1032) = .900, p > .05$  toward computer technology. Table 7 shows the results of the three one-way ANOVAs for social and technical aptitude toward computer technology by age, academic major and class (Huck & Cormier, 1996).



**Table 7: Analysis of variance for social aptitude and technical aptitude of college students toward computer technology by age (A), academic major (M) and class (C)**

Source		df	SS	MS	F
<b>Social Aptitude (N = 1051)</b>					
Between Groups	(A)	3	1801.93	600.64	6.13*
	(M)	4	2016.04	504.01	5.15*
	(C)	3	107.75	35.92	.36
Within Groups	(A)	1048	102651.72	97.95	
	(M)	1047	102437.61	97.84	
	(C)	1032	102408.18	99.23	
Total	(A)	1051	104453.65		
	(M)	1051	104453.65		
	(C)	1035**	102515.93		
<b>Technical Aptitude (N=1051)</b>					
Between Groups	(A)	3	656.65	218.88	.60
	(M)	4	7146.99	1786.75	5.24*
	(C)	3	932.94	310.98	.90
Within Groups	(A)	1048	363327.18	346.69	
	(M)	1047	356836.84	340.82	
	(C)	1032	356677.19	345.62	
Total	(A)	1051	363983.83		
	(M)	1051	363983.83		
	(C)	1035**	357610.13		

\* $p < .001$ \*\*missing data for 16 entries resulted in lower  $N$  value for class

**Research Question Two:** What was the (1) attitude of college students toward the dependent variables of (A) social and (B) technical computer technology based upon the independent variables of (a) age, (b) gender, (c) ethnicity, (d) class standing, and (e) academic major? Technical attitude data were collected from survey questions 47 through 76. Social attitude data were collected from survey questions 77 through 99. Demographic data were collected from survey questions 100 through 105. Reliability was tested using Cronbach's reliability coefficient with .7 or higher as the standard of measurement. Frequency and percentage distributions were applied to the data using means, percentages, standard deviations, and standard error for all social attitude, technical attitude, and demographic questions. Group means were assessed using independent  $t$ -tests and one-way analysis of variance (ANOVA) to understand factors influencing student social and technical computer attitude.

Using SPSS (Field, 2005), a  $t$ -test produced group statistics on perceptions of social and technical attitude toward computer technology based upon gender and ethnicity. A one-way ANOVA produced group statistics on social and technical computer technology attitude based upon age, major, and class. Cronbach's alpha for internal consistency was .69 for the social and technical attitude scale. On average, using a scale of one to five with five being highest, males had a higher perception of social attitude toward computer technology ( $M = 67.51$ ,  $SE = .50$ ), than females ( $M = 64.92$ ,  $SE = .26$ ). This difference was significant for equality of means  $t(537.52) = -4.60$ ,  $p < .05$ . Males also had a higher perception of technical attitude toward computer technology ( $M = 91.04$ ,  $SE = .56$ ), than females ( $M = 88.75$ ,  $SE = .29$ ). This difference was significant for equality of means  $t(524.03) = -3.607$ ,  $p < .05$ .

Table 8 shows the frequencies and percentages for social and technical attitude toward computer technology based on gender. Table 9 shows the results of the independent samples *t*-tests for social and technical attitude of college students toward computer technology based on gender (Huck & Cormier, 1996).

**Table 8: Frequencies and percentages for the independent variable gender for social attitude and technical attitude of college students toward computer technology**

Dependent Variables	Gender	N	Mean	SD	SE
Social Attitude	Female	712	64.92	7.06	.26
	Male	340	67.51	9.17	.50
Technical Attitude	Female	712	88.75	7.73	.29
	Male	340	91.04	10.41	.56

**Table 9: Comparison of sample means by gender using independent samples *t*-tests for social attitude and technical attitude of college students toward computer technology**

Dependent Variables	Gender	<i>t</i>	<i>df</i>	Sig. (2-tailed)
Social Attitude	Female vs. Male	-4.60	537.52	.000*
Technical Attitude	Female vs. Male	-3.60	524.03	.000*

\* $p < .001$

Using a scale of one to five with five being highest, Nonwhites on average had a higher perception of social attitude toward computer technology ( $M = 66.03$ ,  $SE = .72$ ), than Whites ( $M = 65.71$ ,  $SE = .26$ ). This difference was not significant for equality of means  $t(1050) = -.46$ ,  $p > .05$ . Nonwhites also had a higher perception of technical attitude toward computer technology ( $M = 90.13$ ,  $SE = .85$ ) than Whites ( $M = 89.38$ ,  $SE = .28$ ). This difference was not significant for equality of means  $t(191.80) = -.84$ ,  $p > .05$ .

Table 10 shows the frequencies and percentages for social and technical attitude of college students toward computer technology based on ethnicity. Table 11 shows the results of the independent samples *t*-tests for social and technical attitude of college students towards computer technology based on ethnicity (Huck & Cormier, 1996).

**Table 10: Frequencies and percentages for the independent variable ethnicity for social attitude and technical attitude of college students toward computer technology**

Dependent Variables	Ethnicity	N	Mean	SD	SE
Social Attitude	White	895	65.71	7.68	.26
	Nonwhite	157	66.03	9.06	.72
Technical Attitude	White	895	89.38	8.39	.28
	Nonwhite	157	90.13	10.59	.85

**Table 11: Comparison of sample means by ethnicity using independent samples *t*-tests for social attitude and technical attitude of college students toward computer technology**

Dependent Variables	Ethnicity	<i>t</i>	<i>df</i>	Sig. (2-tailed)
Social Attitude	White vs. Nonwhite	-.46	1050	.65
Technical Attitude	White vs. Nonwhite	-.84	191.81	.40

\* $p < .05$ 

Analysis of variance procedures were performed for social and technical attitude of college students toward computer technology based upon age, academic major and class. There was no significant effect by age on social attitude toward computer technology,  $F(3, 1048) = .50, p > .05$  or technical attitude toward computer technology,  $F(3, 1048) = 1.06, p > .05$  of college students. There was no significant effect by academic major on social attitude toward computer technology,  $F(4, 1047) = 1.05, p > .05$  or technical attitude on computer technology,  $F(4, 1047) = .98, p > .05$  of college students. There was no significant effect of class on either social attitude toward computer technology,  $F(3, 1032) = 1.32, p > .05$  or technical attitude toward computer technology,  $F(3, 1032) = .900, p > .05$  of college students. Table 12 shows the analysis of variance results of the three one-way ANOVAs (Huck & Cormier, 1996).

**Table 12: Analysis of variance for social attitude and technical attitude toward computer technology of college students by age (A), academic major (M) and class (C)**

Source		df	SS	MS	F
<b>Social Attitude (N = 1051)</b>					
Between Groups	(A)	3	94.29	31.43	.50
	(M)	4	261.35	65.34	1.05
	(C)	3	244.36	81.45	1.32
Within Groups	(A)	1048	65409.35	62.41	
	(M)	1047	65242.29	62.31	
	(C)	1032	102408.18	99.23	
Total	(A)	1051	65503.64		
	(M)	1051	65503.64		
	(C)	1035**	77456.35		
<b>Technical Attitude (N=1051)</b>					
Between Groups	(A)	3	243.58	81.19	1.06
	(M)	4	301.16	75.29	.98
	(C)	3	47.75	15.92	.21
Within Groups	(A)	1048	80217.36	76.54	
	(M)	1047	80159.78	76.56	
	(C)	1032	77408.60	75.01	
Total	(A)	1051	80460.94		
	(M)	1051	80460.94		
	(C)	1035**	77456.35		

\*  $p < .05$ 

**\*\*missing data for 16 entries in the class category**  
**Research Question Three:** Were there significant differences between social technology and technical technology perceptions of aptitude and attitude in college students? One-way ANOVAs and independent  $t$ -tests were used to determine significance in all levels of variables. Results of the independent samples  $t$ -tests revealed males had significantly higher perceptions of technical aptitude toward computer technology than females. Males also had higher levels of both social and technical attitude toward computer technology than females. Whites had higher perceptions of social aptitude toward computer technology than Nonwhites.

Significance was assessed using Tukey's HSD post hoc test to compare all groups of participants with each other where there were four or more levels of independent variables in the one-way ANOVA tests. A one-way ANOVA used to determine perceptions of social aptitude toward computer technology by age revealed a significant  $F$  ratio of 6.13 ( $p < .001$ ), which indicated there was a difference between groups. Tukey's post hoc multiple comparison test indicated that there were no significant differences between the ages of 18 – 19 ( $M = 69.42$ ); 20 – 21 ( $M = 69.05$ ); 22 – 25 ( $M = 69.03$ ) however the college students aged 26 years and older ( $M = 63.46$ ) had significantly lower means from the 18 - 25 year olds in terms of social aptitude toward computer technology in college students ( $p < .05$ ).

Social aptitude toward computer technology by major revealed a significant  $F$  ratio of 5.15 ( $p < .001$ ) in the one-way ANOVA. Tukey's post hoc multiple comparison test indicated that Apparel ( $M = 70.06$ ) and Business ( $M = 70.73$ ) majors had significantly higher means from Agriculture majors ( $M = 66.04$ ) with regard to social aptitude toward computer technology ( $p < .05$ ). Business majors also had significantly higher means from those majors in the Other category ( $M = 68.01$ ) with regard to social aptitude toward computer technology.

Arts and Science majors had no significant differences from any of the majors in the area of social aptitude toward computer technology.

Technical aptitude of college students toward computer technology by major revealed a significant  $F$  ratio of 5.24 ( $p < .001$ ) in the one-way ANOVA. Tukey's post hoc test indicated that Business majors ( $M = 115.30$ ) had significantly higher means from Arts and Sciences majors ( $M = 111.31$ ) and from Other majors ( $M = 108.64$ ) with regard to technical aptitude of computer technology. No significant differences were found with Apparel or Agriculture majors with regard to technical aptitude of computer technology. There were no significant differences in social and technical attitude by age, academic major or class.

**Research Question Four:** What was the correlation between perceived social aptitude, technical aptitude, social attitude and technical attitudes of college students? Pearson product correlation coefficients measured the relationship between the attitude (CAS) and perceived aptitude (CSE) and social and technical skills using data from survey questions three through 99. Basic correlation analysis was used to determine the significance and strength of the effect of the relationships among the study variables.

Pearson correlation coefficients were calculated between social aptitude, technical aptitude, social attitude, and technical attitude. There was a strong positive correlation between both social aptitude with technical aptitude ( $r = .801$ ) and social attitude with technical attitude ( $r = .677$ ). There were moderate positive correlations between both technical aptitude with social attitude ( $r = .135$ ) and technical aptitude with technical attitude ( $r = .119$ ). There were low positive correlations between both social aptitude with social attitude ( $r = .063$ ) and social aptitude with technical attitude ( $r = .043$ ). All the scores were positively related and are reported in Table 13 (Huck & Cormier, 1996).

**Table 13: Comparison of social aptitude (SocApt), technical aptitude (TechApt), social attitude (SocAtt), and technical attitude (TechAtt) scores for college students ( $n = 1052$ )**

	SocApt	TechApt	SocAtt	TechAtt
Social Aptitude	1.00			
Technical Aptitude	.801*	*1.00		
Social Attitude	.063*	.135*	*1.00	
Technical Attitude	.043	.119**	.677*	*1.00

\* $p < .05$  (2-tailed)

\*\* $p < .01$  (2-tailed)

### 5.0 Summary, Conclusions, and Recommendations

On average, females had a higher perception of social aptitude toward computer technology than males, however this difference was not statistically significant. Males, on average, had a higher perception of technical aptitude toward computer technology than females and this difference was statistically significant. In terms of ethnicity, Whites on average had a higher perception of social aptitude toward computer technology than Nonwhites, which was statistically different. Whites also had a higher perception of technical aptitude toward computer technology than Nonwhites however this difference was not significant. There was a significant effect of age on social aptitude perceptions toward computer technology but no significant effect by age on technical aptitude perceptions toward computer aptitude. There was a significant effect of academic major on perceptions of both social aptitude toward computer technology, and technical aptitude toward computer technology of college students. There was no significant effect of class on perceptions of either social aptitude toward computer technology or technical aptitude toward computer technology.

On average, males had a higher perception of social attitude and technical attitude toward computer technology than females. Both differences were statistically significant. Nonwhites on average had a higher perception of social attitude and technical attitude toward computer technology than Whites. Neither of these differences was statistically significant. There was no significant effect by age, academic major or class on social or technical attitude toward computer technology.

Males had higher perceptions of technical aptitude toward computer technology than females. Males also had higher levels of both social and technical attitude toward computer technology than females. Whites had higher perceptions of social aptitude toward computer technology than Nonwhites. There was a significant difference by age for perceptions of social aptitude toward computer technology. Further testing indicated that there were no significant differences between the ages of 18 and 25 however the college students who were over 25 had significantly lower mean scores from the 18 to 25 year olds in terms of social aptitude toward computer technology in college students.

Social aptitude toward computer technology by major revealed a statistically significant difference. Further testing indicated that Apparel and Business majors had significantly higher mean scores compared to Agriculture majors with regard to social aptitude toward computer technology. Business majors had significantly higher mean scores compared with the mean scores in the Other category with regard to social aptitude toward computer technology. Arts and Science majors had no significant differences from any of the majors in the area of social aptitude toward computer technology.

Technical aptitude of college students toward computer technology by major revealed a significant difference. Further testing indicated that Business majors had significantly higher mean scores as compared to Arts and Sciences majors, with regard to technical aptitude of computer technology. Business majors also revealed significantly higher mean scores from Other majors in the area of technical aptitude of computer technology. There were no significant differences in the mean scores of Apparel and Agriculture majors with respect to technical aptitude. No significant differences were found in social and technical attitude by age, academic major or class.

There were strong positive correlations between social aptitude with technical aptitude and social attitude with technical attitude. Moderately positive correlations were found between social attitude with technical aptitude and technical attitude with technical aptitude. There were low positive correlations between social aptitude with social attitude and social aptitude with technical attitude.

Females scored higher in their perception of aptitude toward social technology such as e-mailing, instant messaging, downloading music and computer games, using social networks such as Facebook and iPads more than males, however the difference was not enough to be statistically significant. Males scored significantly higher in their perceptions of aptitude toward technical technology, such as office based software packages, web page creation and graphic software. Males also scored higher in their perception of social and technical attitude such as lack of anxiety, confidence and general likeing toward computer technology than females. These perceptions were all statistically significant. These findings are consistent with previous research on gender differences, finding differences existing between college men and women in how they experienced computer technology. According to previous studies (Lee, 2003; Sherman, End, Kraan, Cole, Campbell, Birchmeier, & Klausner, 2000; Imhof, Vollmeyer, & Beierlein, 2006) differences do exist between college men and women in how they experience technology. In particular, men tend to spend more time and outperformed women at computer competency. In addition, Shashaani (1993; 1997) concluded females were less interested and less confident than males in computer technology.

In terms of ethnicity, Whites scored significantly higher on perceptions of social aptitude toward computer technology such as emailing, instant messaging, downloading music and computer games, using social networks such as Facebook than Nonwhites. Whites also scored higher on perceptions of technical aptitude such as office based software packages, web page creation and graphic software toward computer technology than Nonwhites however this difference was not significant. Nonwhites, on average, had higher perceptions of social attitude and technical attitude such as a lack of anxiety, confidence and general liking toward computer technology than Whites, however these differences were not statistically significant.

College students' technological preparedness, specifically Internet and email use, varies by socioeconomic factors such as race according to Sax (2001). Other previous research (Flowers & Zhang, 2003; Madigan & Goodfellow, 2005; Ching, Basham, & Fang, 2005) on computer technology with regard to ethnicity found that technological preparedness is driven by socioeconomic factors such as race. This research is consistent with those findings. However attitudes by Nonwhites, even though not statistically significant, showed higher averages than Whites.

When testing for differences in social and technical aptitude perceptions of college students toward computer technology based upon age, this study found a significant effect of age on social aptitude perceptions such as emailing, instant messaging, downloading music and computer games, using social networks such as Facebook, and iPads toward computer technology. However, no significant effect of age on technical aptitude perceptions toward computer aptitude were found. Further testing indicated that there were no significant differences of those respondents who were between the ages of 18 and 25. However, college students who were over 25 had significantly lower mean scores for social aptitude toward computer technology from the 18 to 25 year olds. When testing for differences in social and technical attitude toward computer technology in college students based upon age no significant effect was found for social attitude or technical attitude toward computer technology of college students. Research has shown that the Net Generation tends to be more technologically sophisticated than previous generations, using the Internet to communicate socially, for entertainment and to stay in touch with friends and family (Lenhart & Madden, 2007; Napoli & Ewing, 2001). There were differences between the Net Generation age group (18 to 25) as compared to the older generations (25 and older) in computer aptitude, however no differences were found in attitudes of liking, confidence, or anxiety toward computer technology.

There was a significant effect of academic major on perceptions of both social aptitude toward computer technology, and technical aptitude toward computer technology of college students. Further testing indicated that Apparel and Business majors had significantly higher mean scores than Agriculture majors with regard to social aptitude toward computer technology. Business majors also had significantly higher mean scores from those majors in the Other category with regard to social aptitude toward computer technology. Arts and Science majors had no significant differences from any of the majors in the area of social aptitude toward computer technology.

Technical aptitude of college students toward computer technology by major revealed a significant difference. Further testing indicated that Business majors had significantly higher means than Arts and Sciences majors and majors in the Other category with regard to technical aptitude of computer technology. There was no significant effect of academic major on social attitude or technical attitude on computer technology of college students. Previous research by Karsten and Roth (1998) found a significant relationship between student perceptions of computer literacy and course performance offering support for continuing a basic training approach in college courses designed to develop and enhance student computer literacy.

There were no significant effects of class on perceptions of either social aptitude toward computer technology or technical aptitude toward computer technology. There were also no significant effects of class on either social attitude or technical attitude toward computer technology of college students. The lack of significant results by class standing on either social or technical aptitude or attitude would seem to support results from previous studies related to age and the characteristics that these students tend to be more technologically savvy in some areas, regardless of their class standing in college.

There were strong positive correlations of social aptitude with technical aptitude and social attitude with technical attitude. Social attitude with technical aptitude was positively correlated as was technical attitude with technical aptitude, however these correlations were moderate. There were low positive correlations of social aptitude with technical attitude and social aptitude with social attitude.

The results of the correlations from data collected in this study support previous findings on attitudes and aptitudes of college undergraduates. The strong positive relationship of social aptitude with technical aptitude indicates a tendency toward positive perceived computer aptitudes, both socially and technically. The strong positive relationship of social attitude with technical attitude indicates a tendency toward positive attitudes toward social and technical computer technology. The other correlations, although moderate to low, were all positive to support a relationship between attitude and aptitude toward both technical and social computer technology. Social technology and technical technology tend to be related when it come to attitudes and aptitude of college undergraduates toward computer technology.

## **6. Recommendations**

Higher education administration and faculty could be impacted with the knowledge needed to develop and implement more meaningful technology curriculum in apparel merchandising and design programs. Employers could be more satisfied with the competencies and qualifications of apparel merchandising and design graduates. Students may benefit the most by receiving the needed technology exposure for successful academic and vocational careers based upon their needs. Secondary education can better prepare students for the technology skills needed in postsecondary education if they have a better understanding of the type of technology skills students have. University programs must prepare for the socially technical student. Apparel programs must be aware of the range of knowledge of both social and technical student types enrolling in specialized computer courses prior to teaching those courses. Industry must be aware of the type of technology skills students are entering the job market with.

The growing need for designers and merchandisers with CAD experience calls for CAD based curriculum in higher education clothing, textile, apparel, and merchandising programs. Student interest and motivation for learning computer-aided-design systems has caused many apparel programs to review and revise their curricula. With the advent of even greater technological advances in the apparel industry, apparel merchandising and design students will need further exposure to computer-aided-design techniques. As the apparel business continues to demand versatility and creativity from its employees, competition from other countries and increased numbers of apparel designers and merchandisers entering the field will require experience with computer-aided-design programs. Educators must update curriculum and facilities to keep up with the accelerated computerization of the apparel industry. Before the update of apparel curriculum can be completed, student readiness must be assessed to determine true computer and technological skills. There can be a blending of social technology and technical technology in the classroom or work place. More students are using social technology skills, which are already being implemented in the learning and working environments by the use of e-mail, instant messaging, Facebook, and iPads social networking sites. With the influx of social technology in the schools and industry, it is possible that technical technology aptitude and attitudes may be improved.

A better understanding of the computer gender gap will come from an appreciation of the Internet as a social technology in which online behaviors and attitudes are extensions of offline social processes and relationships. Further study of the social technology aptitudes of females may be needed based upon the higher means of females to males. More research may be needed to tailor computer-based instruction to the needs of students based on the social technological aspect which will also prepare students for computer based learning environments. A study of the non-traditional student might be beneficial to the discussion of age and technology based upon results of Net Generation aptitudes versus other generations. Another area for further research would be to determine the similarities and differences between related majors including Business, Apparel, and Arts and Sciences in the area of social and technical aptitude and attitude. A more detailed breakdown of related majors would be beneficial for the vocational choices of undergraduates.

Further research may be needed to study the types of technology currently being used in the apparel manufacturing and retailing industry. The application of that knowledge may be used in undergraduate curriculum to equip future designers, product developers, and merchandisers with the level of information needed to be competitive in a technology based apparel industry today.



## References

- Alreck, P. L., & Settle, R. B. (1985). *The survey research handbook*. Homewood, IL: Richard D. Irwin, Inc.
- Aviles, K., Phillips, B., Rosenblatt, T., & Vargas, J. (2005). If higher education listened to me. *Educause*, 40,(5), 17-28.
- Bennett, S., Maton, K., Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence, *British Journal of Educational Technology*, 39(5)775–786.
- Bugeja, M. J. (2006). Facing the facebook. *The Chronicle of Higher Education*, 52(21), C1-C4.
- Ching, C. C., Basham, J. D., & Fang, E. (2005). The legacy of the digital divide: Gender, socioeconomic status, and early exposure as predictors of full-spectrum technology use among young adults. *Urban Education*, 40(4), 394-411.
- Dickerson, K. G. (2003). *Inside the fashion business*. (7<sup>th</sup> ed.). Upper Saddle River, NJ: Prentice Hall.
- Elam, C., Stratton, T., & Gibson, D.D., (2007). Welcoming a New Generation to College: The Millennial Students. *Journal of College Admission*, 195, 20-25.
- Field, A. (2005). *Discovering statistics using SPSS*. (2<sup>nd</sup> ed.). London, England: Sage Publications Ltd.
- Flowers, L., & Zhang, Y. (2003). Racial differences in information technology use in college. *College Student Journal*, 37(2), 235-242.
- Harrison, A. W., & Rainer, R. K. (1992). An examination of the factor structures and concurrent validities for the computer attitude scale, the computer anxiety rating, and the computer self-efficacy scale. *Educational & Psychological Measurement*, 52(3), 735-746.
- Howe, N., & Strauss, W. (2000). *Millennials rising: The next generation*. New York: Vintage Books.
- Huck, S. W., & Cormier, W. H. (1996). *Reading statistics and research*. (2<sup>nd</sup> ed.). New York, NY: HarperCollins Publishers, Inc.
- Imhof, M., Vollmeyer, R., & Beierlein, C. (2006). Computer use and the gender gap: The issue of access, use, motivation, and performance. *Computers in Human Behavior*, 23, 2823-2837.
- Karsten, R., & Roth, R. M. (1998). The relationship of computer experience and computer self-efficacy to performance in introductory computer literacy courses. *Journal of Research on Computing in Educating*, 31(1), 14-25.
- Lee, A. C. K. (2003). Undergraduate students' gender differences in IT skills and attitudes. *Journal of Computer Assisted Learning*, 19(4), 488 – 501.
- Lenhart, A., & Madden, M. (2007). *Social networking websites and teens: An overview*. Washington: Pew Internet & American Life Project.
- Loyd, B. H., & Gressard, C. (1984). Reliability and factorial validity of computer attitude scales. *Educational and Psychological Measurement*, 44(2), 501-505.
- Madigan, E., & Goodfellow, M. (2005). The influence of family income and parents education on digital access: Implications for first-year college students. *Sociological Viewpoints*, 21, 53-62.
- Murphy, C. A., Coover, D., & Owen, S. V. (1989). Development and validation of the computer self-efficacy scale. *Educational and Psychological Measurement*, 49(2), 893-899.
- Napoli, J., & Ewing, M. E. (2001). The net generation: An analysis of lifestyles, attitudes and media habits. *Journal of International Consumer Marketing*, 13(1), 21-34.
- Oblinger, D., & Oblinger, J. (2006). Is it age or IT: First steps toward understanding the Net Generation. *California School Library Association (CSLA) Journal*, 29(2), 8-16.
- Olsen, F. (2000). Campus newcomers arrive with more skill, better gear. *The Chronicle of Higher Education*, 47(10), A39-43.
- Palaigeorgiou, G. E., Siozos, P. D., Konstantakis, N. I., & Tsoukalas, I. A. (2005). A computer attitude scale for computer science freshmen and its education implications. *Journal of Computer Assisted Learning*, 21, 330-342.
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1-6.
- Sax, L. J. (2001). Technological preparedness among entering freshmen: The role of race, class, and gender. *Journal of Educational Computing Research*, 24(4), 363-383.
- Shashaani, L. (1993). Gender-based differences in attitudes toward computers. *Computers Educ.* 20(2), 169-181.
- Shashaani, L. (1997). Gender differences in computer attitudes and use among college students. *Journal of Educational Computing Research*, 16(1), 37-51
- Sherman, R. C., End, C., Kraan, E., Cole, A., Campbell, J., Birchmeier, Z., & Klausner, J. (2000). The Internet gender gap among college students: Forgotten but not gone? *CyberPsychology & Behavior*, 3(5), 885-894.
- Twale, D. J., & Schaller, M. A. (2003). Mandatory computer purchases and student preparedness: Implications for new student orientation. *Journal of College Orientation and Transition*, 10(2), 60-69.
- Vailes, K., Phillips, B., Rosenblatt, T., & Vargas, J. (2005). If higher education listened to me. *Educause*, 40(5), 17-28.