

# STUDENT PERCEPTION & KNOWLEDGE ABOUT INFORMATION TECHNOLOGY: A COMPUTER ATTITUDE AND EXPERIENCE SURVEY TO MEASURE CHANGES

*Raymond Papp*  
*Central Connecticut State University*

*This paper examines the results of a survey of over 100 undergraduates to determine whether their perceptions, knowledge, and attitudes about information technology have changed as a result of completing an introductory course in computer concepts and literacy. The survey was administered to the students during the first class and then again at the end of the semester. The results were compared to determine if any changes occurred over time.*

*The survey measured students' attitude and perception changes along five dimensions: Attitude toward Technology, Knowledge of Technology, Desire to Learn, Perceived Importance of Technology, and Technology Literacy. A factor analysis was used to group the questions into categories and pre- and post-class surveys were subjected to mean comparisons. Results indicate that students enjoyed learning about technology and have shown large increases in their confidence, ability and knowledge about computers.*

*Pedagogical implications are two-fold. Students completing the course showed marked gains in their knowledge, desire to learn, and their perception of the importance of technology. Second, the survey seems to lend support for the need regarding such a course in the undergraduate business core as a means for students to build vitally important skills and literacy in technology.*

Information technology has become a vital part of life in today's electronic society, however learning how to use this new technology can be anything but easy. Many end-users find their initial exposure to computer concepts and literacy daunting, challenging and even frustrating. To study the effects of technology, an introductory business course was chosen for its target audience. The participants have a diverse range of backgrounds, interests, and experiences with computer systems. They also have varying attitudes and preconceptions about technology. This study will attempt to analyze pre- and post-course surveys to determine which specific factors, if any, can affect students' attitudes and perceptions about technology.

Previous studies have shown that student attitudes about and experiences with technology often have a significant impact on student performance (Davis, 1993;

Harris, 1995; Henry, Stone, and Pierce, 1995). This study will attempt to support these findings as well as investigate specific causes for this occurrence, including any change in attitudes as a result of taking this course.

## **Survey Instrument**

During the 1995-96 and 1996-97 academic years, 110 students completed the *Computer Attitude and Experience Survey* instrument (see Appendix A). They were asked to complete it during the first week of class and then again in the last week of the semester to determine if any changes in their attitude toward technology occurred over the term. The survey consists of 6 demographic questions and 14 questions related to technology attitudes and experience. The demographic variables include gender, age, grade level, major, prior

TABLE 1

FACTOR CATEGORIES & CRONBACH ALPHA COEFFICIENTS

Questionnaire Item Groupings (Factors)	Cronbach's Alpha
<b><u>Attitude toward Technology</u></b>	0.86
Q1: I am comfortable around computers.	
Q2: I have a strong background in computers.	
Q4: I feel comfortable operating a PC.	
	0.79
<b><u>Knowledge of Technology</u></b>	
Q3: I understand and can describe the basic components of a computer	
Q5: I am able to communicate using electronic mail.	
Q6: I am able to write a letter using a word processor.	
Q7: I am able to develop a basic spreadsheet application.	
Q9: I am able to create a slide presentation using a presenter graphics package	
	0.59
<b><u>Desire to Learn</u></b>	
Q8: I feel comfortable learning a new software package.	
Q10: I am interested in learning more about computers in general.	
	0.98
<b><u>Technology Literacy</u></b>	
Q11: I want to learn just enough about computers to "get by" in my field.	
Q12: I want to learn everything I can about computers.	
	0.49
<b><u>Perceived Importance of Technology</u></b>	
Q13: It is very important for me to be computer literate	
Q14: It is very important for everyone to be computer literate	

classes and/or experience with computer systems, and the number of years of work experience. The 14 technology attitude and experiential questions were grouped into five categories measuring *Attitude toward Technology*, *Knowledge of Technology*, *Desire to Learn*, *Perceived Importance of Technology* and *Technology Literacy* based on the results of a principle components factor analysis. The groups also exhibit a high degree of reliability as seen by the Cronbach Alpha scores (see Table 1) and T-Test scores (see Appendix B). These groups were then correlated and subjected to mean comparisons, controlling for pre- and post-surveys, to study changes in student attitudes.

**Demographics**

Of the 110 students who completed the survey, most were either Sophomores (52%) or Juniors (29%), and 52% identified themselves as Male and 48% as Female.

Over half the students were between 19 and 22 years of age and 40% were over 25 years of age. 92% had at least some contact with computers in high school, and over 40% had already taken a basic computer class in college. The students were distributed among the following majors: Accounting (19%), Finance/Insurance (10%), Management (19%), Marketing (27%), and MIS (25%).

One-third indicated that they had no experience with computers and 21% had one year's experience or less with computers "on the job". Approximately 24% had between two and three years experience and about 22% had more than four years work experience with computers.

Of the 110 students surveyed, the grade distribution was as follows: 16 A's, 47 B's, 31 C's, 9 D's and 7 F's. Female students generally scored higher than the males in the percentage of A's, B's and C's received. Also of

note is the finding that none of the students with 2 or more years of experience with computers "on the job" received a grade lower than 75 or "C". This might indicate that previous experience with computers results in better performance when learning new computer technologies due to a "comfort" factor.

## DATA ANALYSIS

### Attitude toward Technology

New users often have a poor attitude toward complex and unfamiliar technology and may, in fact, have a negative predisposition to it. This may be due in large part to their inability to readily comprehend or utilize it. It is the author's contention that exposure to new technologies in a planned, comprehensive, educational setting (i.e., an introductory MIS class) can go a long way to alleviate some of these anxieties. Specifically, *a student's attitude toward technology will be a reflection of his/her level of security and confidence with it.*

Analysis of the surveys seems to indicate that students' attitude toward technology was initially one of insecurity and doubt, but with a willingness to learn how to use this technology. Prior to taking this class, only 22% of the students were comfortable around computers and more than 56% felt they did not have a strong background in computers. Only 45% felt

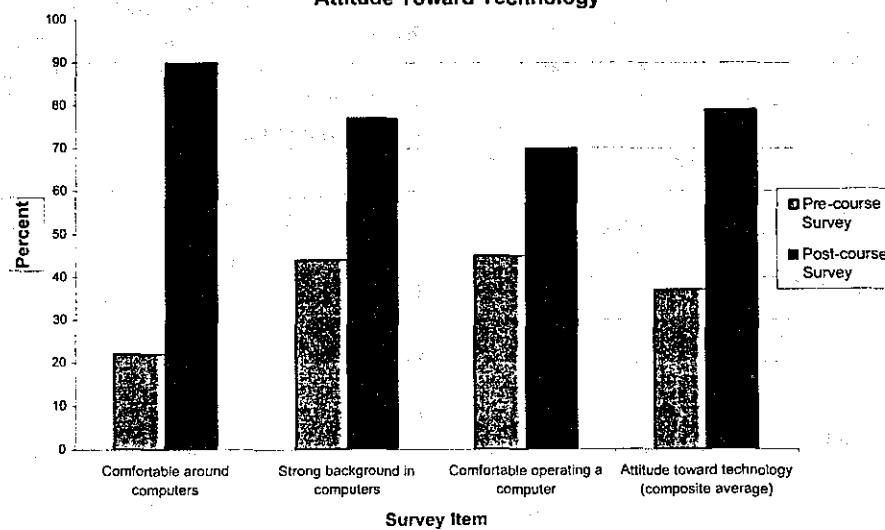
comfortable operating a PC. This is in direct contrast to the post-course surveys which revealed that 90% now felt comfortable around computers, only 23% felt they did not have a strong background in computers, and over 70% now felt confident they could operate a computer. The *Attitude* factor, which averages questions 1, 2, and 4, seems to lend support to these findings. In the pre-course survey, over 63% of the students had a negative attitude (expressed as a three or less on a scale of 1-7) toward computers. The post-course survey shows that only 20% of the students felt negatively toward computers. In fact, over 75% had a strong attitude (6 or 7) after the course, compared to 37% beforehand. This is encouraging for it illustrates that an introductory course can dramatically improve students' attitude toward technology. Hands-on learning seems to lessen student fears about computers. Figure 1 illustrates the change in the *Attitude* factor from the pre-course and post-course surveys.

### Knowledge of Technology

Just as a student's attitude toward technology is a direct result of his/her experience with it, knowledge of technology is also dependent on familiarization with it. *A student's knowledge of technology will also increase as a result of a hands on course which seeks to familiarize the student with the technologies in question using lecture coupled with interactive, hands on learning.*

FIGURE 1

Attitude Toward Technology



Students' self-assessed knowledge of technology showed a dramatic change upon analysis of the survey results. Before taking the class, only 16% felt they could describe the basic components of a computer, over 80% could not use a spreadsheet, and 74% could not create a slide presentation using a presentation package. This is in contrast to the post-course surveys, which indicated dramatic gains in knowledge. 60% felt they had a good grasp of the basic components of a computer, only 23% were uncomfortable using a spreadsheet, and 30% did not feel proficient creating a slide presentation. The *Knowledge* factor, the composite average of questions 3, 5, 6, 7 and 9, also supports these findings. Before taking the class, over 60% of the students had a weak knowledge of technology, yet after taking the class, only 23% knowledge of technology. Figure 2 compares the change in the *Knowledge* factor from the pre-course and post-course surveys.

**Desire to Learn**

Interestingly, this course actually increased students' desire to learn more about computers. Initially, only about a third of the students felt comfortable learning a

new software package, yet after completing the class the percentage increased to 73%. An equally large gain is also manifested in students' desire to learn more about technology in general. While 72% wanted to learn more initially, the percentage jumped to 97% after completion of the course. This seems to lend support to the premise that *the more students are exposed to computer technologies, the more they want to learn and the greater their interest level*. This was the case with several of the topics that were covered in the class. For example, students were asked learn the Hyper-Text Markup Language (HTML) and design their own home page for the World Wide Web. Many students exceeded the project requirements and created some spectacular pages complete with graphics, sound, animation, and other advanced features. They also exhibited this desire with the presentation graphics assignment, with many using advanced features in that assignment as well. The *Desire to Learn* factor, the average of questions 8 and 10, illustrates perhaps the greatest amount of increase among all the factors; this is illustrated in Figure 3, comparing the change in the *Desire* factor from the pre-course (53%) and post-course (81%) surveys.

**FIGURE 2**

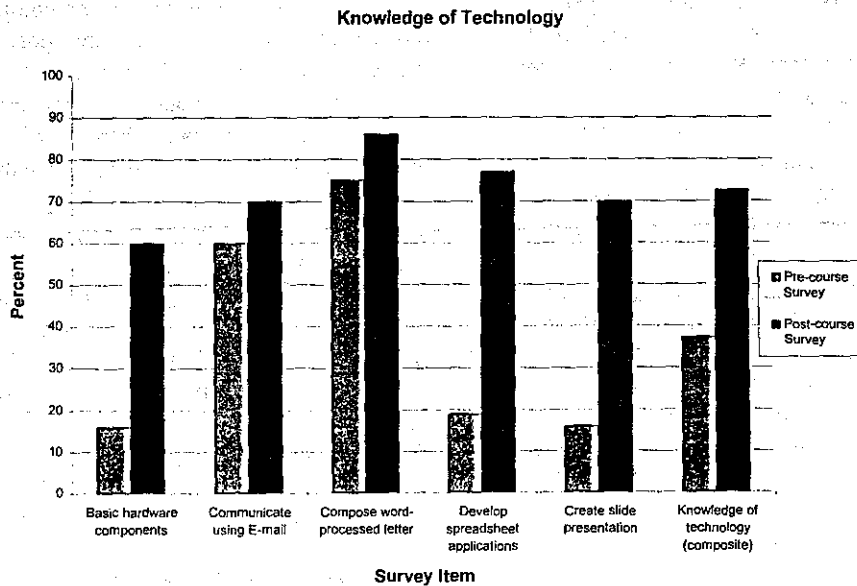
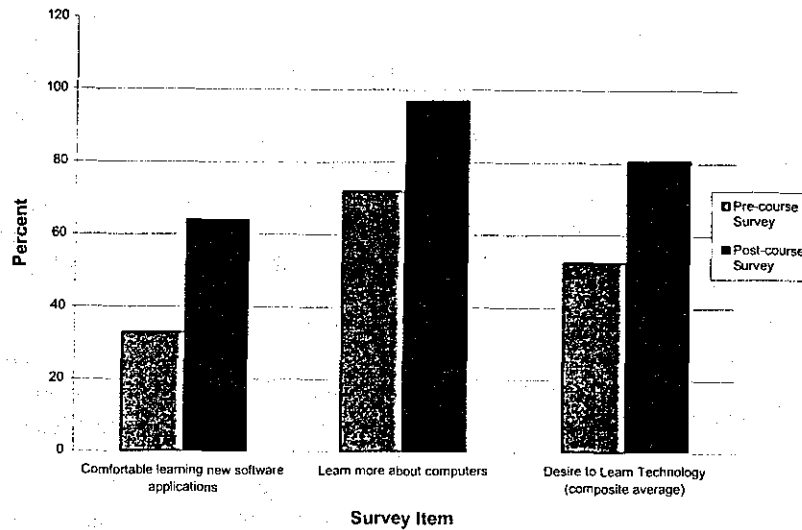


FIGURE 3

Desire to Learn Technology



**Importance of Technology**

Exposure to computers can be addictive. *Students who are exposed to and use computer technology will want to learn more and will place a greater value on technology.* Analysis of the survey data seems to support this contention. 17% wanted to learn just enough about computers to “get by” initially, yet by the end of the course, the percentage dropped to 8%. Correspondingly, more than 90% wanted to learn “everything I can” about computers, up from 65% initially. This is a positive indication that exposure to computer technology is habit-forming. Students realize that technology can improve their lives, hence their desire to learn increases. The composite measurement called *Importance*, which encompasses questions 11 and 12, suggests that student perception of the importance of technology did increase, although only moderately. This seems to indicate an initial awareness of the necessity of computer technology. The moderate increase affirms their original belief in importance, as illustrated in Figure 5 which highlights the change in the *Importance* factor.

**Technology Literacy Perception**

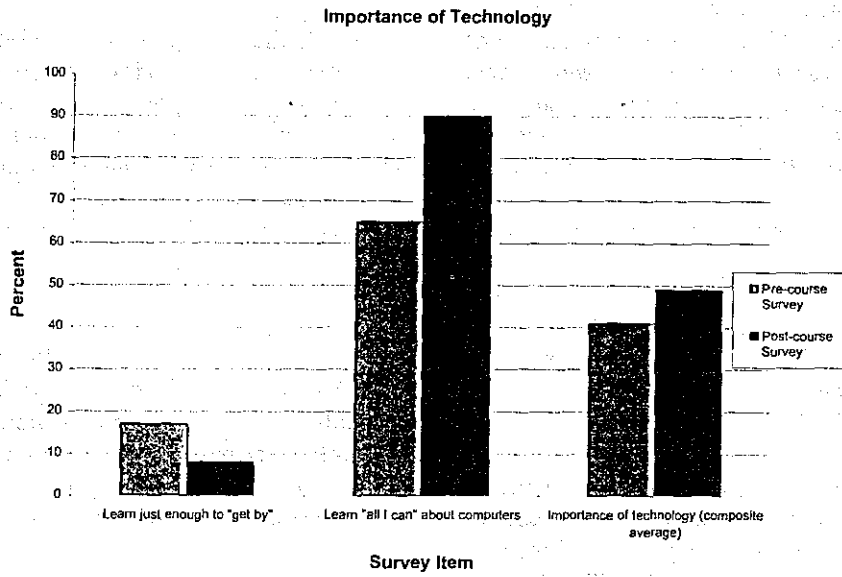
The ability to be computer literate is vital in today’s information intensive business world. Therefore, students who believe in the importance of computer

literacy will have a more positive outlook on computer technology and *this attitude will carry over to their ability to master these technologies as well as shape their perceptions of it.* This contention was analyzed and tested using the survey data. Initially, over 84% of the students felt that it was important for them to be computer literate and more than two-thirds felt that it was important for everyone to be computer literate in today’s society. The pre- and post-survey figures increased to 97% and 95%, respectively. This moderate gain suggests that students’ initial perceptions about computer literacy can change with exposure to technology and consequently re-shape their perceptions of it. Students seem to be fairly cognizant of the benefits and necessity of learning these new technologies and therefore exhibit only a moderate degree of variance from pre- and post-surveys. The *Literacy* factor is the composite of questions 13 and 14 and measures the importance of literacy for the individual and society in general. The figure below illustrates the change from the pre-course and post-course surveys.

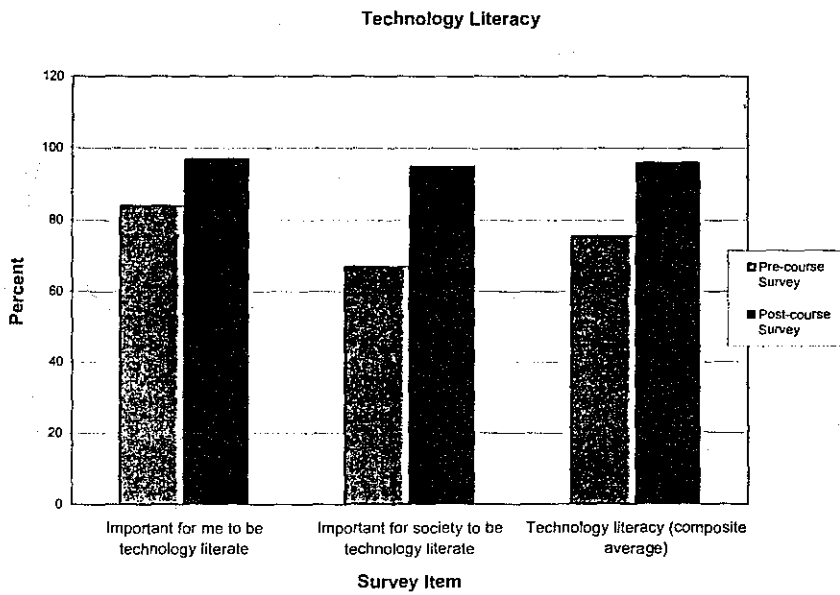
**PEDAGOGICAL IMPLICATIONS**

The students seemed to enjoy learning about technology and have shown dramatic increases in their confidence, ability and knowledge about computers. This course seems to have accomplished its goal—to prepare

**FIGURE 4**



**FIGURE 5**





Major:

Accounting/  
Actuarial  
1

Finance/  
Insurance  
2

Economics  
3

Marketing  
4

Management/  
MIS  
5

Non-Business  
6

Use the following scale for the questions below.

Strongly Disagree

Disagree

Agree

Strongly Agree

1

2

3

4

5

6

7

- I am comfortable around computers. 1 2 3 4 5 6 7
- I have a strong background in computers. 1 2 3 4 5 6 7
- I understand and can describe the basic components of a computer (e.g., hardware). 1 2 3 4 5 6 7
- I feel comfortable operating a PC (personal computer). 1 2 3 4 5 6 7
- I am able to communicate using electronic mail. 1 2 3 4 5 6 7
- I am able to write a letter using a word processor. 1 2 3 4 5 6 7
- I am able to develop a basic spreadsheet application. 1 2 3 4 5 6 7
- I feel comfortable learning a new software package. 1 2 3 4 5 6 7
- I am able to create a slide presentation using a graphics package (e.g., PowerPoint, Freelance). 1 2 3 4 5 6 7
- I am interested in learning more about computers in general. 1 2 3 4 5 6 7
- I want to learn just enough about computers to "get by" in my field. 1 2 3 4 5 6 7
- I want to learn everything I can about computers. 1 2 3 4 5 6 7
- It is very important for me to be computer literate. 1 2 3 4 5 6 7
- It is very important for everyone to be computer literate in today's society. 1 2 3 4 5 6 7

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Social Security Number: \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ Name: \_\_\_\_\_

*Thank you for completing this survey!*

APPENDIX B

T-TESTS FOR PRE- AND POST-SURVEY RESULTS

Variable	Mean (N=110)	Standard Deviation	SE of Mean	Mean Difference	Levene's Test for Equality		Variance	T- Value	df
					F=	P=			
Q01: Pre	5.1909	1.378	.131	.5000	5.542	.019	Equal	-3.00	218
Post	5.6909	1.073	.102				Unequal	-3.00	205
Q02: Pre	3.8727	1.682	.160	-.6636	5.336	.022	Equal	-3.21	218
Post	4.5364	1.373	.131				Unequal	-3.21	210
Q03: Pre	4.7636	1.477	.141	-.5636	2.202	.139	Equal	-3.09	218
Post	5.3273	1.212	.116				Unequal	-3.09	210
Q04: Pre	5.3455	1.281	.122	-.4455	10.108	.002	Equal	-2.92	218
Post	5.7909	0.959	.091				Unequal	-2.92	202
Q05: Pre	5.5455	1.386	.132	-.8727	15.218	.000	Equal	-5.48	218
Post	6.4182	0.932	.089				Unequal	-5.48	191
Q06: Pre	6.1727	0.994	.095	-.4364	17.859	.000	Equal	-3.73	218
Post	6.6091	0.718	.068				Unequal	-3.73	198
Q07: Pre	4.8818	1.607	.153	-.8091	11.902	.001	Equal	-4.33	218
Post	5.6909	1.123	.107				Unequal	-4.33	195
Q08: Pre	4.7909	1.586	.151	-.7273	11.519	.001	Equal	-3.82	218
Post	5.5182	1.210	.115				Unequal	-3.82	204
Q09: Pre	2.6182	1.708	.163	-2.2182	.038	.845	Equal	-9.78	218
Post	4.8364	1.656	.158				Unequal	-9.78	218
Q10: Pre	6.1909	1.121	.107	-.0909	2.990	.085	Equal	-.65	218
Post	6.2818	0.959	0.091				Unequal	-.65	213
Q11: Pre	2.1909	1.662	.158	-.0182	.332	.565	Equal	-.08	218
Post	2.2091	1.603	.153				Unequal	-.08	218
Q12: Pre	5.900	1.368	.130	.1273	.002	.963	Equal	.71	218
Post	5.7727	1.304	.124				Unequal	.71	218
Q13: Pre	6.4818	0.821	.078	.2182	2.956	.087	Equal	1.72	218
Post	6.2636	1.046	.100				Unequal	1.72	206
Q14: Pre	6.0091	1.274	.121	.0909	.040	.841	Equal	.52	218
Post	5.9182	1.314	.125				Unequal	.52	218