

# Students' Computer Proficiencies, Perceptions and Experiences: An Exploratory Study

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## Abstract

College students use computers for many reasons. Computer experience by college students has been studied by several researchers. This is a report of an exploratory study of students using the computer laboratory of an urban university. The study shows that students use computers more for personal reasons than school works. The results shall help college administrators in deploying resources where it will be more useful for college students.

**Keywords:** computer literacy, computer experience, opportunity, diversity, digital divide

## 1. INTRODUCTION

Technology can have a powerful impact on students, helping them to organize thoughts and display information. Since the world today relies on computer use and support, it is vital to be computer literate. College students use computers for many different reasons. Most usage for students ranges from internet research, music, shopping, keeping in touch with old friends, and other recreational uses. Although individual computers are relatively inexpensive and the computer hardware and software market is very competitive, it is still costly to purchase the system software to run them. Technology changes rapidly. Today, computers are a fact of life, a common thread that ties together our education, work, and home life. The influence of computers is universal. Computers are used in applications ranging from running a farm, writing a term paper, diagnosing a disease, creating certifications and important documents, to constructing and launching a space vehicle.

The computer experience of college students from Morgan State University ranging from all majors, classes, and genders was investigated.

Morgan State University is designated the urban university of state of Maryland. Over 90% of the students are African-American students who attended inner urban schools before coming to the university. The purpose of this study is to examine the use of computers by students in a culturally unique environment. The following research questions are answered:

- How many years of computer experience do the students have?
- What percentages of computer usages are for school works and what percentages are for personal activities?
- What percentage of students times are used on computers at home and at school?
- For what activities do students use computers on the Internet?
- How prepared are the students in terms of the number of computer courses taken?
  - How involved are the students on computer related matters

- What are the experiences in terms of knowledge of computer application software used by the students?

## 2. LITERATURE REVIEW

According to the Theory of Reasoned Action, an individual's behavior can be determined by intentions (Fishbein & Ajzen, 1975). An individual's attitude toward the computer has a great impact on their intentions to use or not to use the computer. That is why researchers propose numerous methods of measuring computer attitudes (Shaft *et al.*, 2004). In its application, the theory shows that computer experience is the value account that creates attitudes. As a result positive experiences should create positive attitudes (Betsch *et al.*, 2001). Another theory that applies to computer use is the Conditioning Theory. This theory postulates that attitudes toward the computer are formed through repeated interactions with the computer as well as the thoughts or feelings associated with the computer (Olson & Fazio, 2001).

The theory of planned behavior predicts human behavior based on relationships among attitudes, norms, beliefs, behavioral intentions and behavior relating to the use of the computer, in this case. A person's attitude towards a behavior, coupled with prevailing subjective norms, and with perceptions of the factors that control the behavior, combined to influence an individual's intention to perform a given behavior (Ajzen, 1991). Applying this in the context of adopting computer and the intention to use the computer, the planned behavior tends to influence an individual's subsequent computer usage. Moreover, perceived behavioral control also directly influences the intention to use computer, as well as ultimate computer usage.

Theoretically, an individual's computer experience can be defined as the combination of Objective Computer Experience which is quantitative, and Subjective Computer Experience which is qualitative. Objective Computer Experience is the "totality of externally observable, direct and/or indirect human-computer interaction which transpires across time.", while Subjective Computer Experience is "a private psychological state, reflecting the thoughts and feelings a person ascribes to some previous or existing computing event." (Smith *et al.* 1999). Smith *et al.* (2004) later defined the Subjective Computer Experience as "a private psychological state, reflecting the thoughts and feelings a person ascribes to some previous or existing

computing event". However, Subjective Computer Experience can be considered to be the amount of time an individual uses computers. (Prince, 2008).

Direct interactions are measured by opportunity to use computers, diversity of experiences, and amount of computer use, while indirect interactions are measured by the potential sources of information regarding the computer and relevant computing technologies (Jones and Clarke, 1995). Direct experiences are considered across diverse settings (e.g., home, school, work) to capture the user's interactions when computer use is mandated by the job or personal and voluntary (Smith *et al.*, 1999).

The type of applications a user has experienced in is an important measure of Objective Computer Experience. Hasan (2003) found that time spent with programming and graphics applications had a stronger impact on computer self-efficacy than experience with spreadsheet and database applications. Brock *et al.* (1992), found a positive relationship between increased computer experience and computer literacy. Their findings suggest that experience with different applications will have different impacts on an individual's attitudes toward the computer and therefore, should be considered in a measure of computer experience.

Attitudes toward the computer differ from computer experience because it is the past objective and subjective stimuli that have combined to create these attitudes. Therefore, computer experience should only measure the value account that created these thoughts and feelings of anxiety and self-efficacy (Betsch *et al.*, 2001). Attitudes, objective and subjective experiences prepare students for productive use of computers. While the students in this study use computers for personal purposes more than their school works, it is expected that most of them shall be comfortable in using computers in their future careers.

Beckers and Schmidt (2001) found that there is a linkage between past experience with computers and consequent behavior in the computing environment. Computer experience has been included in several studies involving the constructs of computer self-efficacy because of its significance. (Potosky, 2002; Hasan, 2003). The ability to measure an individual's computer experience is a very important tool because it potentially impacts many other attitudinal measures in the computing domain

such as computer self-efficacy (Beckers, 2001; Potosky, 2002; Hasan, 2003).

There is a strong linkage between past experience with computers and ensuing attitude and consequent behavior in the computing environment (Beckers & Schmidt, 2001). The intention to use or not to use the computer affects an individual's attitude toward the computer and has a great impact on the use of computers (Shaft, *et. al.*, 2004).

The impact of perceived computer experience on the behavior and performance of students was studied by Ballon and Huguenard (2008). They found that higher levels of computer experience positively affected lecture, laboratory and homework. Students' previous experience has been widely considered an important factor affecting subsequent computer performance. There are different types of computer experience. Yan (2006) studied four indicators used to examine general computer experience. These are the length of time using computers, frequency of using computers, computer ownership and computer courses taken. Smith *at al* (1999) found that both computer ownership and high school computer courses influenced introductory programming course scores in a study of 656 college students.

It is a known fact that students with prior access to computers in secondary schools tend to enter universities with a greater focus, advanced computer skills, positive attitudes toward computers, and an awareness of technology's relevance to their careers (Ramayah, 2005). It is therefore not strange that some researchers argued that considering many college students prior encounter with computers, it might be wise to discard introductory computer courses all together for new entrants. Smith (2004) examines the difference between pre- and post-course levels of computer self-efficacy and performance for six software programs (word processing, spreadsheet, database, presentation graphics, graphical user interface (GUI) management, and telecommunications) and concluded that educators should continue to teach introductory information technology courses at the postsecondary level.

There are several reasons why we should be interested in students' computer activities. For students, computers improve access to information, help get tasks done better or more quickly and make communicating easy. Computer literacy depends on how and the fre-

quency of the use of computers by students. These in turn provide us with a yardstick to measure how well prepared the present generation of students are when they are entering the employment market. It also has the potential to improve academic performance (Wege-rif, 2004). Generally, students are computer literate with about 80 per cent either owning or planning to buy their own computer. (Vlosky & Summers, 2000). Students' learning strategies is an important variable relating to their computer literacy (Tsai and Tsai, 2003). To determine the level of computer literacy of a student, Baugh (2004) used spreadsheets and databases skills as minimal skills in these areas as components of computer literacy. He described the process of the evaluation of undergraduate students in the area of spreadsheet and database topics.

While all the referred studies dealt with students in general, none considered students with peculiar characteristics. This study looks at the experiences of students in an urban minority institutions where most of them are from homes where computer systems are not household equipments.

### 3. METHODOLOGY

The methodology chosen allowed for investigation of problems in realistic situations. It allows for the collection of data from a variety of different people, in a relatively short period of time (Wimmer & Dominick, 2006). Respondents who were students using the five computer laboratories in Earl G. Graves School of Business and Management, Morgan State University were represented in the study. The study looks at the computer usage among the students who use the five laboratories. A structured questionnaire was used to collect data from the students. This process took place during a period of one week. The sample size is reasonable considering the number of students in the university. Three hundred and seventy questionnaires were returned out of 400 distributed. This represented 92.5 percent that can be considered good for analysis (Babbie, 2001).

A rating between 1 and 5 indicates the nearness to most important or least important an issue is to a student. A questionnaire on rating critical issues is the traditional data collection tool which does not force respondents to confront the relationships between the issues (Margado et al, 1999). Rating method is used because issues could be termed to be homo-

genous considering the environments within which the students are. Rating is also used because it allows the evaluation of one issue at a time rather considering all issues simultaneously. Simple descriptive statistics such as means are used to determine the ratings of the issues on the application software (Pinsonneault *et al*, 1993).

The study uses the data to examine the use of computers by students. Specifically, the study examines the overall rate of use, the ways in which students use the technologies, where the use occurs – home or school and the relationships of these aspects of computer use to gender, classifications and discipline characteristics. All statistical comparisons in this report were tested for significance at the 95 percent confidence level ( $p < 0.05$ ), and all reported differences are statistically significant and are five percentage points or larger, unless otherwise noted. To assist in answering the research questions, direct and indirect computer interactions of students and availability of opportunities to students were examined. In addition, the diversity of computer experience of the students was examined.

#### 4. RESULTS

The respondents were nearly equally divided in terms of gender. Female students were about 50.81 per cent while male students were about 49.19 per cent. About 44.32 per cent of the respondents were seniors, while 28.11 percent were juniors. Sophomores and freshmen were 14.05 percent and 13.51 per cent respectively. Though the computer laboratories are in the School of Business and Management, other students whose majors are not in the School also use the laboratories. This is reflected in Table 1. Students from the College of Liberal Arts made up about 12.70 per cent of the respondents while students from the School of Science and Mathematics were 10.0 percent. College of Engineering students account for 11.62 percent while the respondents from the School of Business and Management were 54.05 per cent. Students from other faculties were 11.62 percent. The computer laboratories in the SBM is centrally located and most students in the university must take an introductory Information Technology course which necessitate that some of them must use the SBM laboratories, even though their majors are not located in the SBM.

We adopt Prince (2004) approach in considering direct and indirect computer interactions by

students, and the availability of opportunities for students to use computers. In other to measure the direct computer interactions of students in form of amount of computer uses, they were required to answer the following questions. Most of the students have direct interaction with computers. As shown in Tables 2 and 3, more than 50% of the students have direct interaction for both personal and school purposes. About 83% of the students have taken at least one required computer course. About 58% of the students use a computer for more than 10 hours a week. In terms of peer conversation on computers, about 86% of the students engage in computer related conversation with their peers. Table 2 and Table 3 show students direct computer interactions and the percentages of students involved in direct computer interactions.

In term of availability of opportunities to use computers, the average year computers are available to the students in schools 10.78 years. The schools provide good opportunities for many students to have access to the computers. This is indicated by the fact that 87% of week, the students has access to computers in schools, while the average time a student spends on a computer in a week in the school is 7.67 hours. The students have access to computers at their homes for 56.34% of the week. Table 4 shows other measures of availability of opportunities for students.

In other to measure the variety of students' experiences, a five-point Likert scale of agreement (1 = Never, 2 = Rarely, 3 = Often, 4 = Very often, 5 = Very frequency), was used to ask students to indicate the frequency of the uses of computer application software for school reasons and for personal reasons. About 60% of the students use Microsoft Word or similar technology for personal reasons while about 80% of them use it for their school assignments. Another popular technology or software used by the students is the E-mail. While about 81% use e-mail for personal reasons, 71% of the students use e-mail for school assignments. Few students have experience using ACCESS for both school assignments and personal reasons. In terms using the Internet for research, about 67% of the students use the Internet to conduct personal research while about 70% of them use the Internet for school assignments. Table 5 provides a breakdown in percentages of students using various technologies for personal reasons,

while Table 6 provides similar data on students using the technologies for school assignments.

## 5. DISCUSSION

The issue of digital divide relates to the accessibility of minorities to computers and the Internet. While this study is not specifically on digital divide, some of the findings will be of use to the discussion on digital divide. The key findings of this study are:

- Most of the computer experiences of the students are the result of using computers for personal reasons.
- Most of the students have taken at least one computer course in school
- Students do not take computer courses because they want to,
- In line with previous study, access to computers at home by minority students is not significant.
- For both personal and school works, the most used software technologies are word-processing software and e-mail.
- Majority of the students use the Internet
- The least use software is for statistical analysis even though appreciable number of the students uses the Internet for research.

To answer the research questions, the results show that students have on the average about 6 years of computer experience. The percentages of computer usages for school works is about 87% while that of personal activities is about 56%. As for Internet utilization, the activities students use computers on the Internet for music. Email, instant messaging and research. Few students take computer courses because they want to. But in terms of preparation, most students took adequate number of required courses. IT is noteworthy that students are involved in computer related matters while the experiences of students when considering their knowledge of computer application software are appreciative.

From the key findings, the use of computers and the experience of minority students in the use of computers are improving. Using computers for personal reasons help bridge the digital divide. Since the schools provide greater

accessibilities to the students it will be of great help if school administrators provide more computers in schools for more students. In terms of using the computers for research, statistical analysis package is use least because most of the courses in the School of Business do not require the use of the software. With much course management software such as Blackboard and MyItlab being used for many of the courses students' uses of computers and their experiences shall increase.

## 6. CONCLUSION

This study confirms the patterns of computer and Internet use seen in previous researches where the subjects are not minority students and are observed in more recent data representing a different population than has been described previously (DeBell & Chapman 2003). The results of this study which is unique in terms of its population could be used in reviewing teaching effectiveness in various departments in relation to instructional technology in urban minority institutions. The results can also be used to direct investments in technology and facilities upgrades.

As computer and Internet use become increasingly widespread, larger percentages of minority student population will enjoy the potential benefits of using computers. The potential effects of these technologies on users make it important to describe the populations who are using them and to learn more about how they are being used. This report describes the population of students who may experience both the benefits and risks of computer and Internet use. The study contributes to and increases the existing knowledge in computer literacy education regarding minority students and helps bridge the digital divide.

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**APPENDIX 1**

College/School	Arts	Science	Engineering	Bus & Mgmt	Others
<b>Percentages</b>	<b>12.70</b>	<b>10.00</b>	<b>11.62</b>	<b>54.05</b>	<b>11.62</b>

**Table 1. Respondents by Colleges/Faculties**

Students that	School	Personal
Used a computer for 10 years or more	<b>31.6%</b>	<b>48.4%</b>
Used a computer for more than 10 hours a week	<b>51.1%</b>	<b>58.6%</b>
Checked your email for more than 10 or more times	<b>15.7%</b>	<b>52.7%</b>
Used the computer in a week for the Internet for 10 or more hrs	<b>43.8%</b>	<b>61.5%</b>

**Table 2: Students Direct Computer Interactions**

Took one or more wanted computer courses	<b>56.5</b>
Took one or more required computer courses	<b>83.0</b>
Read one or more computer-related magazines month	<b>30.8</b>
Watched one or more computer-related TV programs	<b>45.4</b>
Engaged in computer-related family conversations	<b>73.2</b>
Engaged in computer-related peer conversations	<b>86.5</b>

**Table 3: Percentages of Students Direct Computer Interactions**

Average years computer available at school	<b>10.78</b>
Average years computer available at home	<b>6.65</b>
Percentage of week computer available at school	<b>87.34%</b>
Available time used to access computer at school	<b>7.67hrs</b>
Percentage of week computer available at home	<b>56.34%</b>
Available time used to access computer at home	<b>68.23%</b>

**Table 4: Availability of Opportunities**

	WORD	EXCEL	ACCESS	PPOINT	STAT	PFIN	EMAIL	IM	MUSIC	RESCH
<b>Never</b>	21.89	40.54	58.65	50.54	67.84	55.68	12.43	21.35	20.00	15.95
<b>Rarely</b>	18.65	24.32	21.89	21.35	13.78	14.86	4.32	7.84	11.08	16.22
<b>Often</b>	15.41	18.92	10.54	12.97	6.49	9.19	8.65	8.11	12.70	21.35
<b>Very Often</b>	15.95	7.57	3.24	7.30	4.32	6.76	21.35	21.35	20.54	21.62
<b>Very Frqntly</b>	28.11	8.65	5.68	7.84	7.57	13.51	53.24	41.35	35.68	24.86

**Table 5. Percentages of Students Using Technologies for Personal Reasons**

	WORD	EXCEL	ACCESS	PPOINT	STAT	PFIN	EMAIL	IM	MUSIC	RSCH
<b>Never</b>	8.65	14.59	38.92	17.57	62.16	57.57	17.84	49.19	56.22	17.84
<b>Rarely</b>	7.84	19.73	26.22	20.27	17.84	14.05	9.46	13.24	12.43	6.76
<b>Often</b>	12.16	27.03	16.49	23.24	6.76	8.92	14.32	8.92	8.11	15.95
<b>Very Often</b>	21.62	19.19	7.03	20.54	6.22	5.14	20.54	8.11	6.49	22.97
<b>Very Frqntly</b>	49.73	19.46	11.35	18.38	7.03	14.32	37.84	20.54	16.76	36.49

**Table 6. Percentages of Students Using Technologies for School Works**



**APPENDIX 2**

**Survey of Computer Experiences of Students**

**Please complete this survey about your experience on the use of computers. Thank you.**

- |   |                                   |                                  |
|---|-----------------------------------|----------------------------------|
| <b>Your Gender: (Circle one)</b>            | <b>1) Female</b>                  | <b>2) Male</b>                   |
| <b>Faculty/School/College: (Circle one)</b> | <b>1) Liberal Arts</b>            | <b>2) Science 3) Engineering</b> |
|   | <b>4) Business and Management</b> | <b>5) Others</b>                 |
| <b>Classification: (Circle one)</b>         | <b>1) Freshman</b>                | <b>2) Sophomore 3) Junior</b>    |
| <b>4) Senior</b>                            |                                   |                                  |

**(A) For the following questions, write your response in the last columns. All times, hours and years refer to averages.**

	<b>Questions</b>	<b>Res- ponses</b>
1	How many years have you been using a computer at home?	
2	How many years have you been using a computer at school?	
3	How many hours during a week have you use a computer for school purposes?	
4	How many hours during a week have you use a computer for personal purposes?	
5	How many times during the week have you checked your school e-mail?	
6	How many times during the week have you checked your personal e-mail?	
7	How many hours during the week have you spent using Internet for school purposes?	
8	How many hours during the week have you spent using Internet for personal purposes?	
9	What percentage of your time at school was spent using the computer for school purposes?	
10	What percentage of your time at school was spent using the computer for personal purposes?	
11	What percentage of your time at home was spent using the computer for school purposes?	
12	What percentage of your time at home was spent using the computer for personal purposes?	
13	How many years has a computer been available to you at home?	
14	How many years has a computer been available to you at school?	
15	What percentage of your week at school has a computer available to you?	
16	How much of that time have you used that access at school?	
17	What percentage of your week at home has a computer available to you?	
18	How much of that time have you used that access at home?	
19	How many computer courses have you completed?	
20	How many computer courses did you take because you wanted to?	
21	How many computer courses did you take because you had to for school?	
22	On the average, how many computer-related magazines do you read each month?	
23	On the average, how many computer-related TV programs do you watch each month?	
24	On the average how often do you engage in computer-related conversations with your family?	
25	On the average how often do you engage in computer-related conversations with your schoolmates?	

**(B) Consider the following computer softwares. How often do you use any for SCHOOL works? Enter your responses in the column to the right. (1) Never (2) Rarely (3) Often (4) Very Often (5) Very Frequently**

26	Word Processing (Microsoft Word, etc.)	
27	Spreadsheet (Microsoft Excel or , etc)	
28	Database (Microsoft Access, etc)	
29	Presentation (Microsoft PowerPoint, etc)	
30	Statistical Package (SPSS, AMOS, Minitab, etc)	
31	Personal Assistance (Turbo Tax, Quicken, etc)	
32	E-mail	
33	Instant Messaging	
34	Internet - Music	
35	Internet - videos	
36	Internet - gaming	
37	Internet - shopping	
38	Internet - research	

**(C) Consider the following computer softwares. How often do you use any for PERSONAL works? Enter your responses in the column to the right. (1) Never (2) Rarely (3) Often (4) Very Often (5) Very Frequently**

39	Word Processing (Microsoft Word, etc.)	
40	Spreadsheet (Microsoft Excel or , etc)	
41	Database (Microsoft Access, etc)	
42	Presentation (Microsoft PowerPoint, etc)	
43	Statistical Package (SPSS, AMOS, Minitab, etc)	
44	Personal Assistance (Turbo Tax, Quicken, etc)	
45	E-mail	
46	Instant Messaging	
47	Internet - Music	
48	Internet - videos	
49	Internet - gaming	
50	Internet - shopping	
51	Internet - research	