

SURVEY OF TECHNOLOGY SKILLS OF INCOMING FRESHMEN

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ABSTRACT

The major objective of this study was to provide postsecondary faculty, especially those teaching computer literacy and introductory computer courses, with an understanding of what computer skills and background the typical freshmen student possesses when entering college. As a result of this study, a profile was developed to help identify the skill level of incoming freshmen students in a variety of computer-related areas, including software applications and hardware.

Keywords : Technology skills, computer literacy, computer skills

INTRODUCTION

With the increasing use of computers by students at home and at every grade level in our schools, the need for teachers to be able to determine the computer-related skills of their students is essential in providing the most relevant educational experiences. Virtually every K-12 student today has had considerable access to computers throughout their formal educational experience (4). The secondary curriculum at many high schools today include courses in web site development, network administration, E-commerce, and the most popular application software packages. As a result, students are entering college with increasingly more sophisticated computer skills.

PURPOSE OF THE STUDY

The primary purpose of the study was to determine the computer skills and background of incoming college freshmen at a large mid-western university. As a result of this study, a profile was developed to help identify the skill level of incoming freshmen students in a variety of computer-related areas, including software applications and hardware.

Specific computer skills and the extent of these skills as perceived by students were determined as they related to:

1. Application software such as word processing, database, presentation, statistical, website development, and Windows.
2. Use of the Internet for conducting effective research, buying/shopping online, and various personal interests such as downloading music, games, and chat rooms.
3. How many students own a computer or have access to a computer at their campus home.
4. The type of processor in their campus computer.
5. What application suite is on their campus computer.
6. What one application students use most.

Additional demographic information was also gathered regarding gender, year graduated from high school, type and class of high school graduated from, age students first began using a computer, and number of computer classes taken in high school.

OBJECTIVES

The major objective of this study was to provide postsecondary faculty, especially those teaching computer literacy and introductory computer courses with an understanding of what computer skills and background the typical freshmen student possesses when entering college. Armed with this “profile” of skills for typical incoming freshmen, faculty can accomplish the following objectives:

1. Update and improve the relevance of computer literacy and introductory computer courses and curriculum.
2. Incorporate learning experiences in these courses to address the different levels of skills.
3. Establish a better understanding of the K-12 technology curriculum, especially at the secondary level.

REVIEW OF RELATED LITERATURE

Today’s students are comfortable with computers and use them to do everything from playing games to conducting research on the Internet to communicating with friends via email or real-time messaging. A recent survey of freshmen at the University of California at Los Angeles found that 66 percent reported having used email and 83 percent had used the Internet for research (3). In previous years, computer education consisted primarily of programming and basic computer literacy activities according to Becker (1).

Providing students with computer skills is a responsibility of our educational system at all levels. At the postsecondary level, colleges and universities are increasingly adopting computer literacy standards as a condition of graduation (3). If students are overwhelmed by the technology, the damage is just as serious as when students perceive a lack of challenge. A community college study based on pre-enrollment factors of 543 traditional incoming students included self-reported ability to use five computer application programs and found a relationship between computer skills (combined with other factors like high school GPA) and retention rates or “persistence in college” (5). The results of this study led to the recommendation to design pilot programs in computer skills training for at-risk entering students as a strategy to increase retention.

The dynamic nature of the information technology field continually challenges faculty to update computer literacy courses in at least two ways: (1) to keep up with the constant changes in technology, and (2) to teach at the appropriate level given their students’ existing skills and knowledge. Skill based courses are particularly susceptible to two opposing risks: (1) boring students when content is redundant and duplicates instruction in skills and concepts they have already learned; or (2) overwhelming students with technology expectations that exceed their current knowledge base and/or skill level.

The body of knowledge for the information technology field differs in a key area from other fields of study according to (6). The knowledge base for fields such as history or philosophy accumulated over hundreds or thousands of years and is added slowly to the existing base, usually complementing rather than superseding that knowledge base. “In information technology, the knowledge base developed in approximately fifty years” and new knowledge is added at a rapid pace, often making existing knowledge obsolete or less important than before (6). “This increasingly rapid rate of change sets the field apart from most other academic disciplines, creating unique problems for instructors who are trying to prepare their students to function effectively in their careers” (7).

How do faculty at the postsecondary level stay abreast of the increase in computer skills and knowledge of a high school graduate, design a course that effectively targets students’ technology needs, while at the same time deal with the challenges of keeping up-to-date in a rapidly changing field? It is particularly important for those faculty teaching computer literacy courses to have an understanding of what skills the typical freshmen student is bringing to the classroom to enable them to provide the most relevant learning experience in a crucial course in the college curriculum. The instructor can help students by selecting material to present and emphasize according to Westfall (7), but without a firm grasp of students’ existing skills and knowledge, this could be futile.

METHODOLOGY

This study was conducted at a Division I comprehensive public university in the Midwest with enrollments of 17,162 undergraduates. The freshmen class consisted of 4,736 students of which 3,607 were considered new freshmen attending school for the First Time In Any College (or FTIAC). The university has students enrolled from 42 states and 78 countries. The average ACT composite score for entering new freshmen for 2001 was 22.1. The average high school GPA of these new freshmen was 3.36. Gender and minority data of these new freshmen consisted of 36.2 percent male, 63.8 percent female, and 8.4 percent minority students.

A 19-item descriptive survey was administered to incoming freshmen students during the 2001 Freshmen Convocation held on-campus one day prior to the beginning of fall semester classes. The survey was randomly and informally distributed to freshmen students in attendance at the event. Of the 3,607 new freshmen enrolled for fall semester 2001, 358 were surveyed. Discussion of the demographics and results of the study follow.

FINDINGS

Table 1 summarizes the gender of respondents and the year graduated from high school. Of the 358 responses of incoming freshmen students, 29 percent were female and 71 percent were male. The vast majority of students who responded (92 percent) graduated in the years 2000 and 2001. Similarly, 319 students (89 percent) attended public high schools, 37 (10.3 percent) attended private high schools, and 2 (.6 percent) attended some “other” type of high school.

Table 1. Student Gender and Year Graduated from High School (n=358)

	Responses by Gender		Responses by Year Graduated
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Gender	# Responses	% Responses	Year	# Responses	% Responses
Female	253	70.7%	2001	319	89.1%
Male	105	29.3%	2000	10	2.8%
			1990-99	12	8.1%
Total	358	100.0%	Total	358	100.0%

Students were asked what “class” high school they graduated from (A, B, C, D, or “other”). The public school system in the state this study was conducted categorizes school districts for athletic purposes based on enrollment in each high school. These classifications range from “A” for the largest districts (1,008 and above) to D for the smallest (242 and below). The largest percentage of students (32.5 percent) reported graduating from a class “A” high school, 29.6 percent from class “B,” and 14.5 percent from class “C”.

Table 2 summarizes the results of the question “how many (if any) computer classes did you take in high school?” Nearly 70 percent of students had taken at least one computer course in high school. The largest percentage of students (36.7 percent) reported having taken two computer classes and 32.5 percent had taken one computer class in high school. Sixty students (16.8 percent) had taken three or more computer classes in high school and 50 students (14 percent) had not taken any computer classes in high school.

Table 2. Number of Computer Classes Taken in High School (n=357)

# of Computer Classes Taken	# of Responses	% of Responses
0	50	14.0%
1	116	32.5%
2	131	36.7%
3 or more	60	16.8%
Total	357	100.0%

The largest percentage of students (28 percent) reported having first begun using a computer at age 10. Table 3 shows the various ages students reported using a computer for the first time. The four most frequent ages reported by students were 10, 12, 8, and 13; representing a combined total of 62 percent of the responses.

Table 3. Age Students First Began Using a Computer (n=347)

Age	# of Responses	% of Responses
1-4	6	1.8%
5	13	3.7%
6	16	4.6%
7	19	5.5%
8	41	11.8%
9	19	5.5%
10	97	28.0%
11	14	4.0%
12	50	14.4%
13	27	7.8%
14	19	5.5%
15	14	3.9%
16	6	1.7%
18-26	4	1.2%
Total	347	100.0%

Students were asked “what one software application do you use most?” The overwhelming majority of students (317 or 88.6 percent) reported using some type of word processing software application most (such as Word, WordPerfect, and Works). Nearly 75 percent of students reported using Microsoft Word. Twelve students (3.4 percent) reported the software application they use most to be Microsoft Excel.

Nearly all students (92.2 percent) reported they own or have access to a computer at their campus home (where they live during the school year). When asked how they “acquired” this computer, 142 (42.9 percent) indicated they received their computer as a gift from their parents, 28.1 percent purchased the computer themselves, and 18.4 percent said they use their roommate’s computer. Students were also asked what type of processor the computer they own or have access to at their campus home has. The most common processor reported by 101 students (31.8 percent) was a Pentium III. The second largest percentage of students (27 percent) reported they did not know the type of processor in the computer they own or have access to and 11.6 percent of students reported having a Pentium IV processor.

Students were also asked what application suite they have on the computer they own or have access to at their campus home. Microsoft Office 2000 was the application suite most reported by students (114 or 55.1 percent) and Microsoft Works was second with 104 students (32.2 percent) reporting. When combining those students reporting they have either Microsoft Office 2000 or 98, over 55 percent of students have some version of this application suite on their computers.

Students were asked to rate their computer skills on a scale of 1 - 5 with one being “none” and 5 being “high” in a variety of applications such as word processing, database, presentation software, statistical software, website development software, and Windows. In addition, students were asked to rate their skill level in using specific Internet applications such as conducting effective research, using email, buying/shopping online, and personal interests (downloading music, programs, games, chat rooms, etc.). Tables 4 and 5 summarize these responses.

Table 4. Student Ratings of Skill Level in Using Applications (n=353-356)

Application	Rating “none”	Rating 2	Rating 3	Rating 4	Rating “high”	Total # Responses
	1	2	3	4	5	
Word Processing	2 .6%	13 3.7%	82 23%	167 46.9%	92 25.8%	356 100%
Database	52 14.6%	86 24.2%	134 37.6%	64 18%	20 5.6%	356 100%
Presentation	25 7.1%	78 22.1%	110 31.2%	99 28%	41 11.6%	353 100%
Statistical	115 32.3%	87 24.4%	81 22.8%	55 15.4%	18 5.1%	356 100%
Website Dev.	85 23.9%	92 25.8%	93 26.1%	58 16.3%	28 7.9%	356 100%
Windows	0 0.0%	11 3.1%	42 11.8%	132 37.1%	171 48%	356 100%

When compared across other applications, the largest percentage of students (48%) rated their skill level highest for Windows with a “high” rating of “5”. Over 300 students (85.1%) rated their skill level as either “4” or “5” for using Windows. The application rated second highest for skill level by students was word processing applications with 167 students (46.9 percent) reporting their skill level as a “4”. When combined with those who rated their word processing skill level with a “high” rating of “5,” over 259 students (72.7 percent) rated their word processing skills as a “4” or “5”. The largest percentage of students rated their skill level for database (37.6 percent), presentation software (31.2 percent), and website development applications (26.1 percent) as a “3”. Students rated their skill level lowest for statistical software with 115 (32.3%) of students rating themselves as a “1” (or none) for this application.

Table 5 shows the distribution of ratings by students in reporting their skill level in using specific Internet applications such as conducting effective research, using email, buying/shopping online, and personal interests.

Table 5. Student Ratings of Skill Level in Using Internet (n=356)

Application	Rating “none”	Rating	Rating	Rating	Rating “high”	Total # Responses
	1	2	3	4	5	
Effective Research	10 2.8%	8 2.2%	49 13.8%	142 39.9%	147 41.3%	356 100%
Email	5 1.4%	7 2.0%	18 5.1%	71 19.9%	255 71.6%	356 100%
Buying/Shopping Online	51 14.3%	48 13.5%	68 19.1%	89 25%	100 28.1%	356 100%
Personal Interests	7 2.0%	14 3.9%	44 12.4%	99 27.8%	192 53.9%	356 100%

When dealing with Internet usage, the largest percentage of students rated their skill levels across all categories with a “high” rating of “5”. The largest number of students (255 or 71.6%) felt their skill level in using email was “high” followed by 192 students (53.9%) for “personal interests” such as downloading music, programs, games, chat rooms, etc. Over 90 percent of students (326) rated their skill level as “4” or “5” in using email and over 80 percent of students (291) rated their skill level as “4” or “5” for “personal interests”.

In using the Internet for effective research, 147 students (41.3 percent) felt their skill level was “high” and 100 students (28.1 percent) felt the same about their skill level for buying/shopping online. Over 80 percent of students (289) rated their skill level as “4” or “5” for using the Internet for effective research and over 60 percent of students rated their skill level as “4” or “5” for buying/shopping online.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

It is essential for the university to be aware of what computer skills and classes are being offered at the secondary level to make the necessary changes to their own curriculum. The information provided from this study enables faculty to improve the relevance of the curriculum to better prepare students with the computer skills and knowledge they must have to be productive during their college experience as well as when they enter the workforce.

As a result of this study, one could develop a profile of a typical incoming college freshman for this university. The following list provides this profile information:

Age First Began Using Computers: 10

Number of Computer Classes Taken in High School: 2

Classification of High School Graduated From: "A"

Own/Have Access to Computer at (Campus) Home: Yes (gift from parents)

Most Used Application: Word Processing – Microsoft Word

Most Popular Application Suite: Microsoft Office 2000

Skill Level for Application Software on scale of 1-5 (1=none; 5=high):

Word Processing – 4

Database – 3

Presentation – 3

Statistical – 1

Web Site – 3

Windows – 5

Skill Level for Internet Usage on scale of 1-5 (1=none; 5=high):

Effective Research – 5

Email – 5

Buying/Shopping Online – 5

Personal Interests (downloading music, games, chat rooms, etc.) – 5

Armed with specific information profiling the computer skills and knowledge of incoming freshmen, all university faculty would be better able to determine what are realistic expectations for their students in relationship to assignments requiring computer skills and knowledge. Faculty teaching computer courses, especially introductory level courses would be better able to adjust course expectations and outcomes to fit students' existing skill levels and to better build upon those existing skills. What once may have been non-existent skills for incoming freshmen may now be skills well developed and understood by students. Opportunities to provide students with additional depth of knowledge and skills may be present especially for those teaching introductory computer courses.

Understanding the computer background and skills of a typical high school graduate would provide information that would impact the postsecondary curriculum related to a variety of computer courses. Computer curriculum requires constant revision and updating to ensure relevance and a positive learning experience for students. Addressing a variety of student skill levels in such courses requires the assessment of student skills and knowledge such as this study has provided. Certification programs such as the internationally recognized computer literacy training program European/International Computer Driver's License (ECDL/ICDL) can provide tools to faculty to better assess students and develop their skills to meet computer literacy standards (2, 8). Achievement of the ICDL certification provides a solid basis on which to build more IT skills.

REFERENCES

Available from the authors.