Computer Literacy

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Abstract

Computer literacy continues to be an issue that very much affects Information Systems education. This paper serves as an exploratory study that tries to answer the question as to whether or not business schools, including those with AACSB accreditation, must continue to offer computer literacy courses. Specifically, the paper addresses the question by considering the existence of a comprehensive definition for computer literacy and the relationship between students' perceptions of their computer skills and demonstrated performance. Finally, the paper sets the stage for future research concerning the curriculum design of an undergraduate introductory course in Information Systems.

Keywords: Computer literacy, curriculum design

Computer usage is on the rise throughout American society. During the past 16 years, the Census Bureau reports the percent of the population using computers has steadily increased from less than 20 percent usage in 1984 to nearly half of the population today (Census Bureau, 1999). The Census Bureau also reports that about a quarter of Americans today use the Internet at home, work, or school (Census Bureau, 1999). This pervasive use of computers represents the continual transformation of the American society from an industrial society to information knowledge society.

The impact of this transformation is that new organizational raw material—data—may exist within, and beyond, organizational boundaries waiting to be shaped into meaningful, useful information. The paradigm shift from mechanical to intellectual processes creates a skills gap where individuals with the ability to manage an organization's data assets to create information are in demand. The Bureau of Labor Statistics reports that the need for people with an Information System (IS) education will increase by 11 percent, or nearly 3.5 million individuals, over the next decade (US Department of Labor, 2000).

Higher education faces a challenge in supporting the educational demands of an industry where rapid innovation is the norm. One only needs to consider the development of the microcomputer operating system for evidence of rapid change. Within 20 years, the microcomputer operating system evolved from a mainframe style, text-based Disk Operating System (DOS) through several generations of graphical, icon-based Windows operating systems. Additionally, computers can operate as standalone systems or part of a network of computers across the office, the town, the country, or the world. In such a rapidly changing environment, the educational challenge is to determine what undergraduate curriculum will support the diverse needs of the IS community? Some have suggested the curriculum should focus on a core body of knowledge described as covering three broad skills—organizational, interpersonal, and technical skills (Davis, Gorgone, Couger, Feinstein, & Longenecker, 1997; Doke & Williams, 1999; Van Slyke, Kittner, & Cheney, 1998).

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These skills may provide the road map, but the difficulty is where to begin the journey, since more students receive basic computer education through elementary and secondary education. According to the Census Bureau, about 50 percent of all children had access to a computer at home and 71 percent used a computer at school (Census Bureau 1999). This pervasive usage raises the question: To what extent does the undergraduate IS curriculum need to include computer literacy courses? Pierce, Lloyd, and Solak (2001) frame the question by defining computer literacy, measuring computer literacy, and determining "what factors influence a person's level of computer literacy" (p. 2).

1. PURPOSE

This exploratory study focuses on the pedagogical challenge of designing a computer literacy course within an undergraduate curriculum at a regional campus of a major research university in the Northeast. Specifically, this paper stems from a redesign of an introductory course—Introduction to Business Information Systems. During the past four years, this 3-credit hour course evolved into a course consisting of a 2-hour lecture component, and a 1-hour lab component. Additionally, this course changed from being a core curriculum requirement for all business majors to a required course for management majors only. Currently, the course is being redesigned with several questions in mind:

1. Is there a prevailing definition for computer literacy?
2. Do students perceive they have the prerequisite skills for an IS course of study?
3. What factors influence a student's perception of their prerequisite skills?

2. LITERATURE REVIEW

The literature suggests that a major obstacle is the lack of a consistent definition for computer literacy. Citing Day and Athey's study, Amini (1993) defines computer literacy as a common body of knowledge necessary to function in an information society. Approaching computer literacy from a computer self-efficacy perspective, Karsten and Roth (1998) use a measurable scale to define computer literacy in terms of ability to use a computer. Jones and Pearson (1996), on the other hand, define computer literacy in terms of content knowledge, including "the ability to compare/contrast concepts, execute and write simple applications, and describe the interrelation of a given factor to other factors in the same context" (p. 30). For the exploratory nature of this study, the Jones and Pearson definition of computer literacy was adopted.

If content knowledge forms the basis for computer literacy, does computer familiarity relate to computer literacy? Previous research on this issue shows mixed results. Jones and Person (1996) consider the relationship between familiarity, or computer exposure,

to computer literacy. Their study defined experience in terms of years of usage and breadth of experience (i.e., experience with various software). Using multiple regression and ANOVA, Jones and Person (1996) concluded that a basic relationship between experience and computer literacy exists. Furthermore, they concluded that *where* the student gains experience is important to literacy. In other words, Jones and Person found that gaining computer experience through the use of a home computer provided greater computer literacy than gaining experience through the use of a high school computer course. However, their research suggests that while exposure to computers may occur in high school, at home, at work, or at college, such exposure does not necessarily result in *increased* computer literacy.

Karsten and Roth (1998) define computer familiarity as three separate measures—total years of computer experience, average hours per week of computer use, and number of prior computer courses completed. Their findings demonstrated that a correlational relationship exists between familiarity and literacy. However, when considering the issue of performance (i.e. homework assignments), Karsten and Roth found that only the average hours per week of computer usage related to performance. They concluded that (p. 20)

> Today's students may accumulate a great deal of computer experience prior to college entry (e.g., "surfing" the Internet). However, this type of experience may provide a computer literacy that does not encompass the specific computer skills deemed necessary for success at the college level.

3. METHODOLOGY/ANALYSIS

Since fall 1999, 224 undergraduate students at a regional campus of a major research university in the Northeast enrolled in the Introduction to Business Information Systems course have participated in a faculty-designed needs assessment survey (Appendix A). This self-report survey provides the instructor with data concerning the students perceived level of computing skills. Specifically, the instructor uses the survey data to adjust the depth of coverage in such topics as operating system concepts, file management, Excel, Access, PowerPoint, Internet applications, and web page design and development.

Appendix B shows that during the last four semesters a majority of the 224 students were familiar with the Windows 95 and Windows 98 operating systems. Microsoft Word seems to be the most familiar application software with 96 percent of the students expressing familiarity, whereas about half of the students reported familiarity with both Excel and PowerPoint. Students reported little knowledge of either Access or the ability to create a web page. Finally,

three-quarters of the students reported having home computers and home Internet access. These preliminary results suggest that a possible relationship exists between owning a home computer and computer skills. Additionally, these preliminary results suggest that the survey needs to go beyond the question of familiarity to the question of specific computer skills.

Appendix C shows that students perceived that they possessed good proficiency in terms of using e-mail and the Internet. This perception appears to reflect the high percentage of students having access to a home computer and a home Internet connection. On the other hand, students perceived that they possessed poor proficiency in terms of attaching files to e-mail messages and managing files through an operating system. These results appear contradictory given the high percentage of home computer and home Internet access combined with the high percentage of familiarity with Windows 95/98. Several explanations for these contradictory results exist, which the current survey form lacks the ability to address. For instance, the current survey form does not ask students *how* they use Email. That is, are students using e-mail for short, chat-type, personal communications or as a means to transmit other documents for organizational communications? The results of the current survey suggest the former rather than the latter. If this proposition is valid, then the computer literacy course designer has a solid design foundation. Specifically, the course begins from the foundation that students know how to use e-mail for personal communications but are deficient in how to use e-mail for transmitting organizational information. Another explanation of these contradictory results exists, because the current survey form does not ask students to detail their familiarity with an operating system. Students might be equating understanding of fundamental capabilities of an operating system with their recognition of a specific operating system logo. Finally, the contradictory results concerning file management results because the form of the question concerning this activity is too broad. Students might be proficient in one element of file management and lack proficiency in another, but the question allows students to perceive overall proficiency that may be false.

4. CONCLUSION

Over the next decade, the need for individuals with an IS education will increase as organization's transform from mechanical to intellectual structures. Higher education will face many challenges in meeting the educational demands of this transformation. One such challenge is the ability to design introductory level computer courses that are relevant and academically rigorous. This exploratory study addresses the issue of curriculum design for one regional campus of a major university. This fact represents the major limitation of this study. Yet, the purpose of this study is to highlight a process that has universal application for course designers. Specifically, the curriculum design for this particular

institution has been an evolutionary process questioning such basic elements as the definition of computer literacy and the prerequisite skills of students. This study suggests several major conclusions. One major finding is the lack of a common definition of computer literacy within the IS education literature. This deficiency, while it allows higher education to design localized solutions, does not focus on the global nature of IS requirements. Development of such a common definition is beyond the scope of this paper, but the fact such a limitation exists is essential to curriculum designers. Another major finding flows from the current needs assessment survey. For instance, the current survey provides a very broad picture of perceived computer proficiency. A redesign of the survey instrument is needed to move beyond the "Are you familiar with . . ." questions to a specific listing of competencies. This might be accomplished with a companion instrument that provides a diagnostic proficiency exam. Such a combined approach might change the direction of the traditional 3-credit hour lecture/lab course to a *just-in-time* educational model using self-paced learning and/or modularized instruction. Finally, this study suggests the course design must address the needs of the community. The course design needs to be developed in collaboration with community business leaders and other faculty members.

Curriculum design represents change. This study shows how one institution incorporates elements of change to meet the educational needs of a specific organizational segment. Using an exploratory approach, this study reflects the need for continued research into the needs of the community and students.

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NEEDS ASSESSMENT SURVEY

Spring Semester 2001
BUS 0400 – INTRODUCTION TO BUSINESS INFORMATION SYSTEMS

Computer Skills Survey

Name _____   **Section** _____

For each category, please check all that apply:

1.   Operating Systems

___ DOS   ___ Windows 3.1___ Windows 95 ___ Win NT   __ Windows 98   _____ Other

2.   Applications

Word Processing:____ WordPerfect   ____ Microsoft Word - version _____

Spreadsheet: ____   Lotus   ____ Excel - version _____

                                   ____ Other (please specify):

Database: ____ Dbase   ____   Access - version _____

                                   ____ Paradox   ____ other (please specify)

Presentation graphics: _____ PowerPoint - version _____

                                   _____ other (please specify)

3.   How would you describe your proficiency for:

          Email -

          Internet/WWW –

          File attachments –

          File management via operating system -

4.   Have you ever created a web page?   _____ Yes   _____ No

5.   Do you have a home computer? _____ Yes   _____ No

          If yes, please describe the system.

6.   Do you have home Internet access? _____ Yes   _____ No

          If yes, who is your online provider? _____

PLEASE TELL ME ANYTHING ELSE YOU WANT ME TO KNOW ABOUT YOUR COMPUTER SKILLS.

Windows 98	26	36	48	50	160	40	71.43%
Other				4	2	6	1.5	2.68%
Applications					*Total*	*Average*	
Word Perfect	46	26	32	35	139	34.75	62.05%
Microsoft Word	54	48	54	59	215	53.75	95.98%
Lotus	20	8	10	6	44	11	19.64%
Excel	34	20	28	35	117	29.25	52.23%
Other Spreadsheet		2		1	3	0.75	1.34%
Dbase	5	2	3	3	13	3.25	5.80%
Access	5	5	10	6	26	6.5	11.61%
Paradox		2			2	0.5	0.89%
Powerpoint	34	17	29	34	114	28.5	50.89%
Create Web Page					*Total*	*Average*	
Yes	6	6	10	15	37	9.25	16.52%
No	56	44	42	45	187	46.75	83.48%
Home Computer					*Total*	*Average*	
	Fall 100	**Spring 01**	**Fall 01**	**Spring 02**		Participants	225
Operating Systems					*Total*	*Average*	%
DOS	25.76	12.85	23.60	22.71	84.92	21.23	37.91%
Windows 3.2	25.48	12.29	23.62	22.59	83.99	21.00	37.49%
Windows 96	25.20	11.74	23.64	22.47	83.05	20.76	37.08%

APPENDIX C
PROFICIENCY RESULTS

	Fall 99	Spring 00	Fall 00	Spring 01
Proficiency				
Email				
N/A				
Poor	5.00	6.00	1.00	2.00
Good	45.00	33.00	41.00	46.00
Very Good	12.00	13.00	14.00	13.00
Average	20.67	17.33	18.67	20.33
Internet				
N/A		2.00	1.00	
Poor	7.00	5.00	2.00	1.00
Good	45.00	40.00	40.00	50.00
Very Good	9.00	5.00	12.00	10.00
Average	20.33	13.00	13.75	20.33
Browsers				
N/A				
Poor	10.00			
Good	49.00			
Very Good	2.00			
Average	20.33			
File Attachment				
N/A		14.00	11.00	9.00
Poor		19.00	14.00	22.00
Good		15.00	26.00	26.00
Very Good		3.00	5.00	4.00
Average		12.75	14.00	15.25
File Mgmt w/OS				
N/A		21.00	21.00	25.00
Poor		16.00	17.00	21.00
Good		14.00	15.00	12.00
Very Good		0.00	2.00	3.00
Average		12.75	13.75	15.25