

Computer Skills Proficiency Testing In An Undergraduate Business College Environment: A Case Study

William K. Templeton, Butler University
Lynda F. Jones, Butler University
Xiaolin Li, Butler University

Abstract

Butler University's College of Business Administration (CBA) graduates have consistently demonstrated superior information technology skills in cooperative education work environments and as newly placed graduates. This has been accomplished in part through a required two course sequence focusing on computer applications. Recently, the CBA has revised its business curriculum by instituting a non-credit proficiency test in place of the freshmen level computer applications course. The decision to move from a freshman level class to a proficiency exam was based on issues related to the learning environment, faculty resources, and graduation credits. This paper describes the preparation and testing process that was developed, provides results from the first year of utilization, and discusses the extent to which the goals for moving in this direction have been met thus far.

INTRODUCTION

The business world is increasingly relying on information technology (IT) to survive and thrive in these competitive and constantly changing economic times. Therefore, possessing strong IT skills is becoming even more important for those business school graduates entering and working in the marketplace. Indeed, students, graduates, and employment recruiters alike rank computer literacy as one of the most important, if not **the** most important competency that an employee can have (Rainsbury, Hodges, Burchell, & Lay, 2002; Moody, Stewart, & Bolt-Lee, 2002).

Butler University's College of Business Administration (CBA) graduates have consistently demonstrated superior skills in this area – in both cooperative education work environments and as newly placed graduates. This has been accomplished in part through a required two course sequence focusing on computer applications. Recently, the CBA has revised its business curriculum by instituting a non-credit proficiency test in place of the freshman level computer applications course.

LITERATURE REVIEW

Given the noted demand for information technology skills and business colleges' response to it, the lack of research in this area is somewhat surprising. Perhaps this is partly due to disagreement in the literature as to what constitutes computer literacy. Literature on general and

workplace-specific definitions of competency abound (Rainsbury et al, 2002; Bassellier, Reich, & Benbasat, 2001), but Amini (1993) states that “no absolute and universally accepted definition of computer literacy has been established” (p. 79). George Ernst of the Computer Science Program at Case Western Reserve University in Cleveland says that “computer literacy and computer proficiency are often used interchangeably, yet neither has really been defined.” He attempts to distinguish between the terms by asserting that “Literacy probably goes to the issues of understanding how a computer works...Levels of proficiency are really personal and answer the question, ‘Do you know enough to get the job done?’” (Monroy, 2000, p. 96). Indeed, McTaggart and Hay (n.d.) admit that the terms are not “static” and seem to mean whatever an individual or group wants them to mean at any given point in time.

Perhaps as a result, Gill and Hu (1999) note that current descriptions of curriculum content and organization related to IT are also largely absent from the literature. One available study in this area states that business school deans and faculty have voiced concerns regarding the inconsistency and uncertainty of what is taught in the IT core (Watson, Sousa, & Junglas, 2000). However, a study of AACSB-accredited schools revealed that “remarkable consistency” does exist, particularly in terms of course topics viewed by faculty and CIOs/CEOs to be too important to leave out of the IT curriculum (Stephens & O’Hara, 2001). Examples of these topics include: strategic applications of IT, electronic commerce, data management fundamentals, types of information systems, fundamentals of hardware and software, and many others. This study also noted, though, that these common topics were spread between syllabi that “tend to be designed for two different types of courses: those focusing on technology fundamentals and those concentrating on strategy.” (p. 293). Gill and Hu’s national study also found that topics such as the Internet, networks, and technological ethical issues are now receiving much more curricular attention than in the past – while the focus on programming and computer hardware has decreased. Focus on databases and systems design/analysis continues to be important.

From the student perspective, more research is available. Olsen (2000) notes that students’ knowledge of and experience with computers varies widely across and within universities. However, some commonalities do seem to exist. For instance, McEuen (2001) found that most students come to school equipped with basic email, Internet browsing, and word processing skills. This matches Olsen’s findings, which also add a working knowledge of operating systems such as Windows as another skill incoming freshman seem to possess. What these students appear less likely to possess is experience with more advanced skills, such as spreadsheets, databases, networking, and web page creation (McEuen, 2001). Similarly, Olsen (2000) found that spreadsheets, databases, and presentation skills were less familiar to new students.

While most of this research focuses on perceptions of the students themselves, academic “officials” tend to concur. Officials generally find that typical freshman capabilities include good Internet and word processing skills, with some simple knowledge of spreadsheet functions (Olsen, 2000). Less is documented, however, about the skills gained once students are in college. One study found that students believed their word processing skills improved slightly and their spreadsheet and database skills improved dramatically after entering the university (Amini, 1993).

How students gain these skills varies widely across institutions (Gill & Hu, 1999). Often computer literacy or proficiency requirements are considered prerequisites for other courses (Marcal & Roberts, 2000). Stephens & O'Hara note that many AACSB-accredited schools integrate IT content in the form of a course. Some institutions have more recently transitioned to a computer proficiency exam format instead of or in addition to an IT course. One need only peruse the Internet for examples of this approach. Southeastern Oklahoma State University, the Belk College of Business Administration at the University of North Carolina at Charlotte and the University of Illinois at Urbana-Champaign are but a few of the universities that have posted their proficiency exam information on-line. Green's national study (as cited in Chisholm, Carey, & Hernandez, 2002) reported that as of 1997, 40.3% of campuses had some sort of computer class or computer literacy requirement as part of their curriculum – with that percentage likely to be significantly higher now. The authors call for the establishment of campus-wide basic computer competencies for all students.

MOTIVATION FOR CHANGE

Butler University's College of Business Administration decided to shift from a freshman level computer applications course to a proficiency exam because of issues related to the learning environment, faculty resources, and graduation credits. First, through performance in class and initial self-assessment, it became clear over the years that students were coming to the university with an increased level and range of computer skills. Instructors of the freshman level class found that the content was too basic for a large number of their students. At the same time, a number of students still struggled with the course. The feeling of the instructors was that some students struggled because they were going through adjustment processes common to many freshman students. In short, they lacked the necessary discipline and commitment to their studies. Other students lacked the basic algebra and analytical skills necessary to appropriately construct Excel cell formulas and other specific program applications. A freshman level computer applications course did not seem to be the appropriate place to teach either study skills discipline or algebra.

Faculty resources were another consideration in the decision to convert the freshman level course to a proficiency experience. The College offered 13 or more sections of the freshman course each year, staffed almost entirely by adjunct instructors. AACSB accreditation standards discourage heavy reliance on adjunct instructors, particularly for nearly all sections of a required course. This issue had appeared in our AACSB letters. In addition, by devoting heavy faculty resources to teaching the most basic skills we tended to neglect higher level IT offerings.

Finally, the CBA was exploring ways to reduce the number of credits required for graduation and saw this shift as an opportunity to do so. The College was convinced that learning these skills was essential for our students, but not necessarily deserving of university level credit. The transition to a proficiency testing process was viewed as a way to address all of the issues related to learning environment, faculty resources and program length, while still maintaining high academic standards.

PROFICIENCY PROGRAM

Rather than require all students to take a basic skills class, the CBA decided it would be better to test students to ensure that all had mastery of basic skills before starting the single required sophomore level computer applications course. Assuring a level of proficiency as prerequisite would permit the single sophomore level skills based class to be taught at a more rigorous level than would otherwise be possible, while still maintaining the competitive advantage our graduates seem to enjoy.

Once the decision was made, the proficiency testing process was developed and is currently being utilized. Upon entering the CBA, students are given materials to explain the testing process. These materials explain that students must pass a proficiency exam with a score of 75% or higher before enrolling in the sophomore level class. The materials also contain specific lists of all the fundamental word processing, spreadsheet, presentation graphics, and file management skills that students are expected to know for the exam.

Students can prepare for this exam in one of several ways. If they already feel comfortable with the skill sets, they can study on their own. If they just need a brief review, they can purchase inexpensive workbooks at the bookstore to aid in their preparation. If they feel they need more extensive review, they can attend one or more free workshops provided by the college – each one focusing on specific software programs. To encourage and promote assistance among students, the college has also established a peer-tutoring program. In this program, students with advanced computer skills are hired to work as part-time tutors to help other students master basic computer skills as they prepare to take the proficiency exam. Once prepared, students then sign up for one of the scheduled exam times. Exams are administered in a lab environment and students are notified via email within a few days as to their scores. If they did not pass, they must retake it prior to moving on.

RESULTS FROM THE FIRST YEAR

During the fall 2002 freshman orientation (when the process was first instituted), we conducted a survey to explore the assistance students felt they would need in order to best prepare for the proficiency exam. Approximately 165 students comprised the freshman CBA class. The responses of the 125 students who completed the survey are as follows:

Resources	# of Students Planning to Use	Percentage
Self-Study	104	83%
Word Workbook	18	14%
PowerPoint Workbook	37	29%
Excel Workbook	61	48%
Word Processing Workshop	34	27%
PowerPoint Workshop	83	66%
Excel Workshop A (Basic introduction to Excel)	55	44%

Resources	# of Students Planning to Use	Percentage
Excel Workshop B (Basic formulas, functions, & charting)	105	83%
Excel Workshop C (Worksheet design & business applications of Workshop B content)	82	65%
Peer Tutoring	38	30%

It is clear from this table that students perceive self-study as essential to master these basic computer skills. When extra help is desired, Excel workshops appear to have the highest overall demand – particularly Workshop B. Approximately 25% of students believe that self-study is all they need, while 75% indicated a need to attend one or more workshops in order to pass the exam.

As a result of these data, several workshops have been offered. In the fall of 2002, a total of 14 workshops were conducted: 3 PowerPoint, 2 Word, 2 Excel A, 4 Excel B, and 3 Excel C. Total workshop attendance was 143 (with some students attending workshops more than once). By spring 2003, when students entered the second semester of their freshman year, many had either passed the exam, or had already mastered basic Excel skills by self-study or workshop attendance. Therefore, some changes were made to the workshop structure. This time, 9 two-hour intermediate Excel workshops were offered and 128 students attended (again, some students attended more than once). Only 26 students attended the combined Word and PowerPoint workshop, which was offered 3 times in the spring. Those who did attend the Word/PowerPoint workshop, however, indicated that it was useful not only for exam purposes, but also for their future academic and career performance.

Exams were also offered throughout both semesters. Four exams were held in the fall and twelve were held in the spring. The results of these exams are listed in the following table.

	Fall 2002	Spring 2003	Total
Number of Exam Takers	75	54	129
Number of Exams Passed	38	46	84
Percent of Exams Passed	50.7%	85.2%	65.1%

In the fall, the freshmen were ambitious and very eager to pass the proficiency exam. Many of them underestimated its difficulty level. They signed up for the exam without serious preparation, often without attending a single workshop. Students' lack of sufficient preparation is the fundamental reason for the higher failure rate in fall. In the spring, as the difficulty level of the exam became apparent, students realized that passing the exam was not something they could achieve without effort. Many of them began to devote more time to preparation for the exam. Thus, the pass rate improved significantly in the spring. In addition, some of the students taking the exam in the spring were repeating it. Presumably a practice effect also contributed to the higher pass rate.

Upon examining the test results, it was evident that students rarely had problems with the file management, word processing or presentation graphics components of the exam, but a significant proportion of those who did poorly on the exam had difficulties with the spreadsheet skills. We continue to place emphasis on this content as we plan and deliver workshops.

CONCLUSIONS

Having just instituted this new proficiency testing process in the fall of 2002, the CBA is still in the early stages of assessing its overall impact. Frankly, an area of concern is that nearly half of the freshman class did not pass the proficiency exam. We may attribute part of that result to failures on the exam, but a more significant reason is that a large number of students did not sit for the exam. Without the structure of a class, many students procrastinated. The result is that many of them have not met the prerequisite to take their sophomore level applications course. They are beginning to take the program more seriously at this point. Because this was a new system we expect better attention to this requirement in future freshman classes. Freshmen students were slow to grasp the nature of the program and were often the victims of bad advice from upper class students who were not subject to the requirement, but nonetheless felt qualified to offer advice to their underclass colleagues. Advisors are also now more aware of the exam process and are becoming more diligent in making sure their advisees meet this requirement in a timely manner.

In addition to the data presented above, we are beginning to collect comparative data between students taking the old course and those taking the proficiency exam in terms of how well prepared they are for the sophomore class. We are now only teaching 2-3 sections of the freshman course per year (instead of 13) to accommodate those students who are still operating under the old program requirements. One full-time faculty member, rather than several adjuncts, is conducting the proficiency exam process and teaching these sections. We have also successfully reduced the overall graduation requirements by three credits by taking this approach. So while there is undoubtedly still more work to be done to continue to monitor, modify, and assess this process, as well as firmly establish it as part of our curriculum, early indicators point to this being a positive decision on the part of the CBA for its faculty, students, and ultimately the business community.

REFERENCES

- Amini, M. S. (1993). Factors affecting the perception of computing literacy among business majors. *Journal of Education for Business*, 69(2), 79-82.
- Bassellier, G., Reich, B. H., & Benbasat, I. (2001). Information technology competence of business managers: A definition and research model. *Journal of Management Information Systems*, 17(4), 159-182.
- Chisholm, I. M., Carey, J., & Hernandez, A. (2002). Information technology skills for a pluralistic society: Is the playing field level? *Journal of Research on Technology in Education*, 35(1), 58-79.
- Gill, T. G., & Hu, Q. (1999). The evolving undergraduate information systems education: A survey of U.S. institutions. *Journal of Education for Business*, 74(5), 289-295.
- Marcal, L., & Roberts, W. W. (2000). Computer literacy requirements and student performance in business communications. *Journal of Education for Business*, 75(5), 253-257.
- McEuen, S. F. (2001). How fluent with information technology (FIT) are our students? *Educause Quarterly*, 24(4), 8-17.
- McTaggart, J., & Hay, L. (n.d.). Defining computer proficiency: How to measure the immeasurable. Retrieved August, 2003, from Drake University, Depts. of Mathematics and Computer Science Web site: <http://www.drake.edu/mathcs/mctaggart>.
- Monroy, T. (2000, March 27). Cluelessness: The other digital divide. *Inter@ctive Week*, 7(12), 96.
- Moody, J., Stewart, B., & Bolt-Lee, C. (2002). Showcasing the skilled business graduate: Expanding the tool kit. *Business Communication Quarterly*, 65(1), 21-36.
- Olsen, F. (2000). Campus newcomers arrive with more skill, better gear: A look at freshman computing lifestyles at 5 institutions. *Chronicle of Higher Education*, 47(10), A39-43.
- Rainsbury, E., Hodges, D., Burchell, N., & Lay, M. (2002). Ranking workplace competencies: Student and graduate perceptions. *Asia-Pacific Journal of Cooperative Education*, 3(2), 8-18.
- Stephens, C. S., & O'Hara, M. T. (2001). The core information technology course at AACSB-accredited schools: Consistency or chaos? *Journal of Education for Business*, 76(4), 181-184.
- Watson, H., Sousa, R., & Junglas, I. (2000). Business school deans assess the current state of the IS academic field. *Communications of the Association for Information Systems*, 4, Article 4.