CBA · NAU

College of Business Administration
Northern Arizona University
Box 15066
Flagstaff AZ 86011

Computer Literacy Alternatives

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Craig A. VanLengen
Associate Professor of CIS
(928) 523-7392
craig.vanlengen@nau.edu

College of Business Administration
Northern Arizona University
Box 15066
Flagstaff, AZ 86011-5066

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INTRODUCTION

Most universities have a computer or technology literacy requirement. Other terms are information literacy, IT competency, and information fluency. Information fluency from its definition would appear to encompass computer literacy. Information fluency is "when critical thinking skills are combined with information literacy and relevant computing skills" [15]. The terms information literacy and fluency are derived from efforts by American Association of School Librarians, Association for Educational Communications Technology, and Association of College and Research Libraries [1, 18].

It would appear that most universities would be trying to achieve information fluency/literacy and not just computer literacy. Students should be taught the application of computers not just software applications [13]. All universities would like students to solve problems by collecting necessary information, applying critical thinking skills to evaluate and analyze it, and forming and presenting their findings in the most efficient way. The most efficient way would be to use information technology. In some cases the university general education requirement would be closer to computer skills in common office software since it does not include any technology concepts requirement. Students need to understand the core concepts of computers and information processing to appropriately apply technology to solve problems.

These information and computer skills are appropriate to all majors of the university, not just schools and colleges of business. Schools and colleges of business may want to expand the goals of their computer literacy courses to incorporate the goals and standards of the library associations. Since most of the students in our computer literacy course are not business majors it might be appropriate to change the course outcomes to general information and computer literacy and defer business use of information until the junior-level management information systems course.

Normally the university requirement is included in general or liberal studies core. The reason for this requirement is recognition that fluency in using computers to create information is necessary in the electronic fast-paced environment of our business and personal lives. The difficulty with this requirement is the uneven proficiencies of students coming to the university. In some states and school districts students are not required to demonstrate any computer literacy to graduate from high school. In other states they have a state requirement of some level of computer literacy that is assessed for high school graduation [23].

Since there is no uniform computer literacy requirement at the state level, our incoming freshman have a very wide range of computer proficiency. Some school districts have a computer literacy course and others only have a programming course that is normally only taken by students interested in mathematics. Even if a computer literacy course is available the school district requires students to take a prerequisite course in keyboarding, a boring course they do not want to take. A recent newspaper article stated that "about the only place where they are not immersed in technology is in school" [12].

In a recent semester the author taught the computer literacy course for our institution and conducted an informal survey of incoming proficiency. Over half of the students had word processing and some Internet skills. Less than 10 percent had any proficiency in spreadsheets, database, and presentation software. The students who claimed word processing and Internet skills learned it at home and not from a formal course in high school. While observing the students in the computer lab during the semester it was obvious that their Internet skills were very rudimentary, as were their word processing skills. To see how good their Internet skills were they were given an Internet search assignment without any instruction on search techniques. The assignment took most students the entire one hour and forty-five minute lab period to find any useful information. They had no idea on how to refine the topic into key words or effectively use the search engines.

Students who claimed word processing skills were able to enter text (in most cases slowly because they do not know how to touch type) and to do some formatting such as typeface, style, and size of fonts. Very few were able to change margins, paragraph attributes, or create and use a simple table. Spell checking was not performed unless specifically required. These findings are not unusual.

At Southwestern University they found that students enter the university with basic word processing, e-mail, and Internet skills. However, they do not have "conceptual knowledge of computers and technology" [15]. Students are not able to do effective Internet research because they do not have a conceptual understanding of how

information is organized on the Internet or an understanding of how a database is organized. It is believed that student self-reporting of their computer skills is in excess of reality and the skills they learn on an informal basis are not the same as those the universities are requiring.

SEARCH FOR COMPUTER LITERACY ALTERNATIVES

The purpose of this study was to document the alternative forms of ensuring computer literacy for university students. The search started with a review of the Web sites of our "current peer institutions." This list is used to compare salaries, curriculum and many other purposes. Next a search was conducted of the Web sites of the proposed "peer institutions" list. Lastly a search was conducted using several search engines using various search terms along with computer literacy: credit by exam, proficiency exam, and exam alternatives. The results present findings from both "peer" and "non-peer" institutions.

RESULTS OF SEARCH

The results were classified under the following four areas:

1. University assumes or expects computer literacy and provides assistance for computer literacy but does not have a course or certification requirement.
2. Literacy examination or certification must be completed during the first two years of university enrollment. It is assumed that most incoming students have the necessary skills so little if any resources are needed.
3. Required computer literacy course, with a possible CLEP option.
4. Required computer literacy course with several test-out options.

Each of the alternatives will be discussed and a recommendation will be made.

Computer Literacy Assumed or Expected

Computer literacy is assumed and is not specifically required by the university. In some states this may be appropriate. North Carolina Public Schools has a computer proficiency requirement established for high school graduates starting with the 2001 graduates [23]. They have a multiple choice test and performance tests in word processing, database and spreadsheets.

Even with this background North Carolina State University has a general education computer literacy requirement that can be met by having computer instruction within a course and/or requiring students to use a computer for assignments [22]. Students seeking a degree in business management from NC State must be able to use word processing, spreadsheet, and presentation software for solving management problems. A microcomputer software literacy course is available but the credit hours are not counted for degree requirements. This course can also be substituted for a proficiency test on software applications [21]. The University of North Carolina at Chapel Hill has a computer literacy requirement for business majors. They must take the introductory computer course or show proficiency by examination or course equivalency [34].

Since fall 1999 the University of Dayton has required all first-year students to purchase a personal computer. The university also provides appropriate assessment, tutorials and certification software along with high speed networking [33]. Students are expected to effectively use information technologies to find knowledge, evaluate and analyze information, demonstrate ethical use of information and technology and become a life-long learner of information technology [32].

Examination or Certification

Students must pass an examination or show certification usually during the first two years of university enrollment. It is assumed that most incoming students have the necessary skills so little if any resources are needed. Tutorials and non-credit instruction are made available but university courses in computer literacy are not offered. This just-in-time (JIT) model may be the least costly and most flexible approach [6]. Students identify their weaknesses by using a diagnostic or assessment examination. Self-paced tutorials are available to assist students in obtaining the necessary skills [2]. Washington and Lee University's information fluency program has a Website to inform students and faculty of available resources [37]. They also use an online software tool for self-paced tutorials. James Madison University has a Tech Level I and the Information Seeking Skills Test (ISST). Tech Level I must be passed by the end of the first semester and ISST must be passed by the end of their first academic year [11]. Tech Level I covers basic skills in the use of word processing, spreadsheet, and presentation software. ISST covers the skills necessary to identify a research topic and to locate and evaluate sources of information. Assessment instruments, tutorials, and study guides are available online for both examinations [11].

Since fall 1999, St. Edward's University has had a Computer Competency Requirement. Students must pass a Web-based exam over the following modules: "Introduction to Computers, WWW and Internet Communications, Basic Library Research, Introduction to Word Processing, Introduction to Spreadsheets, and Multimedia Presentations." [25]. Tutorials and practice tests are available online.

SUNY Brockport enrolls all freshman and transfer students in a one-credit computer skills examination preparation course. All undergraduate students must pass the examination. Once students pass the examination they are no longer required to attend the preparation course. Even though students are enrolled in the one-credit course they also have non-credit options including: doing on-line practice tests, using written manuals and books, and on campus tutoring [26]. The computer skills exam covers basic operating system commands, file maintenance, word processing, presentation software, e-mail, Internet, and networking [27]. Besides this general computer literacy requirement the Department of Business Administration and Economics at SUNY Brockport requires the students to take a three credit hour course in end-user computing and no test-out option is mentioned [28].

Mississippi Valley State University requires all incoming freshman to pass a computer literacy test. Passing the exam does not provide credit or a letter grade. An interesting note is that, "the test can be taken only once" [17]. There is no mention what students have to do if they do not pass the test. One could assume that they would then be required to take a course, but this is not mentioned. The university does have an introduction to data processing course for business majors, but the business administration department page was not available to confirm that this was a requirement.

South Dakota State University has information technology literacy goals. Students are tested in their junior year on the five information technology literacy goals and are required to pass the proficiency exam prior to graduation [24]. The goals include the ability to search and locate information, analyze and evaluate the information, ethical and legal aspects of information, and knowledge of information technologies [24].

Required Computer Literacy Course

A required computer literacy course, without any test-out options, except for CLEP examination, appears to be the most common practice. This approach has a number of problems. A single course that teaches concepts and software skills forces all students to take the entire course, even if they possess some of the skills. In a number of cases students with the skills perform poorly because they are bored! This approach makes it very difficult for the faculty. Last semester, when I taught the course, I had students with programming experience to those who had not touched a computer before.

George Mason University has an information technology requirement that can be met by taking either a single course or a combination of several courses [9]. George Mason also has information technology goals that are included in their technology across the curriculum program. The information technology goals are aligned with the information technology requirement. This way students would be able to meet the requirement by taking courses in general education and their major as long as they included information technology goals [8]. In this approach students obtain computer and information literacy skills without taking a course in computers. This approach should make learning about computers more meaningful to students, but could be very difficult to monitor and ensure that all students receive an equal background.

Computer Literacy Requirement with Course or Credit by Examination Options

These universities have a computer literacy requirement that can be met by either taking a specific computer literacy course or courses or by obtaining a passing score on a proficiency examination. Weber State University has a four-part requirement for computer and information literacy. The student can meet the requirement by taking courses, exams, or a combination of classes and exams [38]. Florida State University also has a computer skills competency requirement that can be met with a course or courses or with certification of computer skills procedure. The procedure for certification is determined by the departments offering an approved computer skills course [7].

Columbus State University requires students to be proficient in word processing, presentation software, information retrieval, and e-mail by the time they have earned 30 semester hours. Transfer students have two semesters to complete the requirement. Students can either take a specified course or courses or take a computer literacy test to meet the requirement [4].

California State University, Sacramento, College of Business Administration requires all majors to show computer literacy prior to enrollment in core courses. The computer literacy they are referring to here is in use of productivity software and not information systems concepts. Students can meet the requirement by taking specific courses or a computer literacy and competency exam. They have two additional courses in data analysis for managers and computer information systems for managers [3]. The University of Texas at Austin has a required

introduction to management information systems course that students can earn credit for by passing an examination [35, 36].

Miami University of Ohio has a requirement of minimum proficiencies in using a computer to search the Internet, use Web forms, electronic communication, basic operating system functions including file management, and use of word processing. The school of business has additional requirements on use of spreadsheets and database. These proficiencies can be met by selecting one of several courses or taking a skills exam. The skills exam was internally created but they are switching to an external exam [16].

West Texas A&M University's Department of Accounting, Economics, and Finance has a computer literacy requirement as part of the university core curriculum that can be met with a specific course, by passing WTAMU computer competency exam, CLEP exam, or industry certification exams [39]. Indiana State University has an information technology literacy requirement that can be met with exam competence or by taking one of several courses [10]. The competence exam is provided by Tek.Xam. Tek.Xam provides vendor-neutral individual online assessments of seven information technology knowledge areas [29].

Recommendations

The future computer/information fluency/literacy course needs to be innovative to meet the diverse needs of the incoming university student. In 1999 the National Academy of Sciences funded a report, *Being Fluent with Information Technology*. One of the major findings of this report was that "fluency with information technology requires three kinds of knowledge: contemporary skills, foundational concepts, and intellectual capabilities" [20]. This finding is still appropriate today. Foundational concepts of information processing and intellectual capabilities have remained fairly constant, but the contemporary skills change rapidly. Incoming university students have some of the contemporary skills in using a computer, but may lack a solid background in the concepts of information processing and use of their intellectual capabilities.

If schools and colleges of business want to make their introduction to computers course more relevant for all university students they may need to incorporate the findings on information fluency. In most cases this will require a redesign of the course. Most of the existing courses present the concepts of information processing but present little, if any, on using higher-level thinking skills with the aid of computer technology.

The course redesign may require separating the course into modules for each major area. It would also be appropriate to provide credit-by-examination options with course credit for those students who already possess the necessary skills. For the contemporary skills we could also allow outside certification [14]. Several options are available for credit-by-exam or certification of computer skills. Several of the universities have developed their own test instruments and others are using tests created by outside organizations.

A locally created test would precisely match the learning objectives of each university's course. However, several versions of the examination would have to be created and exam questions would have to be updated on an annual basis to be kept current. Another problem with a local examination is the validity and reliability of the examination.

Computer capabilities, hardware and software functions, and office productivity software are generic. So why should each university reinvent the wheel, by creating a university-specific computer literacy assessment instrument? ExpertRating has computer skills tests in computer fundamentals, operating systems, networking, and software applications. Students can take a test for free and if they pass can order a certificate to prove proficiency [5].

Tek.Xam offers twelve assessment tests covering general computing, word processing, spreadsheets, database, presentation, Internet, and Web authoring. They have sample tests, study guides for each test and provide performance reporting. The charge is $10 for each module or $50 if students are required to take all seven modules and volume discounts are available. The tests were originally created by the Virginia Foundation for Independent Colleges. They have now partnered with ACT, Inc. and Brainbench to improve the assessment instruments and make it available to a wider audience [30].

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