

## Are College Students Prepared for a Technology-Rich Learning Environment?

**Victoria Ratliff**

Dean of Business & Information Technology  
Mountain Empire Community College  
Big Stone Gap, VA 24219 USA  
[vratliff@me.vccs.edu](mailto:vratliff@me.vccs.edu)

### Abstract

The majority of today's college students have grown up in a world immersed in technology – computers, electronic media, cell phones and more. Due to this, educators often expect students to have the technology skills needed to perform in an academic environment. Unfortunately, this is often a misconception. This article reviews the technology readiness of students at a rural community college located in the Southeastern region of the United States, and suggests that it is a responsibility of higher education to assess the skills of incoming students before expecting them to perform in a technology-rich learning environment.

**Key Words:** Readiness, Technology, Learning Environment, Community College, Student Success

### Introduction

In a world where pre-school children are browsing websites for their favorite games, and teens are more in touch with their friends online than in the hallways of their schools, it would be easy to accept the premise that students entering college today are more tech-savvy than ever before. So why are so many college freshmen unsuccessful in entry-level computer classes?

Students often consider themselves proficient in the use of modern technology, but it appears to be the “wrong” type for academic purposes. Students may be experts with chatting, Twittering, or social networking, but be inexperienced in attaching a document to an email or creating an essay with word processing software. Many students who do communicate with their professors by e-mail often neglect to use punctuation, rarely use standard formatting, and generally include slang or acronyms that confuse or frustrate faculty.

Higher education has become dependent upon technology to deliver and enhance course offerings, particularly at the community college level. While the growth of distance education classes has contributed to this, technology is being infused more and more into traditionally-delivered classes as well. Even a developmental level writing course requires students to produce documents in an electronic format. To the surprise of many students, professors often ask them to add formulas to spreadsheets to complete mathematical equations, and an introductory computer class is more difficult than they anticipate. It is, therefore, necessary for college students to have a certain amount of competency in computer and software use from the very beginning of their college careers.

### Supporting Literature

Students are most often considered college-ready when they have met certain goals – high school graduation or successful completion of a General Educational Development (GED) program, as well as certain performance levels on nationally recognized exams. In reality, however, this does not ensure that students are prepared to enroll and succeed in a college environment. The definition of college readiness is an all encompassing term meant to reflect students' level of prerequisite knowledge and skills in certain areas (Conley, 2007). The ability to utilize key technological tools for academic purposes is a key component of this comprehensive definition.

The perception among teachers has been that younger students should have a satisfactory level of computer skills upon entering college as a result of their increased personal use of the Internet. However, this presumption has been proven wrong by more than one study. An assessment of business students who had reportedly used computers and technology prior to attending college found that 64 percent of those students' test scores fell below 60 percent on technology pre-instruction assessments (Wallace & Clariana, 2005). Wallace and Clariana concluded that "incoming business students lack the necessary computer knowledge, skills, and abilities to pursue their undergraduate degree programs" (p. 141), without some type of information concepts and technology instruction.

Kaminski, Seel, and Cullen conducted a survey of freshmen at Colorado State University, and reported that professors should not assume students have prior knowledge of the most basic information technology skills (2003). Students who are more prepared for the rigor of college perform better than those who lack the necessary skills to perform in this environment. However, many students entering college "do not develop effective learning strategies unless they receive explicit instruction and the opportunity to apply these skills," (Rachal, Daigle & Rachal, 2007, p. 191). The result, therefore, is that faculty often must remediate students in the use of technology prior to providing instruction in the intended subject area, reducing the amount of time available for the delivery of vital course content (Rafaill & Peach, 2001).

Student expectations of college life are often very different from their experiences. In a survey of 27,864 students at 103 two- and four-year colleges and universities, investigators found that most undergraduates today are "digital natives" who have grown up with technology (Caruso & Salaway, 2007). However, students believe there are different types of technology for different purposes. Responding students agreed that E-mail, Web sites, message boards and Blackboard are reasonable ways to communicate with professors and other students, but indicated that instant messaging and social networking sites are personal and should not be used for classroom interaction (Caruso & Salaway, 2007). Faculty report, however, that the technological environment within society has forced them to change teaching methodologies. Students require more than lecture to become engaged in the learning process (Kellner, 2005), and faculty have had to incorporate the use of blogs and other social networking tools to pique the interest of students in their content area.

An effective technology-rich learning environment generally includes the use of computers, software, Internet connections, projectors, and a variety of other high-tech devices, as well as an online course management system and student information system. When implementing these tools into the curriculum, it would be advantageous for faculty to know upfront if their students are prepared for this environment.

### **Community College Assessment**

While the identified studies on student readiness have been broad-based, the author determined that a more focused study of students in a community college setting was needed. A rural community college located within the Southeast region of the United States served as the target of this investigation.

A review of the college's demographics revealed that the student body consists of approximately 4,300 students, with roughly 50% of the students taking one or more distance learning classes. Students of the college are provided access to 23 dedicated computer labs, with a total of 589 workstations. Various educational technologies, such as Smart Boards, multi-media presentation systems, student response systems, video-conferencing, and wireless Internet access are used in the classrooms to enhance student learning. All students are assigned a student e-mail account, and the college utilizes the BlackBoard course management system extensively in online, hybrid, and traditional classes.

To determine if entering college freshmen in this rural setting have the necessary skills to succeed in a technology-rich learning environment, a short-term study was conducted. A survey of the faculty at the target institution determined that the basic skills needed to perform in this environment would include:

- PC Basics: ability to create, save and find files within different directories.
- Microsoft Office 2007 Application Basics:
  - Word Processing – to prepare papers for classes using standard formatting techniques.
  - Presentation software – to view and/or create presentations.
  - Spreadsheets – to store, manipulate and analyze data.

- Internet Basics:
  - Upload / download files
  - Use of E-mail
  - Browsers – to locate specific web sites and/or use search engines for research purposes.

The input of faculty provided a basis for the development of the readiness assessment instrument. Faculty across the campus were asked to submit questions to the investigator that would measure the level of information technology skills needed by students entering their respective classes. A representative of each academic division, along with two Information Technology faculty members, the investigator, and a representative from the Office of Institutional Research, convened to develop the assessment questions based upon the suggestions submitted by faculty. Following the composition and revision process, the final product consisted of forty questions designed to measure the knowledge of incoming students on very basic concepts of computer information systems and peripheral equipment.

Questions chosen for the assessment included such topics as opening, saving and renaming files, printing documents, sending and retrieving email, and downloading documents. A multiple-choice format was used for the assessment to allow students an opportunity to use the technique of elimination to determine the most appropriate answer.

The technology readiness assessment was piloted during the first week of classes of the 2009 spring semester to validate the test questions. At that time, 172 students participated in the pilot. Upon studying the results, there were no apparent problems with the questions as designed. The mean score of those taking the pilot assessment was 83.73%. The students participating in this pilot were enrolled in student development courses, including some who were previously enrolled in classes during the fall semester.

Following the pilot, it was determined that this assessment would be administered to all incoming freshman during a scheduled orientation session for new students. The initial target group included 182 orientation participants, of which 177 were high school seniors and five were identified as adult learners. Five faculty members from the Information Technology Division proctored the assessment sessions. All students were provided an information sheet explaining the purpose of the assessment and were encouraged to answer the questions to the best of their abilities.

Upon completion of the assessment, all students were made aware of their scores by the automated system. Students were advised that those whose scores fell below the 75<sup>th</sup> percentile would be contacted by a representative of the college regarding available remediation opportunities.

As indicated in Figure 1 below, one hundred eighty-two students participated in the initial assessment of incoming freshmen on April 7, 2009. The average score of the 182 students was 77.07%, representing a much lower average than anticipated.

Of the 182 participants, 74 students scored at or below the 75<sup>th</sup> percentile, representing 41% of the participants. In a review of the results of individual questions, there appeared to be no specific pattern to the inaccurate responses. Of those tested, no student obtained a perfect score, yet two students answered 97.5% of the questions correctly. On the other side of the scale, one student scored 37.5%, while 14 other scores ranged between 40% and 60%.

Four additional orientation sessions were held during June and July of this year, with a total of 149 students completing the technology readiness assessment. These students were evaluated using the same format and test given to those on April 7. Of the 149 students, 71 scored at or below the 75<sup>th</sup> percentile, indicating nearly 48% require remediation. The average age of the students participating in these sessions was 19.8 years.

## Discussion

Although the majority of those participating in this study have been influenced by technology throughout their lives, the results indicate that a significant number of them are less than adequately prepared for a technology-rich learning environment. Using technology to perform academic research, analyze data, compose essays, or prepare presentations is simply not the primary use of computers by most entering freshmen. Given the results of this study, what strategies can be implemented to improve the success

rates of college freshmen? The challenge for this college will be the management of the process following the assessment sessions.

<b>Technology Readiness Results</b>	
<b>4/7/09 Orientation Session</b>	
<i>Score</i>	<i>Frequency</i>
10 – 19	0
20- 29	0
30 – 39	1
40 – 49	3
50 – 59	11
60 – 69	26
70 – 79	73
80 – 89	62
90 – 100	6
	Total 182

*Figure 1.* Frequency of Technology Readiness Assessment Scores.

A significant amount of follow-up with the students who need remediation will be required to ensure their access and participation in a remedial program. However, by tracking the students via their college identification numbers, the college would be able to compare success rates of those students who were assessed and did not require remediation, those who tested, required and completed remediation, and those who tested, required remediation, but failed to complete a remedial program. This data will further allow the institution to determine any correlation of readiness skills to the success rates in college-level courses.

While more research is required to determine if this study will have a long-term impact on student success at the target institution, the initial results have already sparked the interest of both the faculty and administration of the college. Educators often perceive student attributes to be much different than what test data reveals. For example, in the past advisors at the target institution have had to rely upon students' self-appraisals of their technology skills. While most students report that they use a computer on a regular basis, it is unclear if they realize there are differences in academic use and social networking. Few freshmen have experience using word processing programs, and even fewer have used spreadsheet or presentation software prior to college. Their reports of "regular computer use" are from a personal and/or social aspect (Caruso & Salaway, 2007). As a result, students could be placed in classes that they are not prepared to take. With the student's technology assessment score in hand, an advisor could provide better guidance to the student during academic planning sessions and ensure that those who score low on the technology assessment enroll in a remedial level or basic computer course during their first semester.

## **Conclusion**

To analogize the importance of this issue, one might ask if students should be expected to run before they can walk. Colleges regularly assess incoming students on their reading, writing and mathematical skills, and teach developmental classes to those who score below the college-level in these disciplines –

taking small steps that prepare them for the marathon. If a student cannot type an essay into a word processing program, how can they be expected to submit it electronically to their professor? When students are not prepared to use the educational tools required of them for success, colleges have an opportunity to identify the disparities and remedy the problems before they result in frustration for the students and their subsequent attrition or failure.

In this author's opinion, many higher education institutions are ignoring a fundamental element of student success. Community colleges should no longer limit their focus to the traditional three R's of readiness – reading, writing and arithmetic – but should take into consideration the technology readiness levels of their students as well. To complete the academic race, students must be ready to walk before they can run in a technology-rich learning environment. Recognizing the need to measure technology readiness is the first step.

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