UTILIZING SOFTWARE APPLICATION TOOLS TO ENHANCE ONLINE STUDENT ENGAGEMENT AND ACHIEVEMENT

By

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ABSTRACT

The field of education is experiencing a rapid shift as internet-enabled distance learning becomes more widespread. Often, traditional classroom teaching pedagogical techniques can be ill-suited to the online environment. While a traditional entry-level class might see a student attrition rate of 5-10%, the same teaching pedagogy in an online environment can experience dramatically higher student attrition. The CIS Department at Mount Olive College is addressing the challenge of technology/business applications literacy by implementing a new e-learning solution. A customized, self-paced, web-based 100-level tutorial using a novel approach in which students interact with an application's embedded search and help is featured. This interactive learning activity encourages students to utilize the built-in "help" features to solve the problem or task at hand. As students become proficient at using these "help" features, their proficiency, confidence, and student engagement in the class material increases. The course online facilitator is able to shift their time and energy from "putting out fires" to focusing on higher-level feedback on assignments and administrative functions. Since more classes require the use of application software in completing assignments, students take this newly acquired problem solving approach to other situations and courses, enhancing their progress throughout their undergraduate program and increasing the probability of program completion.

Keywords: Education, Technology, E-learning Strategies, Engagement, Success, Teaching Technologies, Internet Based Strategies, Innovative Pedagogical Strategies, Asynchronous Distance Learning.

INTRODUCTION

The field of education is experiencing a rapid shift as internet-enabled distance learning becomes more widespread. Often, traditional classroom teaching pedagogical techniques can be ill-suited to the online environment. An increasing number of post-secondary institutions are offering some type of online learning format for their students. Even though the technology is available, are educators and students ready? Traditional entry-level classes might see a student attrition rate of 5-25%, while the same teaching pedagogy in an online environment for the same class at the same institution can experience dramatically higher student attrition - 45% or more (Lowe, 2005). Additionally, several regional focus groups consisting of major employers from New Bern, Greenville, and Wilmington, North Carolina (MOC Focus Groups, 2010) indicated that students needed more training with the Microsoft Office (MS Office) productivity tools including advanced spreadsheets and database software (i.e., MS Excel and Access). Eighty percent of enterprise customers use a version of MS Office for worker productivity and collaboration, with only 8 percent using alternatives such as Sun StarOffice, Google Premier Apps, Lotus Symphony and Zoho (McLeish, 2009).

As Murray (2003) notes, to be functionally literate in the workplace, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. The leadership of Mount Olive College feels it is important that students' computer skills improve as they move through their college education and that the skills they learn are what employers need them to have. And this needs to be accomplished with finite institutional resources, leveraging the potential of online classes while minimizing the high attrition associated with online classes.

Significance of the Problem

Often, traditional classroom teaching pedagogical techniques can be ill suited to the online environment. While a traditional entry-level class might see a student attrition rate of 5-25%, the same teaching pedagogy in an online environment can experience dramatically higher student attrition - 45% or more (Lowe, 2005). There have been significant changes in pedagogy methods due to the presence of the Internet and other widespread computer usage (Proserpio & Giola, 2007). These changes have created a more visual learner that in turn affects the delivery of what was once considered traditional lecture material. A crucial aspect of student learning - student engagement – is a key attribute of program quality (Mitchell, Sheard, & Markham, 2000). Instructors must build lessons around interactive media to create a more engaging environment for the student than the traditional classroom lecture.

Using distance learning requires the teacher to move to a position of facilitator (Meissonier & Houze, 2005). The teacher loses some control with e-learning. Their role of knowledge holder shifts to that of stimulation of learners (p. 990). The knowledge is put forth but it is the student responsibility to accept it. The traditional lecture classroom allows the instructor to put forth knowledge as established by departmental learning goals. Distance learning allows the instructor to put forth the knowledge but it is not delivered verbally to students in most cases making instruction seem somewhat impersonal (p.990). As technology increases and the presence of online education increases, instructor goals are bound to shift toward online learning. This means a shift in their pedagogical methods and an increase in their own technological knowledge that result in the role of facilitation and support of learners.

Since more classes require the use of application software (i.e., MS Office) in completing assignments, student proficiency with business application software is critical to ensure progress throughout their undergraduate program. Today's high school graduates have been immersed in a technology rich society. However, the type of technology they have been exposed to may not be the type required to be successful in higher education. Social networking sites, such as Facebook, MySpace, and text messages have developed their own style of language. Many students have become accustomed to using this language and often insert it within their coursework. They do not use proper formatting, grammar and mechanics, and formal communication skills required by instructors (Ratliff, 2009). Ratliff found students surrounded by technology are not prepared for the distance learning experience. Some abilities needed to enter an online education course are:

- Attaching documents to email.
- Participating in formal discussion boards.
- Internet research.
- Journaling thoughts on assignments.
- Uploading documents to share with fellow students.
- Ethical behavior on plagiarism and assessments.

In 2003, Colorado State University surveyed incoming freshmen about their technology skills (Kaminski, Seel, & Cullen, 2003). It was determined that 98% of students had an email account but only 81% could attach a file (p.37). Ratliff et al. (2009) conducted a study of a rural community college's incoming freshmen. The 182 students were given a technology readiness assessment with the average score being 77% (p. 4). This assessment included questions of basic computer usage such as saving, typing, uploading, downloading, etc. With this in mind it would seem colleges would need some type of technology assessment to ensure student success (Ratliff, 2009). Colleges would also need to offer some type of remedial computer courses or tutoring specifically aimed at this deficiency to create enhanced student engagement and success in online courses.

Meissonier et al. (2005) indicates more motivation is needed for online learning than traditional classroom learning. Since online courses require discipline to complete assignments students who are not prepared for this type of learning may struggle with motivational factors. Distance learning shifts from teacher-centered to student-centered and it requires concentration on the student's part to complete all the components of assignments. Distance education requires the responsibility to fall on the

student. This can be an asset because students will then strive for proficiency and become more engaged in the learning because they feel a part of their own learning.

If a student does not have the necessary skills for a distance education course, it could put them at serious odds that could hinder their success in postsecondary education (Lowe, 2005). Students, whether incoming freshmen or adult non-traditional learners, can suffer serious setbacks in e-learning settings due to lack of computer literacy and would certainly benefit from some type of entry level course prior to online courses or student services tutoring to give them the skills they need to be successful in their academic endeavors (MOC Focus Groups, 2010).

Solution Process and Constraints

As mentioned previously, several regional focus groups consisting of major employers from New Bern, Greenville, and Wilmington, North Carolina (MOC Focus Groups, 2010) disclosed that students needed more training with MS Office productivity tools including advanced spreadsheets and database software (i.e., MS Excel and Access). CIS 110 is a computing technology course which is defined as follows (MOC Course Catalog, 2009):

"The course objectives focus on technology literacy skills, and the application of technologies as tools in addressing external (to the computer) problems or needs. Students will use and integrate business applications (e.g., word processing, spreadsheets, database, and presentation software) to enhance their productivity, creativity, and problem solving capability. In addition, students will use advanced techniques to search and research the Internet; and, they will develop superior collaborative problem solving skills (e.g., using Web 2.0 technologies social networking, etc.) in a world-wide ubiquitous computing environment."

As with many other institutions (Hilberg & Meiselwitz, 2008), research of basic computer competencies at the undergraduate level as well as a perceived/real deficiency in basic computing technology skills and business applications resulted in the adoption of CIS 110 or CIS 201 (Fundamentals of CIS) into the General Education Requirement (GER) for degree completion at MOC. All college students must take and successfully pass either CIS 110 or CIS 201 (or a comparable course for transfer students). Because of the GER adoption of CIS 110, a significant increase in student enrollment is expected. Typically, four seated sections and six online sections were taught per year before CIS 110 or CIS 201 was included into the GER. This year, the numbers of CIS sections were projected to rise to over 20 sections. MOC has two computer classrooms with 24 stations in each classroom and a finite number of CIS faculty. In response to these resource constraints (i.e., providing additional computer classrooms, and adding additional sections and the associated cost and recruiting of professors), an in-house System Development Life Cycle process was undertaken under the leadership of the Accounting and CIS Department Chair with this result: a self-paced, content-rich, online tutorial was created leveraging the embedded "Help" wizards of MS Office 2007. Because of the tutorial's design, the tutorial is expected to assist or even enhance student learning outcomes. Students progress through the tutorial at their own pace while acquiring desired learning outcomes with less required instructor interaction. MOC had to apply an innovative approach to a) fulfill its computer competencies commitments to students and its accrediting bodies (i.e., Association of Collegiate Business Schools and Programs (ACBSP) and Southern Association of Colleges and Schools (SACS)), b) expand the capacity of the CIS 110 classes to accommodate increased enrollment, and c) address the problem of increased attrition in online classes to enhance student engagement, success and course completion.

Process Description

In early January of 2010, the idea of the self-pace tutorial was first vetted with the CIS Department and the Tillman School of Business Dean. The CIS Department was in full agreement with the pedagogy in using an online self-paced tutorial that offered students many benefits while minimizing risk (i.e., significant number of students not accomplishing designated learning outcomes). In addition, other major stakeholders including the Vice President of Academic Affairs and the Dean from the School of Arts and Sciences were involved early in the process. Lastly, the expertise of the Department Chair of the

CIS Department (e.g., prior development of technology learning tutorials, possessing a Education Specialist terminal degree, specialized work in a PhD program (Computing Technology in Education) which involved adult online learning environments, and professional certification in MS Office) helped to solidify and ensure the success of the online, self-paced, tutorial project.

Under the direction of the CIS Department Chair, a customized case study utilizing the System Development Life Cycle (SDLC) was integrated into a CIS 495 capstone class. The foundation of the tutorial would be constructed by senior CIS students with the instructor – who is professionally certified in MS Office - acting as a project manager and course facilitator. The students were very enthusiastic about the real-world project and the practicality and utility of the project. In addition, the two team scenario fostered a competitive environment. Two teams (six students per team) were given the assignment to produce the CIS 110 tutorial with the following framework and criteria:

- Learning objectives must be consistent with CIS 110 Course Description and Syllabus course objectives.
- The tutorial must be web-based and the software platform for web development is Microsoft Web Expression. Mount Olive College is a member of Microsoft Academic Alliance; therefore, all CIS students are able to obtain the web development tool at no cost.
- A holistic approach combining pedagogy and employing superior web usability heuristics is central to the project. The web-based tutorial must be intuitive, easy to navigate with standardized modules. Students taking the tutorial need only be focused on learning and synthesizing the course content.
- Specific knowledge domains are established which include: Computer Basics, MS Word, MS Excel, MS PowerPoint, MS Access, Webmail, Web Collaboration, Internet Research Tools, and Web 2.0. For ease of web maintenance and updating, each domain must be a stand-alone module and contain specific web folders that relate to each domain. The folder/file organization of the Word module is depicted (Figure 1).

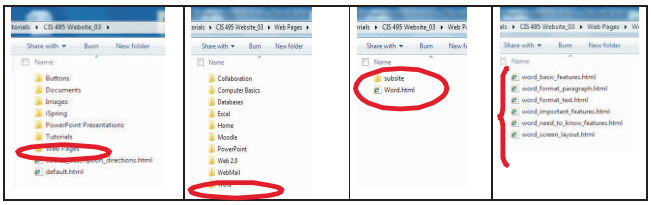

Figure 1. Folder/file organization of the Word module

Business applications modules (e.g., Word, Excel, PowerPoint must be based upon Microsoft Office 2007 Professional Edition; and, the CIS 110 course requires students to have access to Microsoft Office 2007. CIS 110 students would not require a textbook because the tutorial supplants the former textbook; and, standardized assignments will be developed and implemented by the faculty of CIS Department. Lastly, a test-out option would be available to students who believe they have a mastery of the learning objectives. The test would be developed by the CIS Department and would be based on the selected tasks contained within the tutorial.

Within each knowledge domain, CIS 495 students were charged with selecting the most important tasks associated with each learning module. The selection process was comprehensive and the task list was vetted by the CIS 495 students, freshmen students, focus groups (business employers), and the CIS 495 instructor who had the professional certification as Microsoft Office Master (i.e., expert in using Access, Excel, PowerPoint and Word). The final task list was modified and approved by the CIS Department faculty. Final modifications were also made during the beta testing phase of the project.

CIS 495 students were instructed to link to and use video tutorials from within targeted applications (e.g., Word, Excel, PPT, and Access) to accomplished specified tasks. Many professional and updated videos were available at the Microsoft Office Website. The pedagogy relies in part on students searching for specific tasks from within a particular application and then selecting and viewing videos on how to accomplish a specific task. Students grow accustomed to solving a particular task at hand by utilizing the help feature from within the specific application module. This learning strategy places less reliance on an instructor. In addition, the novel problem solving model is expected to port over to other learning situations and in other disciplines.

The CIS 110 self-paced tutorial will be hosted on MOC's website which utilizes Moodle v 1.9.9 on a Linux platform. All students, professors, staff, and administrators will have access to the tutorial. Only those students who need to take the course for credit will register for the eight-week online course (the course will be administered in Moodle version 1.9.9). During the year, five sections will be available to students (i.e., Fall I and Fall II, Spring I and Spring II, and Summer I) with a course cap of 75 students. When students enter the tutorial, they see the simplistic home page picture (Figure 2).

Although some scrolling is evident on the homepage, all modules appear on the left. It would be intuitive for a student to read the directions and then progress through the modules starting from top to bottom (i.e., starting with computer basics and finishing with Web 2.0). The "Word" module is a typical module which uses a consistent theme. Because of the wide range of browser settings (e.g., Internet Explorer), a warning appears at the top of each module notifying users that certain content may be blocked; thus, the warning instructs users on how to deal with a problem if it occurs (Figure 3).

Students are first exposed to learning when they preview a short video describing a particular module (e.g., MS Word). Then the student will view a PowerPoint presentation (Figure 4). After the presentation, the student is instructed to click on various headings that appear below the PowerPoint presentation. Each heading directs the student to a separate webpage that greets the user information relevant to the task.

When the student has viewed the PowerPoint presentation,

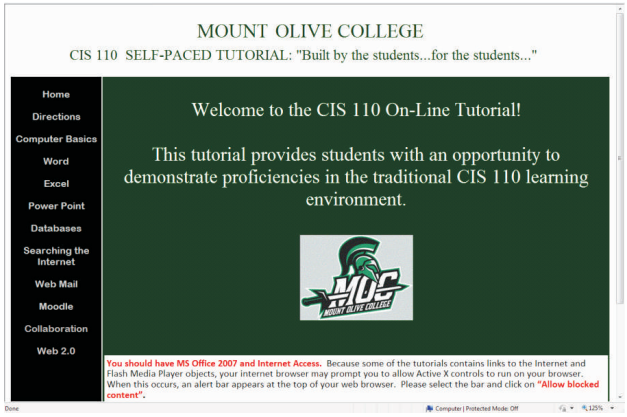

Figure 2. Tutorial home page

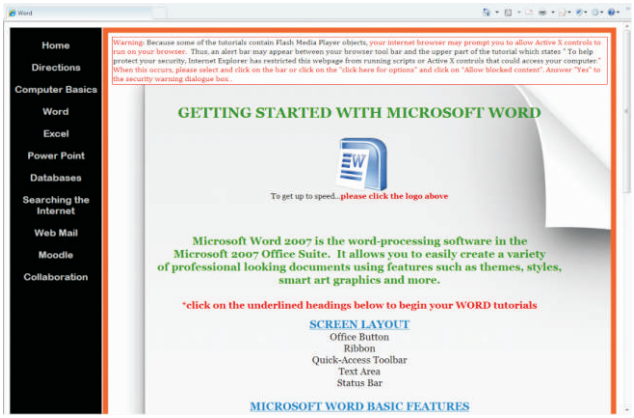

Figure 3. Warning appears at the top of each module

they will scroll down and do the "hands on" learning activity which consists of opening the application (MS Word in this case) and typing in various key words into a search box (Figure 5).

The student then types in a "key word" which generates various alternatives. The student chooses a particular

Figure 4. PowerPoint presentation

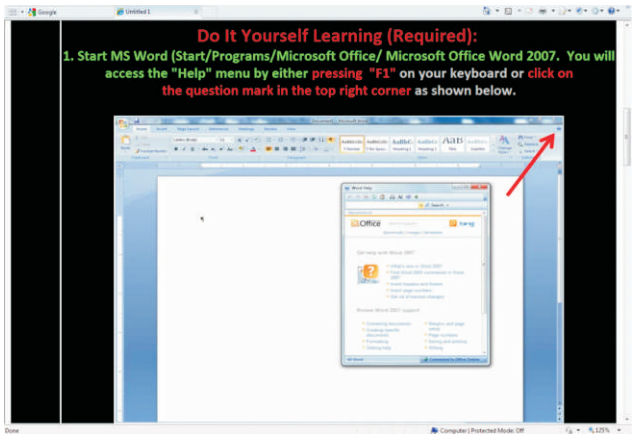

Figure 5. Hands-on learning exercise

alternative which is most relevant to the key word. Thus, the student is now informed about a term or how to complete a task associated with a particular key word (Figure 6).

Potential Constraints

All students are required to have Internet access – and preferably broadband. This is mandated by administration because every student must have an email account and every course now has an online component/supplement. However, students should have adequate bandwidth (128 Kbps, fractional T1 is preferred) for the best presentation of the online tutorial. MOC computer labs have broadband access at all locations. Student access may be variable depending on their location – this is especially true for students employed by the US Government or military, who can be located anywhere globally.

All students are required to have access to MS Office 2007. This is mandated by the need to ensure a common learning platform for the entire class. Attempting to accommodate earlier versions of MS Office (2000, XP, etc.) would impose a considerable burden on class administration. Further, all new PC systems being deployed with MS Office are being deployed with v2007 or later. An additional, related constraint is the need to "update" the tutorial at a future date as MS Office 2010 becomes more widely deployed.

All students are required to use the Internet Explorer v7.0 or v8.0 browser. While this may change as the software tutorial is refined, the time and resource constraints required that a compatibility standard be selected. As shown in Figure 7, MS Internet Explorer currently has the greatest market share

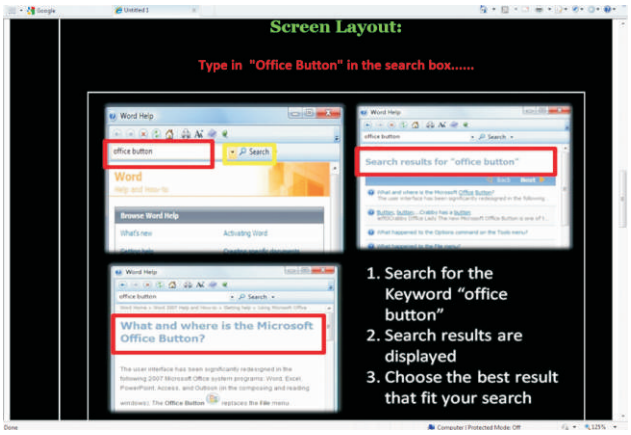

Figure 6.Keyword selection options

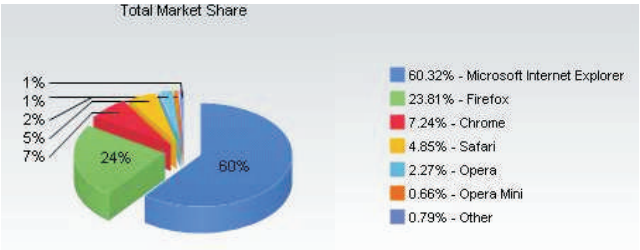

Figure 7. June 2010 browser market share.

(Netmarketshare.com, 2010) and is fully compatible with Moodle v1.9.9 – whereas browsers like Google Chrome are not expected to be fully compatible until Moodle v2.0 is released.

Conclusion

The novel design of the tutorial creates a learning environment in which the instructor role shifts from step-by-step instruction to primarily facilitation. This permits the instructor to assist more students; and, it is projected that a significant number of students will complete the tutorial on schedule or ahead of schedule, allowing the instructor to focus on those students who need additional help accomplishing the learning objectives. Learning outcomes are expected to be maintained or be enhanced because many students, who truly need help, will get it. MOC anticipating an increase in overall student pass rates could result due to more instructor interaction and intervention with those students requiring more attention.

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