

ONLINE TECHNOLOGY MANAGEMENT STUDENT TUTORIAL CASE STUDY

Joanne Kuzma
University of Worcester
Henwick Grove, Worcester, UK, WR26AJ
j.kuzma@worc.ac.uk

ABSTRACT

This paper presents a case study of implementing online video-based tutorials to enhance student learning. Initially, these tutorials were developed using a software product, Camtasia, to mitigate learning differences between traditional-based classrooms versus online classes. Because online students often did not receive the same hands-on and visual learning modality that was available to students on traditional classroom settings, tutorials were assumed to level the playing field between these two groups. However, after two years of developing and integrating these tutorials into online classes, it was found that only a small minority of students were using them. Other issues were that tutorials took a long time to develop, and many lecturers felt they were ineffective. This case describes the reasons the tutorials were developed, the integration process, issues raised, and implications for future development.

Keywords

Online learning, Tutorials, Flash, ICT

1. INTRODUCTION

The College of Technology & Management (CTM) of St. Petersburg College (SPC) in Florida, USA offers a variety of technology and management degrees aimed primarily at returning adult students. Classes are offered in either a pure online format or a blended format, which is a combination of online and traditional classroom-based learning. Approximately 75 percent of students take classes in the online format. Students taking blended classes had direct personal contact with lecturers during a traditional classroom setting, and instructors could visually show students specific academic concepts via the overhead projector or on classroom computers. However, students in the online classroom environment did not have the personal approach of the instructors to show them specific information on course concepts or would have personal tutoring or the ability to visually follow the instructor's directions.

In order to equalize the learning for online students, the CTM lecturers created a series of online video-based tutorials for some of their modules using Camtasia software. These tutorials were tailored for the online students, although they could also be used to supplement traditional classroom-based learning.

2. LITERATURE REVIEW

The ability for online students to receive the same level of instruction as students in traditional classroom environments is important, especially for the institution to meet accreditation. Evans & Champion (2007) indicate that accrediting bodies are continuing to modify expectations and are holding online entities to increasingly higher expectations. This requires lecturers to learn and use new technologies which can help their student to learn more effectively. Lecturers must ensure that online students have the same opportunities as students in traditional formats, and the modules in both formats are of high quality to ensure enhanced learning.

Software tools, such as Camtasia, are now used in many schools to improve student learning and to address diverse student learning styles. Selvester, Mulholland, & Wong (2006) analysed an implementation of Camtasia technology into a course at California State University, Chico in 2005. They found that for complex assignments, students often had to refer to the assignment description several times during the semester and often asked the same questions over and over again. They found that a Camtasia video could be used as a supplement for face-to-face contact and could refer to the video throughout the semester at their convenience. A video containing the instructors directions could help eliminate class time spent answering the same questions from multiple students. Routine tasks such as syllabus review or complex instructions could be made available to all students, even ones that may have missed a class meeting. This experience showed that students became more self-reliant learners.

Southern University at Shreveport Louisiana also implemented Camtasia-based learning methods in their curriculum (Evans & Champion, 2007). The school found that guidance and verbal instructions were conspicuously absent from online courses, and implemented a training program for online instructors to teach them how to effectively implement new online technologies, such as Blackboard and Camtasia. Their implementation of Camtasia was successful and they found students could access the files at their convenience and students could access files with mobile technologies, such as iPod. Belawati (2005) performed a study of students utilizing online tutorials at Universitas Terbuka in Indonesia. He found that students who used online tutorials had higher course completion rates and achievement than students who did not use the tutorials. Students did complain of some technical issues, but expressed appreciation of the innovative technology.

Although experiences at South University, Terbuka and California State University were overwhelming positive, other institutions found mixed results. McGrann (2005-2006) implemented a series of 13 Camtasia video lectures at Binghamton University for a Computer-Aided Engineering class. An end-of-course survey found that more than half of the students were either "not satisfied" or only "somewhat satisfied" with Camtasia videos. However, the effect of the study was not robust enough to make a general conclusion on the effectiveness of online video tutorials. In order to improve student satisfaction, lecturers scheduled a weekly classroom review session to augment the online tutorials, but they also continued to include the online tutorials in their classes. Korkmaz & Harwood (2004) implemented online tutorials for chemistry classes at Indiana University. They assumed that all students would take advantage of the online tutorials, but instead found that students often only focused on required assignments and did not take advantage of the available optional tutorials.

Online video-based tutorials can offer advantages to online students to meet parity with traditional classroom-based students. However, there are issues lecturers should consider when creating videos. Minkel (2004) quotes lecturers who find that creating online tutorials is a time-consuming job. Even with years of experience, creating a one-hour tutorial can take eight hour of preparation time. Mark (2004) states that some students could have issues accessing large video files if they are still on dial-up internet access or have older operating systems on their computer.

3. TUTORIAL NEEDS ASSESSMENT

Starting in 2002, CTM lecturers started to develop new modules with basic assignments, quizzes and PowerPoint slide materials which were uploaded into its online learning management system – Blackboard. During these first two years, there was little thought into the issue that online students may not be receiving the same amount of instructor's personal interaction as students taking a blended section. Students in blended section were expected to attend a traditional classroom setting at least one evening a week for 2.5 hours. Thus, they were able to have individual attention from the professor, who was able to go over concepts in a lecture and seminar format. In addition, students in a classroom had access to computers, and were able to receive hands-on experience on the system. This was especially helpful with information systems classes, such as systems analysis and computer security essentials, where students were required to install and use computer software packages. In a classroom setting, the instructor was able to walk through the installation and use of software or other concepts, and students could receive individualized attention when they had questions on a procedure.

However, students in online classes did not have the same level of learning transmission as the students attending the in the traditional classroom setting. Some instructors did provide a written document of instructions for some lessons, but students especially encountered difficulty for concepts that required a more visual approach to the instructions. For example, an instructor in a finance class may have created a document of instructions for a lesson on how to create a balance sheet using an Excel spreadsheet. If a student in an online class was not familiar with Excel icons, they may find that written directions were insufficient to understand the assignment requirements.

Lecturers in online sections found that for some specific lessons and assignments, online students were asking similar questions each semester. Lecturers would spend extra time emailing the same response to a variety of students, or walk several different students through the directions in separate telephone conversations. Some students were sometimes confused with written directions and had trouble visualizing some concepts, especially if the student had little prior knowledge or experience with the topic. This situation

did not occur with all modules, but lecturers felt a more effective way could be found to mitigate this issue for some specific modules and content.

4. DEVELOPMENT NEEDS ASSESSMENT

In the spring of 2006, the lecturers met to determine how these issues could be mitigated and decided to test the implementation of online Flash-based tutorials to be incorporated into specific classes. They prioritized tutorial categories to develop and created a development time-line. Table 1 shows that four main categories of tutorials were to be developed, along with the modules they would be incorporated into. Most of the tutorial categories were reusable across several classes, for example, business plan tutorials could be used for three separate modules: a) Electronic commerce, b) Business plan strategies and c) Capstone. The last column of Table 1 shows the separate tutorials to be created for each category. For example, nine separate tutorials were to be developed for the business plan category: a) table of contents, b) executive summary, c) general business description, d) products and services, e) management, f) operations, g) technology, h) marketing, i) risk analysis and j) financials. Also, the learning outcomes for students were listed in the fourth column; the overall outcome for each was to develop a proper plan.

Category	Semester	Module Inclusion	Learning Outcome	Tutorial Content
Business plan	Summer 2006	Electronic commerce, Business plan, Capstone	Understand and create adequate information in each section	Table of contents, executive summary, general business description, products and services, management, operations, technology, marketing, risk analysis, financials
Systems requirements plan	Fall 2006	Software essentials, Capstone	Understand and create adequate information in each section	Table of contents, executive summary, project scope, current system, new system requirements, process specifications, data conversion, alternative solution, risk analysis
International business plan	Spring 2007	International business, Capstone	Understand and create adequate information in each section	Table of contents, executive summary, elements of system, technology capability, bureaucracy, ethics, monetary policy, market entry, business culture, myths and stereotypes, American company operations
Citation and reference	Fall 2006	All	Properly cite and reference all materials	Quiz and URL sites

Table 1: Tutorial Development Plan

Each separate tutorial was created using Camtasia Studio (from TechSmith), which is a software that allows users to capture and edit computer screen presentations. The reason why Camtasia was chosen by the CTM project team was that a school-wide site license was purchased for this software in 2005. The school's instructional technology staff had analysed several software products and considered several factors in their decision including: 1) cost, 2) functionality and features, 3) ability to use the product in most departments and 4) vendor support. SPC decided to purchase Camtasia for use throughout all departments at SPC. Therefore, because of the site license and the functionality of the software, this product was used for tutorial development.

A lecturer can use any number of computer software products, such as PowerPoint, Excel, or Word, to create a series of text-based instructions for students. They may also use a webcam to record video-based presentations from their desk using Camtasia. Camtasia allows the developer to perform three main functions (TechSmith, 2010):

- Recording. Using a webcam and/or microphone, one can record either screen shots on a computer, or record from a presentation from the camera. The software also allows recording podcasts;
- Editing and enhancing. Developers can edit and cut sections of video and audio recordings, zoom the presentation and add other editing features for a more professional look and feel; and
- Sharing. The presentations can be recorded in a variety of formats including Flash, iPod, QuickTime (MOV) and Audio (MP3).

Figure 1 shows a screen shot of Camtasia Studio screen recorder. The left side of the screen shows that the instructor had options to record from the computer screen or record from a PowerPoint presentation. They also can choose options to add, edit or produce their videos. The bottom of the screen print shows the time line of the presentation, which allows the developer to edit specific screen shots (similar to editing a movie). The right side of the screen shot illustrates a simulated view of the computer screen that would be edited. To use the project, lecturers first attended a one-hour training classes of this product which was given by the SPC instructional technologies. After this training, most lecturers found they were able to quickly understand and use the basic functionality of screen and video recording. Some members of the project team did eventually did implement some of the more advanced functions, such as video editing, when they developed the online tutorials.

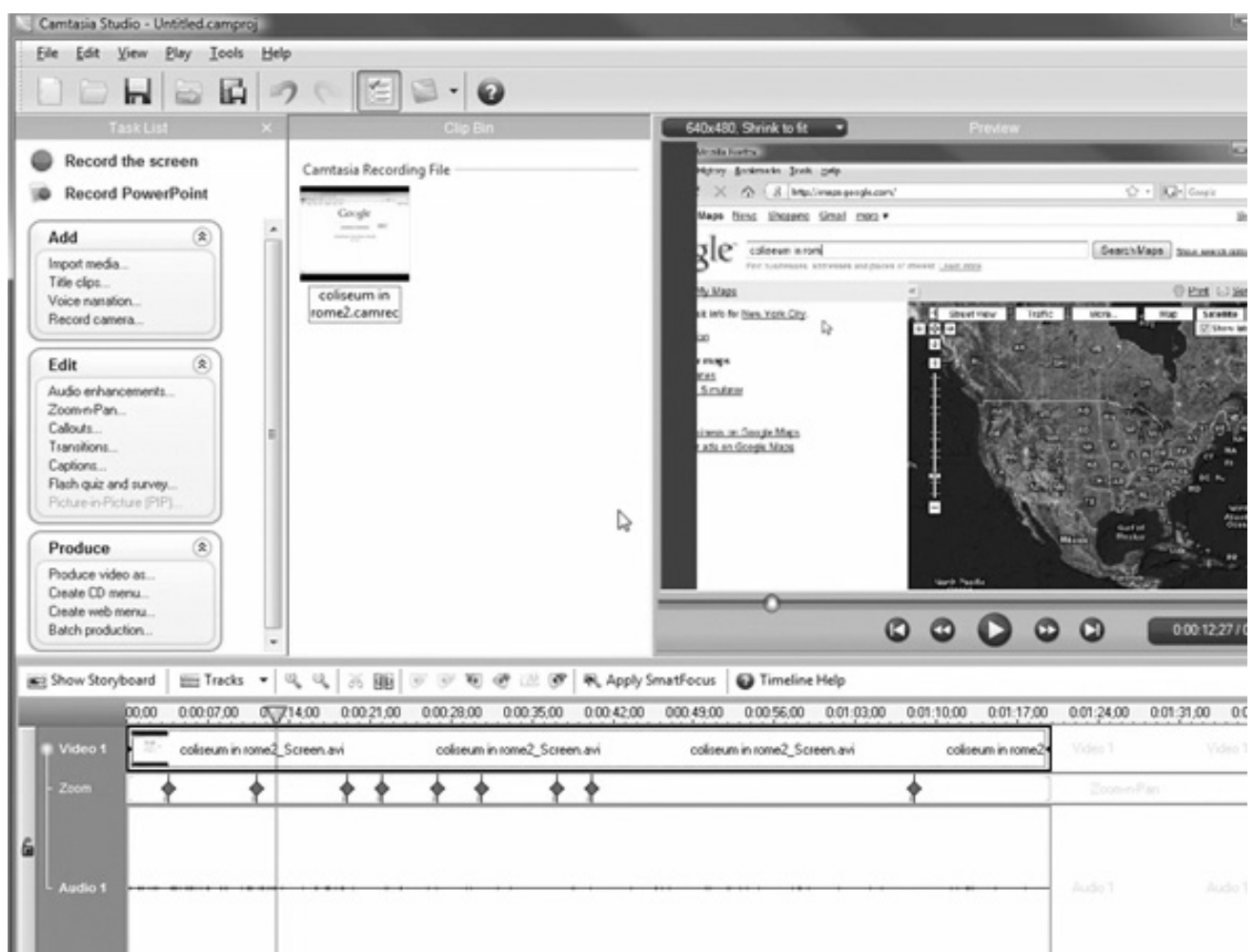


Figure 1: Camtasia Screen Shot (TechSmith, 2010)

For CTM lecturers, a webcam and microphone were purchased for each team member to have the ability to develop tutorials in their offices instead of having to travel to the college studio facilities. Lecturers recorded both voice narration as well as capturing screen presentations on their computers. For example, an instructor could walk through the process of how to create a financial plan using Excel. The software captures the voice narration as well and the mouse pointer moving over Excel. At this end of this process, the developer would save the video presentation as a Flash-based tutorial. The tutorial would then be uploaded into the Angel

class template where students would access the tutorial for the appropriate class. When students opened the tutorial, they would hear the instructor's voice as well as visually observe the recorded video screen presentation. Besides recording tutorials using screen shot generation, several lecturers also used the webcams to record themselves giving directions about a topic.

In order to keep to an appropriate attention span for the students, each tutorial was kept to a length between 10 to 15 minutes. Although these were considered "short" tutorials, the lecturers felt that the entire process to create a tutorial was time consuming. First, the instructor had to ensure that they had the proper software and hardware installed on their computers. The CTM department purchased webcams for each instructor, and most already had the basic Microsoft Office Suite installed on their computers. However, if lecturers were creating a tutorial using other software, such as systems design project software for the systems requirements plan tutorials, they had to install and test this software. Next, the lecturers had to create a short script of what they were going to include in the tutorial and what was going to be said. This could involve considerable research for some topics. The next step was recording the actual presentation. As long as the instructor had practiced the presentation at least once before the "live" recording, the presentation was usually successful. However, occasionally a lecturer made a mistake and found they had to re-record an entire presentation. Although Camtasia allows re-recording from a specific spot, some lecturers found it was usually easier and faster to just re-record a 10 to 15 minute presentation rather than attempting to edit a recording that had errors. After the recording was completed, lecturers then uploaded the Flash-formatted files into the Angel learning management system and tested it to ensure students could view the tutorial properly. The project team found that creating a single tutorial usually took between five to eight hours of dedicated time. In addition, lecturers were encouraged to create other shorter tutorials that would be used in a single class. For example, one lecturer created a 5-minute tutorial on avoiding phishing attacks for the security essentials module.

5. TUTORIAL ANALYSIS

5.1 Subsections

In 2006, CTM lecturers created over 35 individual tutorials within the four categories shown in Table 1, as well as several other miscellaneous tutorials. By the spring of 2008, the project team wanted to analyse the effectiveness of tutorials and whether students and lecturers felt they were beneficial. Rather than analysing all tutorials, the team decided to perform a review of just the business plan tutorials used within the capstone, electronic commerce and business plan strategies modules.

In the spring of 2008, lecturers compiled a usage chart of how often the business plan tutorials were used in each of the three modules. Table 2 shows how many students choose the business plan assignment for fall 2007 and spring 2008, and the number of students that accessed the business plan tutorials for each semester. It should be noted that the total number of students enrolled in both the electronic commerce and capstone classes was larger. However, students were given a choice of several assignments. For example, in the technology management capstone module, students could choose among three projects: a) business plan, b) systems requirements analysis and c) process improvement plan. This case study only analysed the business plan tutorials because this was the most popular assignment students chose among the three, and lecturers felt it would be an appropriate one to analyse for all of the tutorials.

The statistics in Table 2 illustrate that for the electronic commerce and capstone modules, an average of between 18 percent and 26 percent of students accessed the business plan tutorials in 2007 and 2008. The business plan strategies class was a new class first offered in spring of 2008. Because there were no optional assignments, all students were required to complete a business plan assignments. In this class, all students did access the business plan tutorials.

Module	Fall 2007 total students	Fall 2007 students using tutorials	Spring 2008 total Students	Spring 2008 student using tutorials
Electronic Commerce	28	5	31	8
Capstone	44	10	59	12
Business Plan Strategies	0	0	17	17

Table 2: Student Tutorial Usage

When creating the tutorials, the project team assumed that most (if not all students) would take advantage of reviewing the tutorials in order to improve the quality of their assignments. However, after reviewing the statistics, the team was surprised and concerned that less than one fourth of students took advantage of using tutorials. At this point, they met to analyse student instructional surveys that the students complete at the end of each class to determine if students had specific issues with tutorials. They also reviewed future directions of the business plan tutorials as well as efforts to analyse participation of other tutorials during future semesters.

5.2 Project Team Review

When the project team reviewed the results at the end of spring 2008, they realized there were issues with effective use of the tutorials. They also were split on using tutorials for classes, half of the 8-person team felt that tutorials were advantageous and made their jobs easier, while four did not feel that tutorials were worth the time to develop.

The lecturers who liked the tutorials felt that the tutorials saved them time in answering the same student questions over and over again. Although creating tutorials took a great deal of time in the short term, in the longer term, they would save additional time by having tutorials that all students could view and thus the tutorials would provide answers to student questions. These lecturers also felt that the quality of work was better and that students had a narrow template for the assignment requirements, and would have a better understanding of the requirement boundaries.

The other half of the project team felt the tutorials had more disadvantages than advantages. The time difference in answering a few more student questions was less than spending up to one full day in creating a short 15 to 20 minute tutorial. Several lecturers also mentioned that tutorials resulted in too much “spoon-feeding” the students. These instructors maintained that student business plans often turned out in a boiler plate format, and there was little room for creativity.

5.3 Project Student Review

At the end of each semester, students completed a student survey of instruction for each module. This survey had a section where students could comment on various aspects of the completed module, including level of instruction, exams, tutorials, instructors and texts. The project team compiled a review of all survey comments and reviewed specific feedback related to the tutorials. Table 3 shows the most common positive and negative comments from the student survey, along with the number of responses for each.

Some students felt that the tutorials were helpful in explaining concepts, especially those that the students had no experience with. Students were also pleased that they could review tutorials at their convenience and many of the questions were answered within the tutorials, and students did not have to wait for email responses from instructors. It was encouraging that some students definitely found the tutorials helpful and did use them, but these were in the minority of those enrolled in each class.

Along with positive feedback, some students had issues with tutorials. Several mentioned that they felt that there were too many tutorials to view and they spent too much time reviewing tutorials to get the information they needed. Following the specific directions on the tutorials did not leave much room for creativity in their projects and it left them unable to “think outside the box.” They felt the tutorials were too rigid in expecting a very specific approach to the project, and felt their projects could have been more creative if they were allowed to go outside the bounds of the tutorial directions.

Although some students who used the tutorials did complete the surveys, there was no specific feedback from students who did not bother to use the tutorials. Instead, lecturers held some informal meetings with students and asked them specific questions at the end of the capstone module presentation. Several students mentioned that since they already had completed portions of the business plan project in the electronic commerce module in a prior semester, they did not need to review tutorials again. They had a good grasp of parts of the business plan already and reviewing the same tutorials again would merely “waste their time.” Five students mentioned that they simply did not have the time to review tutorials with their limited budgeted time. Because of time constraints with busy working schedules and family life, they were content to get by with average grades and putting in minimal extra time into their assignments.

Issues	# responses	Positives	# responses
Too many	9	Help explain concepts	6
Waste of time	5	Convenient	4
Do not have time to review	5		
Too rigid	5		
Too long	2		

Table 3: Student Survey Results

5.4 Procedural Changes

Because of the lack of students using the tutorials, and the concerns with the limitations the tutorials put on the creativity of the business plan projects, the project team felt they should implement some changes for the fall 2008 semester. Since the business plan tutorials were two years old, they were due for an upgrade with new academic materials. Lecturers were going to spend a long time with updating several of the tutorials, with the result that only a small minority of students using the tutorials in the electronic commerce and capstone classes.

In light of these issues, and the issue of tutorials contributing to a lack of creativity in the projects, it was decided to delete the tutorials from the capstone and electronic commerce modules for fall 2008. The tutorials would temporarily be kept in the business plan strategies class because this was a new module and only had been offered one time so far (in the Spring of 2008). Then, at the end of 2008, the team would analyse student survey of instruction results and meet with a select number of students to analyse if the tutorial deletion helped improve the creative aspect of the projects, and to determine if students would miss having these tutorials.

At this time, an analysis would also be completed on several other main tutorials categories: the systems requirements analysis and international operations plans tutorials. Both of the tutorials within these categories were also two years old and would need updates. Once the review of student progress was made on the business plan deletions, it would be determined if the business plan tutorials should be updated and inserted back into the two modules, or if they should be permanently deleted. Lecturers may also pick another option to put the tutorials back in, but instead of updating all tutorials, to only update some of the critical ones where academic changes have been faster. For example, the marketing tutorial would be a prime example of a critical update, while an executive summary could be left alone. This project analysis would also help determine the fate of the other two main tutorial categories as well.

6. IMPLICATIONS

There were issues raised with the limitations of the case study as well as considerations for lecturers from other institutions when considering their own online tutorial implementation. First, the scope of this case study was limited to reviewing the results from three modules. Both electronic commerce and capstone showed low numbers of students using tutorials. The business plan strategies had all students using it, but this was because review was made mandatory and the assignments were specific to reviewing the tutorials. It would be beneficial to expand the survey results to other classes to see if there are any major differences in results.

The second limitation with this case study was that the current student survey format does not differentiate between classroom-based students versus online-only students. Thus, it is difficult to ascertain whether there is a difference in usage between the two groups. With students in the traditional classroom setting, instructors are able to ask for informal feedback during seminar sessions, but this is difficult to do with online students.

The CTM staff plans to work with the survey administrators to determine if it is possible to add another question to the survey.

A large consideration that should be established before other institutions implement their own tutorials is to first determine student needs and desires for tutorial topics. At the end of this process, the CTM team realized they were making assumptions about what sort of tutorials the students desired, without bothering to ask the students for their opinions. Thus, it is important to analyse the needs of both student groups to determine if online students have different learning needs versus students in a more traditional environment. Because of the amount of time and effort it takes to develop these tutorials, the team members concluded that it is better to concentrate on developing specific modules that the students would find most useful as opposed to developing tutorials for all subject topics. A survey of student needs would be helpful in determining which specific tutorials to develop. It may also solve one issue on the student feedback survey indicating that there were too many tutorials and students only wanted to concentrate on what they determine were the most appropriate for understanding the topic. It may also be beneficial for the lecturers to develop tutorials that could be effectively used across a variety of classes, such as a module on how create a Microsoft table of contents for their research papers. Also, attempts should be made to find online tutorials that would be available for free on the web, or in sites such as YouTube, and link directly to these tutorials.

CTM lecturers developed a variety of tutorials for various modules, and this process could be used by lecturers from other institutions. There are a wide range of tutorials that could be created for each module, but some guidance should be applied before starting implementation. First, lecturers should meet as team to decide which modules and subjects would be suitable for development. Subjects that are more appropriate would be those that use specific software for the modules. For example, classes that use software such as Word, Excel, Photoshop or Dreamweaver would be prime candidates to develop Flash-based tutorials where the student can actually 'see' visual instructions of how to properly use the software. Also, it would be valuable to develop tutorials for programming language modules, such as Java or Visual Basic, However, although these are better candidates for development, it does not preclude any type of instructional tutorial being developed for any topic. The second point of guidance for other project teams would be to work together to develop a plan where certain tutorials could be re-used for several modules, and only would be created once. For example, a tutorial on how to properly cite and reference project papers could be used in almost all modules, and thus should only have one version that could be used in all appropriate modules.

It should also be noted that although online video tutorials are one method of assisting students with improving their learning skills, this is only one method for lecturers to consider. The CTM lecturers also employed other methods in the online learning system, Angel, on an individual basis. For example, some used frequently asked questions (FAQ) forums and others used instant messaging capabilities. Although this paper was aimed at assessing the capability of online video tutorials, further research within the CTM could determine which methods may be more appropriate in certain modules, topics and situations. Further analysis could also be used to determine the reasons why some students are not using these tutorials and if they could be modified or changed to increase student participation.

7. CONCLUSION

This paper presented a case study which analysed the effects of using Flash-based video tutorials for online classes. Instructors spent a great deal of time creating many 15 to 20 minute tutorials for students in several classes in order to provide more in-depth assistance to students and to create instructional parity between online and in-class modules. Initially, the project team assumed that the vast majority of online students would take full advantage of watching the videos in order to improve the quality of their assignments. However, statistics showed that less than 26% of students were using the tutorials. This was an extremely disappointing result, as lecturers had hoped students would have gained more benefit from these tutorials to improve their knowledge and grades. This review has shown that lecturers cannot assume that students will necessarily take advantage of technology and module enhancements, and a return on investment needs to be considered before spending a great deal of time and money on tutorials that may not serve a vast majority of the students.

After the project team analysed module surveys and met with students, they found a variety of reasons why students were not watching the videos, including time constraints and contributions to lack of creativity into project creation. Faced with the prospect of having to spend too much time updating the tutorials to keep up with academic and module topic changes, the project team decided to delete the tutorials from the capstone and electronic commerce classes for the fall of 2008. In the summer of 2009, the team will reassess the

student results to see if there is a quality improvement, and then decide what further action to take and compile these results in further research publications.

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