E-Learning Design for Microsoft Access & ASP.NET

A Senior Project submitted

In Partial Fulfillment

of the Requirements for the Degree of

Bachelor of Science in Industrial Engineering

The Faculty of California Polytechnic State University,

San Luis Obispo

by

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June 2016

Graded by:_____ Date of Submission_____

Checked by:_____ Approved by:_____

ABSTRACT

The problem definition is that the current video tutorial series is outdated and lacks interactive features that aid with E-Learning. The goal of the project is to create a platform that incorporates features such as structure, interaction, assessments, and competency tests. The project revolved around integrating four softwares together in order to create an effective E-Learning platform. The four softwares were Adobe Captivate, Camtasia, Microsoft Access and Microsoft Visual Studios. Adobe Captive is used to store the tutorial video and assign quizzes. Camtasia is used to record the tutorial videos. Microsoft Access is used to store all the questions given at each tutorial video as well as store the results the student attains. Microsoft Visual Studio is used to create a webform that integrates everything together. There were some key features that were wanted in the prototype. The first feature is an assessment test at the end of each tutorial. The second feature is that the student must pass the assessment test before moving to the next video. The third feature is that if the student did not pass assessment quiz, the student must rewatch the same tutorial before re attempting assessment quiz. The fourth feature is that the questions at the end of the tutorial video will be randomize and drawn from the Microsoft Access database. The fifth feature is that the results of the quiz for each student are recorded in the database. The objective of the project is to find a way to incorporate all these features. The end product of the project is a prototype for E-Learning with the features.

Future students will benefit from this prototype. Incorporating these features has been proven to aid student learning. The project is not intended to create an aesthetically pleasing E-Learning platform but a effective one. The overall project is successful in that discoveries in integrating softwares and implementing features to advance E-Learning were made.

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I. Introduction

The idea for this project originated when Jonathan Choi and Christopher Hom realized that the current videos series on database fundamentals were both dull and ineffective. The authors wanted to incorporate core features that have been proven to be beneficial to E-Learning. Finding a way to have these features in the E- learning tutorials is what the creators did the project on. The current video series lacks structure, interaction, assessments, and competency tests. The new tutorials that they have created the framework for will have these features. In order to accomplish solving these problems, they designed, developed and tested the framework for creating tutorials. In addition, they used ASP.NET to build a standard website with user and administrative features that has the capabilities to play the video tutorials and have quiz/assessment functionality. The main goal of the project is not to create all the tutorials for the course but to create the framework for future students to produce and upload videos on to the website. The creators recorded the tutorial videos on Camtasia. They then took that file and put it into Adobe Captivate, a program to create E-Learning material. With Adobe Captivate, they were able to incorporate quizzes. They linked Adobe Captivate to Microsoft Access, a database software, so that they could randomize the questions given at the end of each tutorial. They also linked Adobe Captivate ASP.NET so that users have a easy to use interface when using the video.

The objectives of this project are as follows:

- Develop overall structure for interactive E-Learning tutorials for Microsoft Access and ASP.NET

- Produce videos using Camtasia Studio

- Merge Camtasia Studio video files into Adobe Captivate project

- Incorporate quizzes/assessments using Adobe Captivate 9

- Web Server to play tutorials and utilize quizzes

- Web application code that links Access database to videos

- Users may not move on to the next tutorial unless the they pass assessment quiz

- If the user does not pass assessment test, the interface will send the user back to rewatch tutorial and re-take the assessment test

- Calculate total number of quiz attempts

- *Complete script and learning contents for MS Access and ASP.NET*

The completion of the project will allow future students to produce interactive video tutorials themselves using the framework. The creators conducted a multitude of tests on the tutorials to be certain that the tutorials are interactive and functional. The website, built using ASP.NET, consists of features that support the E-Learning structure. The goal of the project is to not develop a sophisticated E-Learning platform but to discover ways to incorporate core features into an E-Learning platform.

II. Background (includes Literature Review)

There has been a lot of research in regards to the different aspects of E-Learning. In this project, they combined the different subjects around E-Learning to create engaging and effective tutorials for Microsoft Access and ASP.NET. The subjects they researched are educational technology, E-Learning, development, science of learning and learner satisfaction. The current tutorials were not engaging and did not test if the students were E-Learning the material effectively. They want to create the framework to make tutorials that includes the insight of new knowledge that was discovered over the years.

The overall project falls under the category of E-Learning. However, the research for the project that they conducted revolves around database and problem solving. The idea is to research effect E-learning tools so that the authors know what is needed in an effective tutorial series. After conducting research on E-Learning, they analyzed the information and decided what they needed. The features, mention earlier in the introduction, is proven to help student learning. The feature where students must watch a tutorial and then pass an assessment test tested for competency. If the student does not pass the assessment test, it means that the student did not fully learn the material. The feature implemented will send the student back to rewatch the video. This allows the student another opportunity to re learn and understand the material. After she or he has done that, they would be able to retake the quiz. The question will be different. They will have random questions be generated. This feature makes it difficult for the student to cheat. If the feature is the same, the student may ask a friend in the course for the answer. The student can also just search the answer online. By giving the student a different

question, the program eliminates that problem. This feature makes for an effective E-Learning platform because it can access if the student understands the material or not. The last research part that Jonathan Choi and Christopher Hom have discovered is to integrate all the software together to create a smooth and intuitive platform. With an easy to use software package, students are more inclined to use the resource. If students are frustrated by the E-Learning material and how it is set up, they would avoid using it. The topics that the creators researched and are related to the project are as follows:

1. Educational Technology
2. E-Learning
3. Development
4. Science of Learning
5. Learner Satisfaction

Educational Technology

Technology is constantly advancing. With this advance in technology, learning technology such as E-Learning, defined as learning through electronics media over the Internet, grows along with it. E-learning became popular when computer became easily accessible to the general public. Many companies and industries are now taking advantage of this teaching medium. The development of interactive videos progress E-Learning and it's effectiveness in aiding student learning. Educational videos that have interactive features are more effective in helping students learn than educational videos that do not contain interactive features. Interactive videos features include start/pause, replay and video speed (Schwan, Stephan, Roland Riempp, 2004). This theory can be applied to the project, which is to develop the foundation for making E-Learning video

tutorials for Microsoft Access and ASP.NET. Making the tutorials with interactive

feature will increase the effectiveness the tutorial program will have on student learning.

Educational videos with interactive features are highly more effective and

efficient in comparison to educational videos without interactive feature. People who

watched interactive videos to learn how to tie nautical knots were able to learn faster and

more efficiently. The individuals who watched the interactive videos were able to adjust

the videos with interactive features. "Stopping, replaying, reversing or changing the

speed of the video to their own personal liking" helped participants learn quicker

(Schwan, Stephan, Roland Riempp, 2004). A big benefit of interactive videos and media

is that interactive media allows for the user to adapt the presented information to his or

her own needs. Non-interactive videos are inefficient because the users have to organize

the given information at a rate the user cannot change. Each individual is unique and

learn at different paces. Some parts of the videos will be more challenging and harder to

understand yet users would not be able to slow down the pace of the videos so that they

can better process the difficult part of the video. Interactive videos make changing the

pace of the videos possible. Interactive videos also make it easier for users to pause the

video so that he or she can process the given information. The user can take notes while

the video is paused. The authors can apply this idea to my project by making sure my

video tutorials have interactive features such as the start/pause, replay, and speed change.

Jonathan Choi's and Christopher Hom's tutorials will be more effective and efficient if

they use the interactive model. This experiment is proof of the benefits of interactive E-

Learning, which can be applied to my tutorials.

E-Learning and the technology around it continue to advance. More features such as assessment test and online peer-to-peer interaction forums can also make E-Learning more efficient. This new technological feature is an incentive for doing the project because it describes the usefulness of the new tools to make E-Learning easier and more effective.

E-Learning

E-learning is defined as learning through an electronic media such as an computer. E-Learning is a powerful tool to educate future students. Many institutions and organizations such as schools and businesses are using this new tool to educate their students or employees. The creators are using this E-Learning tool to teach future Cal Poly students about Microsoft Access and ASP.NET. E-Learning is a resource that students can use outside the classroom to better their understanding of a certain subject. There are many advantages of using and incorporating E-Learning.

The use of modern technology to educate and train future generations is becoming increasingly popular. Education institutions and companies have been using this new technology as a way to educate their students and their employees. Some of these benefits are that it provides "consistency, reduce delivery time, increase user-learning convenience, reduce information overload, and improve tracking and lowered expenses" (Welsh, Elizabeth T. et.al., 2003). Some of the cons are that the initial investment needed to develop an effective E-Learning program is that it can cost a lot of money and that interaction with other students and instructors are fairly limited. The journal also mentions that a well-designed E-Learning system can be costly to develop but can be a very useful for organizations. Another key topic is the company or educational institution

wanting to implement E-Learning effectively and efficiently should take special consideration in designing the training and IT infrastructure. This is the foundation of the training program. This is the main focus of the project.

The main objective is to create the IT infrastructure for the professor's database video tutorials. Jonathan Choi and Christopher Hom want to link a database to the interactive tutorials. They will have a quiz at the end of the tutorials that students need to pass in order to move on to the next quiz. They want the question given at the end of the tutorials to be linked to a database so that it would make it easier for the instructor to change the questions. They can apply this knowledge to my senior project by keeping in mind the design of the tutorials must be thought out and well designed. They learned that E-Learning can be very effective if implemented properly. This article tells me there are a lot of benefits of E-Learning such as the ones Jonathan Choi and Christopher Hom listed earlier. This article explains to me the importance of the IT infrastructure and how it needs to be well thought-out. The project has the potential to be a very useful tool for the future of Cal Poly's database students and the instructor if the authors create the right foundation for it.

The introduction of the World Wide Web project gained a public face in the 1990s so the concept of E-Learning is still fairly new. As the world is advancing, people are more dependent on technology than ever before. At the University Selangor (Unisel), the faculty of Science and Biotechnology conducted a research to determine the readiness of Unisel's students in E-Learning environment. The experiment consisted of a sample of 110 students from various educational backgrounds. They were given a questionnaire and "assessed on their basic Internet skills and attitude towards characteristics of successful

E-Learning student based on study habits, abilities, motivation and time management behavior. " The study showed that the students were ready to participate in E-Learning.

This document is relevant to the project because it gives a different perspective on E-Learning. Incorporating interactive E-Learning could possibly confuse some students who have difficulty using technology and prefer the traditional method of learning. The studies done from this research raises a question concerning the project: Are future Cal Poly IME & IT students ready and willing to learn by means of E-Learning?

Development

Camtasia is a video production software that specializes in screen capture. This software enables users to capture everything that is shown on a computer screen. The screen capture program along with added narration and caption will provide a great platform to produce tutorials on computer software. Camtasia also has the ability to include assessment quizzes so that the people watching the videos can test their knowledge. Jonathan Choi and Christopher Hom intended to use this software to produce the tutorials because it is user friendly and highly versatile.

Camtasia is a powerful screen recording software that has an option to render the project file in HTML5 format. "Camtasia is also perfect for creating tutorials for software packages and learning management systems" (Smith, 2007). Integrating finished project files into an LMS allows for SCORM features such as instant quiz results and feedback. The project will focus on the framework or structure of future Camtasia video tutorials.

Camtasia Studio is a screen video capture program created by TechSmith. This software program enables educators to create videos and tutorials. Educators can then upload these videos for students so that they can have access to these tutorials at their

leisure. Camtasia is an easy to use software. They have a user-friendly interface. Camtasia is also compatible with many programs, which makes Camtasia an ideal program to use. Camtasia can be viewed with "Adobe Flash, Windows Media, QuickTime, DVD-ready AVI, iPod, iPhone, Real Media MP3, WEB, CD Blog and GIF format"(Carlson, 2013). This makes Camtasia very versatile software. This software is also enables professor to teach their material even outside the classroom. Presentation and tutorials can be recorded with this program, which allows for easy access to students. After doing some research, they have decided to use this software to create the database tutorials.

This software has a straightforward user interface with many capabilities. This software gives flexibility because of its versatile compatibility. Jonathan Choi and Christopher Hom plan to incorporate interactive E-Learning such as answering questions throughout the tutorial as well. This software enables the creators to do that. An aspect that the advisor requested is that they link the assignment questions to a database. They are not sure if Camtasia has that feature. The authors didn't know their advisor wanted this feature. Jonathan Choi and Christopher Hom are going to test out if they can incorporate this feature of linking Camtasia to a database so that the instructor does not need to enter the video to change the assessment questions but enter his database to change the questions. This is something the authors need to explore. They want to use Camtasia but needed to do more research in the possibilities of linking a database like Microsoft Access to Camtasia.

The way a video is produced can greatly affect the interest of the viewers. Viewers want engaging tutorials and educational videos. Producing a video effectively

increases the interest of students watching the educational video. This leads to more engaged students. Students who are more engage will effective learn the material quicker and more effectively.

The way online education videos are designed affects how engaged the students. This means that the ways creators produce the video can affect whether or not the student is engaged or not. The articles mention that shorter videos lead to more engaged students (Peng, Chaoyun, Jie Ren, and Jianping Zhang, 2010). A recording of a classroom lecture is not effective. The two methods students seem to like is an informal talking head video or tablet drawing video (Peng, Chaoyun, Jie Ren, and Jianping Zhang, 2010). The directors writing the script for these tutorial videos should consider some of the finding from this article. Tutorials where the instructors speak quickly and with enthusiasm are considered more engaging (Peng, Chaoyun, Jie Ren, and Jianping Zhang, 2010). Tutorials that give a more personal feel are more engaging. Tutorials with slides alone are not very engaging but with the addition of a instructor head talking can make the tutorial a lot more engaging. Jonathan Choi and Christopher Hom can apply some of the recommendations that this articles gives when designing the videos and creating the script. The authors need to make sure they create the tutorials to be less than 6 minutes long. They need to spend the time with video editing and add in the instructor's head through out the video so that students do not lose focus. The location they pick should be in an informal setting. They need to include many visuals that will help the student maintain focus. They should encourage the instructor to speak quickly and with enthusiasm. Some characteristic of video is the length, speaking rate, video type, production style (slides, code, free drawing, classroom, studio, office desk).

This information is very helpful because it talked about the art of making these tutorial videos. Jonathan Choi and Christopher Hom can apply the recommendations of this article to the project. This would greater increase the interest the students will be in learning database. Having engaging videos would make the tutorials more effective. Students would then have a better understanding of database just because the productions of the E-Learning videos are made to be engaging.

ASP.NET, a framework for web design, can be functionally used for online course platforms. There are many benefits of using an open-source web application that allows HTML5/flash. First being the fact that ASP.NET is designed for dynamic and interactive services. ASP.NET has a wide range of adaptability and can be controlled by the user (Peng, Ren, Zhang, 2010).

For the project, Jonathan Choi and Christopher Hom are considering on constructing a web page using ASP.NET. This will allow storing the HTML5 interactive videos, design the unique web design and layout, and keep all the files organized.

The increase use of E-Learning in business enterprises is apparent. For this reason, the Faculty of Computing and Information Technology researched and studied how to employ Cloud Computing in E-Learning business. Currently, many organizations heavily rely on limited IT infrastructures and resources that are internally managed. With Cloud Computing, organizations can buy or rent resources depending on there needs and pay per use. A cloud provider manages these resources. Some benefits of using the Cloud Computing model are: "investment reduction for the initial setup of IT infrastructure, fast time-to-market, and adaptable and balanced performance among many others" (Gamalel-Din, Salama, Al-Sowaiel, 2014). This article brings about an interesting approach to the

project. Cloud Computing can be utilized in a way to show the completed E-Learning

tutorial videos. Rather than storing the entire collection of tutorials on to a website with

flash capabilities, the authors might be able to incorporate Cloud Computing to store the

videos making them shareable and on-demand.

Science of Learning

Blended learning is an idea of learning through multiple platforms such as the use

of electronic media alongside face-to-face E-Learning. This creates for a more rounded

learning experience. Every student has a different learning style. By applying blended

learning in designing the tutorials, they allow the opportunity for students to learn

through different learning styles. Also, blended learning not only saves cost and resources

but also allows professors to "supplement or compliment existing courseware rather than

replace it" (Driscoli, 2002).

"Building effective blended learning programs" by Harvey Singh article talks

about the idea of blended learning in the realm of E-Learning. E-Learning started out

being very limited. The courses were very classroom based. People started realizing, that

as technology process, that they could incorporate more into this new style of learning.

The new style of E-Learning is introducing multiple channels for students to learn the

information. From this article, a researcher named Badrul Khan said that " Pedagogical,

technological, interface design, evaluation, management, resource support, ethical and

institutional" are concepts incorporated in this more progressive E-Learning style. This

article mentions that everyone learns differently. Creating this blended style of learning

makes sure that no one is left out of the education. Blended learning creates multiple

delivery methods to the students. The idea of this blended learning isn't something

revolutionary. It has always been in traditional classrooms. The idea of putting

introducing it to a different platform like E-Learning is new. Blending works because it

integrates offline E-Learning, online E-Learning, individual learning, peer learning,

instructor learning, structure E-Learning, unstructured learning and real life practice.

Khan's method works because it helps the students organize his or her thoughts, which

leads to effective E-Learning.

 The overall object of "Building effective blended learning programs" is to

convince readers that a blended learning style is way more effective in comparison to a

single channel learning style. This is all possible because of the new technology Jonathan

Choi and Christopher Hom have in this modern age. They can apply this knowledge to

the project by showing their advisor that even though the authors are creating this

interactive tutorials, he still needs to include other ways of learning for his students.

Instructors still needs allow their students to have the opportunity to go class to either

work with the instructor or their peers. Coursework will need to be assigned so that

students can apply the knowledge they have learned through the tutorials. The E-

Learning platform is not a substitute for traditional education but a tool that aids

traditional education.

 Pedagogy is defined as the study of teaching. Jonathan Choi and Christopher Hom

can apply theories of pedagogy to the project so that students will better learn the

material. Having a background of pedagogy will give a better insight on how to design

the video tutorials. "E-learning at work: theoretical underpinnings and pedagogical

challenges" mentions that in order to successfully apply E-Learning, the authors need to

learn about the psychology of learning organization, sociocultural theories of learning

and cognitive theories of learning. People creating these E-Learning platforms and course cannot only be good coders and producers but needs to have an understanding of pedagogy. Pedagogy is the disciple of the theory and practice of education. Having a background in the theory of education helps one construct an effective E-Learning tool for their students. Jonathan Choi and Christopher Hom live in an era where information is highly accessible. A flaw to this gift is that it is accessible but it is not organized (Päivi Tynjälä Päivi Häkkinen, 2005). All the information is out there but it is hard to get more than a general knowledge of it. The progression of E-Learning is only one sided. E-Learning is an advancing technologically. However, E-Learning needs to be studied hand in hand with pedagogy. People need to do research on both pedagogy and the E-Learning and how Jonathan Choi and Christopher Hom can use pedagogy to better improve E-Learning. In order for E-Learning to advance further, people need to look sociocultural theories as well. This is especially important if the E-Learning is use to teach a large group of people. Knowing about social cultural theories will give the developer better insight to how to help as many people learn the subject as possible. Everyone grew up in a different environment with different social and cultural factors. This affects the way individuals learn. Every person has a different preference in learning.

This information can greatly influence the project because this article gave insight that video tutorials are more than just about technology. The creators need to do research on how people learn and what affects the effectiveness E-Learning. There are established social cultural and pedagogy theories that they can apply to my E-Learning project. This will make my tutorials more effective if they have read some general knowledge about

these established theories. Knowing these social science theories and applying them to E-Learning didn't occur to me. This article gave me a different perspective.

This book connects learning and education theory to online E-Learning. The idea is that people should use E-Learning. It is proven to be an effective way to help students. This book talks a lot about how learning theory is an important aspect of E-learning. People always assume that a rise in technology is good but it needs to be applied properly. The design of the course material needs to be designed with learning theory in mind. This will lead to a more engaging learning experience for the user.

Online Learning is designed nicely because it can appeal to the masses and can be done anywhere regardless of time zones, location and distance. The Internet has the latest information. On the instructor side, online E-Learning is beneficial because it can be done from anywhere and anytime. The course work can be updated constantly quickly. This book mentions the cognitive science behind learning and how it can be applied to online E-Learning (Anderson, 2008). Jonathan Choi and Christopher Hom designed the tutorials in a way that express information to the user. The user would then store the information in short-term memory and then to long-term memory. The idea is to go from senses to sensory store to working memory. The tutorials need to be organized in chunks so that students can process the information and then apply it in a short time after. That is why Jonathan Choi and Christopher Hom believe having an assessment quiz at the end of the tutorials will be helpful in getting students to learn the material. The questions at the end of the tutorials need to be questions that require deep thoughts. This way the students can really process the information in their head to their individual liking. This would then lead to long-term memory. Jonathan Choi and Christopher Hom also need to grab the

student's attention. They need to explain to them why the lesson is important. In doing this, the students will be motivated to learn the material. Adding feedback on the quiz will help the student attain satisfaction. If the students know that they did well in the class, they become more confident with the material taught to them.

This article has a lot of information on how to use cognitive science in E-Learning. My favorite advice is to make the E-Learning process active. This keeps the audience engaged and processing information. The most effective way to learn is engaging the brain and stimulating the senses. Another advice they liked is that they should encourage collaboration. Even though the class is online, working with peers and instructors is still very important. It helps one get different ideas and perspective. Peers can also help each other questions. These are all great tips when they are going to design the tutorials. The project will become more effective by applying these cognitive science theories.

Learner Satisfaction

A successful E-Learning course will take many factors into consideration. One of the most important being user satisfaction which is influenced by technology, system design, and interaction. In a study previously

Hypothesis	Independent variable	Significant
1	Learner attitude toward computers	No
2	Learner computer anxiety	Yes
3	Learner Internet self-efficacy	No
4	Instructor response timeliness	No
5	Instructor attitudes toward e-Learning	Yes
6	E-Learning course flexibility	Yes
7	E-Learning course quality	Yes
8	Technology quality	No
9	Internet quality	No
10	Learner perceived usefulness of the e-Learning system	Yes
11	Learner perceived ease of use of the e-Learning system	Yes
12	Diversity in assessment	Yes
13	Learner perceived interaction with others	No

Table 1. Learner Satisfaction Significance

done on E-Learning satisfaction, there were many independent variables that had significant effect on perceived e-Learner satisfaction.

When building and constructing an E-Learning course, these variables must be taken into account because they are "proven to have critical relationships with e-Learner satisfaction" (Sun, Finger, Chen, Yeh, 2008). The design of the project will follow this model to experiment a high-quality and effective E-Learning session.

Ethics

Instructors and Learners of online E-Learning environments should consider ethics in E-Learning. In *What do Learners and Instructors of Online Learning Environments think about Ethics in E-Learning*, a case study from Anadolu University was conducted to find the value and importance of ethics in E-Learning. "Ethics in education means, granting educational opportunities to anyone on equal basis; disregarding nationality, gender, ideological differences, or mental/physical disabilities" (Toprak E., B. Özkanal, S. Kaya & S. Aydın, 2007). With E-Learning, there is a significant potential to reach out to international audiences, which means a more diverse group of participants. There are so many instances when ethical dilemmas have favored productivity and efficiency over ethical concerns. Engineers need to understand the importance of ethics in their everyday life because the ideas and designs that they come up with could potentially be a worldwide disaster. Ethics means "the right thing people should do." In designing a course, instructors must base their courses on the moral and ethical principles. As a learner, E-Learning should be used as a tool to genuinely learn a subject. The Internet, with a plethora of information, could have the answers to questions in the E-Learning assignments/quizzes but it is up to the individual to decide the right thing to do.

Ethics in E-Learning by Bušíková, Alena; Melicheríková, Zuzana talks about E-learning creates the ethical dilemma of academic fraud. They agree the problem this literature reviews talks about. With E-learning, the professors don't know if the student is actually doing the work (Bušíková, 2013). A student could ask a good friend to do the online assessment and exams for them. Students can also hire people to do the work for them while taking all the credit and the professors would not know that another person is doing the work. There is no technology in E-learning to help determine if the user is actually doing the work. That is a scary thought because people can fake their education. This can create many problems for society and employers. When developing an E-Learning platform for the senior project, the authors need to keep in mind the design so that they get the student to do the work and not their peers.

Intellectual Property

E-Learning designers are the creators of educational materials offered online. These materials consist of questions, quizzes, assessments, etc. that students will have to complete. Forums will be used to post answers to questions as well as discussion boards. The digital materials and content posted on such will require careful examination of the limits of ownership and copyright. The E-Learning designers must be aware and not use content that is found at another organization. "Good management of IP rights is critical for the successful implementation of E-Learning, courses, and materials" (Rennfer, 2015). This is a critical component in the design of E-Learning courses. IP is crucial to the success of an E-Learning course because it protects the rights of those who created the original works. IP's main focus is to encourage innovative technologies and ideas while protecting these works.

E-Learning is becoming increasingly popular with new and innovate features being introduced. It is becoming easy to take someone else's intellectual property such as tutorial videos and concepts from the new platform of E-Learning. People creating this E-learning platform can post things on to their E-learning platform without permission. This can be a problem as the people creating the content and material for E-learning but not be compensated for their work (Zhang, 2004). Some E-Learning videos like a tutorial video on tennis might be created and sold a E-Learning company. Once uploaded to a web, it might be stolen from the site it was only intended to be for and uploaded on different places around the web. This creates problems with E-learning because the creators of tutorials videos are not compensated for their work and knowledge. They think this is a problem. It isn't very hard for someone to take something off the web such as songs and post it somewhere elsewhere without the creator of the song knowing about it. This discourages professors to produce these videos because they do not know what can happen to the material they create. Intellectual Research is a significant topic that is very influential to the development of this project.

III. Design

Develop MS Access/ASP.NET lessons
Screencast video tutorial using Camtasia
Render as digital media format
Insert completed Camtasia video tutorial as an object to Captivate
Add quiz functionality using Captivate
Render as SWF or FLV (Flash) to allow interaction

Develop ASP.NET webpages on advisor's server
Link to MS Access database
Embed video tutorials to web application
Web application code that sends quiz results and other information from videos to MS Access database
Implement feature where students' must attain a minimum score to "PASS"

The design of the project followed a comprehensive checklist that is consistent with the overall objectives. The project heavily used Camtasia software to screencast tutorials and Adobe Captivate for the quizzing functionality and interactivity. Jonathan Choi and Christopher Hom linked Microsoft Access to Adobe Captivate to record data, such as scores, time completed, and the score pass quiz/assessment. They combined Camtasia and Camtasia into a single Camtasia project. ASP.NET to build the web application for storing and showing the video tutorials. The first step of the project was to develop the Microsoft Access and ASP.NET lessons. The tutorials are rendered in a digital multimedia format, which is commonly used to store video and audio. They built the framework for the tutorials from scratch.
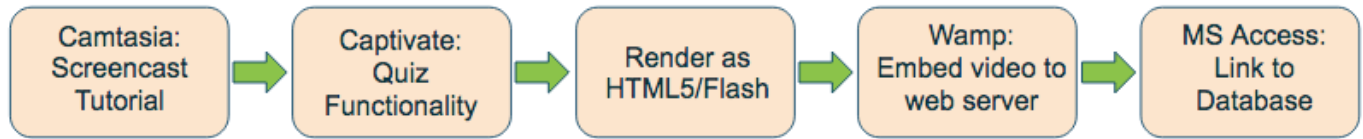
Design Map

Figure 1. Methodology

Microsoft Access and Microsoft Visual Studio are required for the E-Learning

tutorials. The initial concept for the design included a basic Microsoft Access file that

includes a student table, faculty table, and club table. With this, Jonathan Choi and

Christopher Hom were able to come up with a simple tutorial and then screencast with

Camtasia. Once recording was done, the videos were combined with Adobe Captivate to

use its quiz functionality. Then the completed video was published and stored onto a

website/server. The videos were rendered as SWF or FLV (Flash) to allow interaction

between Camtasia and Adobe Captive to incorporate quizzes and assessments within the

tutorials. The design for E-Learning was rigorous because a huge setback or constraint

was Camtasia's limited features of interactiveness. Camtasia's quiz/assessment feature

does not restrict a student from moving on if he/she were to fail completely; it scores the

quiz and lets the student move on to the next section. The design incorporates a feature

where students must attain a minimum set score before moving on to the next segment.

This design makes it so that all students must actively watch the tutorial and apply what

they learn. This was all done through macros and IF statements. A completion

requirement feature that sets the viewing percentage required was also incorporated. The

developed ASP.NET webpages to store all the videos are located on Dr. Yang's server.

The videos were embedded to web application on the server. The web application

consists of a code that sends quiz results and other information from videos to the

Microsoft Access database. The authors developed the Microsoft Access database so that it will store the data in an organized manner. There was no cost associated with this project, as all the required softwares were available for free on campus.

The design map is relatively easy to follow and understand. First, Jonathan Choi and Christopher Hom researched on what was needed for an effective E-Learning platform. They also did research on the best softwares to use to actually create this E-learning platform. After all the information was gathered, They made a list of features that they needed and what software to use. After extensive research, the authors decided on using Microsoft Visual Studios, Adobe Captivate, Camtasia, and Microsoft Access.

Jonathan Choi and Christopher Hom decided on Microsoft Visual Studio because of its compatibility with ASP.NET. ASP.NET is useful because it allows for the creation of a webform that is functional. Also, the creators have had previous experience working with this software. They choose Adobe Captivate because of the various features. It is one of the best E-Learning design softwares out in the market. It has a lot of flexibility and can work with many other softwares like Microsoft Access and Microsoft Visual Studio. The interface is intuitive and the software platform is similar to Microsoft PowerPoint. Adobe Captivate also offers many features that are significant to the design. They decided on Camtasia because of its ease of use to record and screencast. The thought behind choosing these softwares was that they wanted softwares that were user-friendly so that future students who want to create their own tutorial videos do not struggle in doing so.

The authors created a platform for future students to use so choosing the best softwares were a top priority. Future students who want to use the program to create their

own E-Learning program will have an easier time learning how to develop their own. Dr.

Yang had an idea to allow future students to create tutorial videos and come up with

questions as an assignment. This will aid in learning and will help future students learn

more. Dr. Yang's ultimate goal is to pass down information to younger students. Jonathan

Choi and Christopher Hom are using Microsoft Access as the database software because

it is a popular desktop RDBMS (Relational Database Management System). Many

companies use Microsoft Access as their choice of database because it is reliable and part

of the Microsoft Office Suite. As a designer, they know what it is capable of doing, and

the software offers the features they need.

Figure 2. Softwares

IV. Experimentation

      This project did not follow an established method. The goal of the project was to create a prototype platform for E-Learning. This project is compared to the current E-Learning tutorial platform that the professor originally had. The results were determined by what is in the prototype. What that means is that the features are included in the prototype. The performance and progress of the project is measured by prototype. The measures that were put in place to make sure the project was going according to plan were milestones. These milestones are the task that needed to be accomplished in order to finish the milestone.
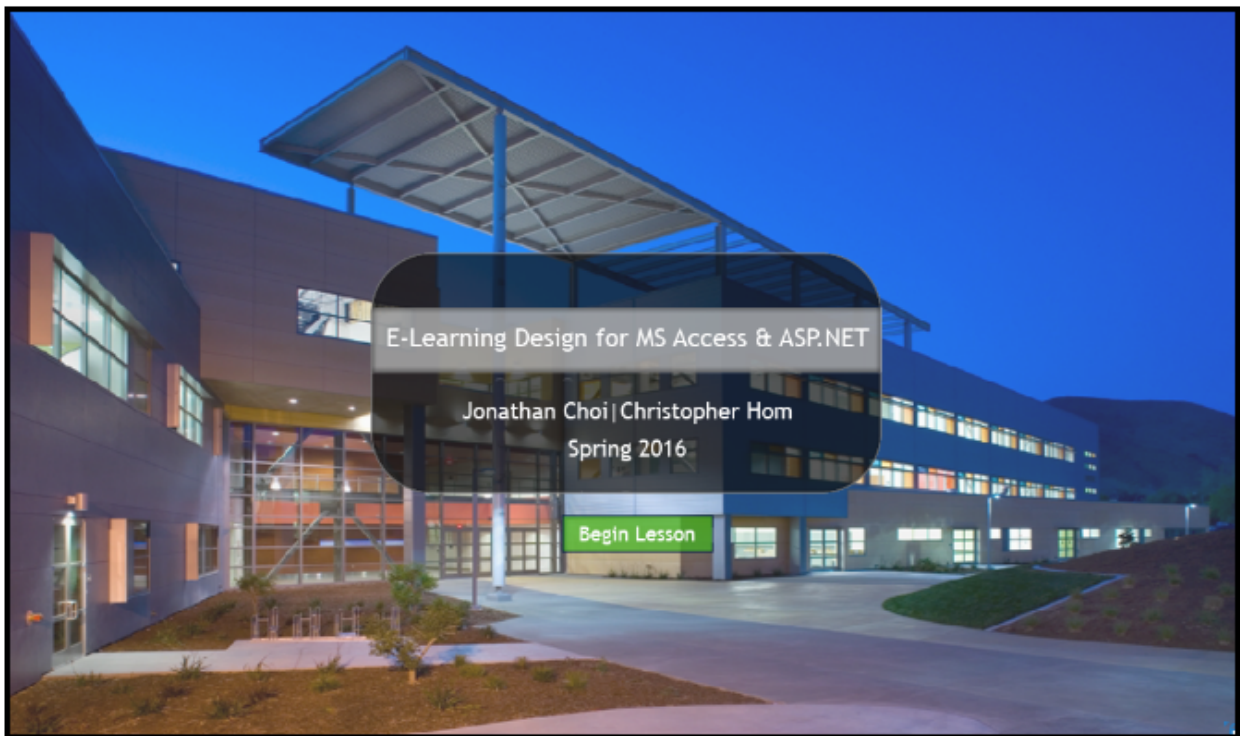
Figure 3. Adobe Captivate Platform Front Page

The picture above is a preview of the rendered Adobe Captivate file. This is just a platform designed for future development. It includes the Camtasia video tutorial, the quiz assessments, and quiz results.

The tasks that were needed to be accomplished were linking all the softwares together. Adobe Captivate, Microsoft Visual Studios, Microsoft Access and Camtasia needed to all be integrated with each other in the project.
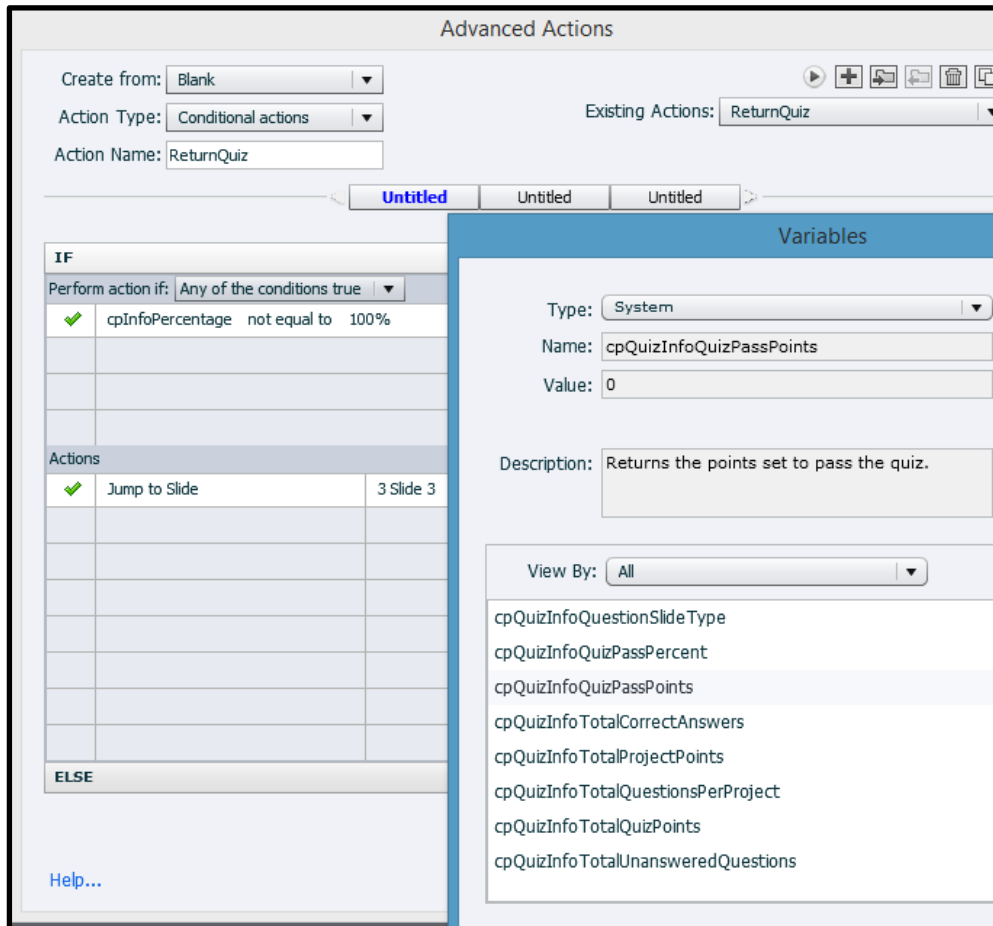

Figure 4. Conditional Statement and IF ELSE

In developing the quiz functionality and interactiveness, Jonathan Choi and Christopher Hom had to play around with the software and see its capabilities. The picture shown above shows a classic conditional statement using IF ELSE. If a student does not reach a minimum score, then he/she will be sent back to the beginning of the video tutorial. However, if he/she passes, then the video continues.

Figure 5 shows the configuration for an Internal Server Learning Management System. Jonathan Choi and Christopher Hom used WAMP server to create the web server and used localhost as the server name. In future development, they will be linking to Dr.Yang's server. The Company, Department and Course information must be consistent when configuring the internal server settings.

Figure 6. Quiz Results and Data Types

The figure to the left shows the quiz results and the required fields set. The curly brackets contain the different data types and show the student's result.
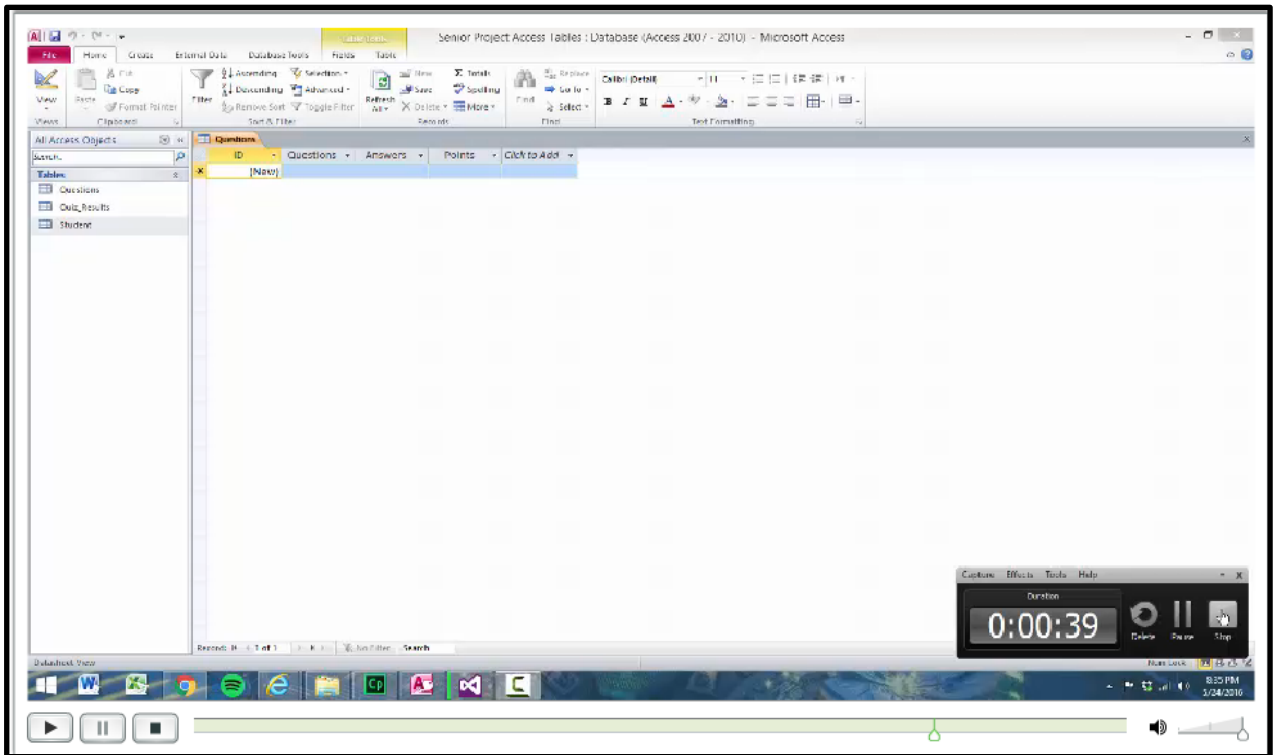
This is the Camtasia video file that was edited in the Adobe Captivate software. Adobe and Camtasia work hand in hand. Students are able to play, pause, and stop the video at any time. When the video is completed, the authors used an expression to automatically continue to the assessments.

Finally, these are a couple examples of the types of quiz questions the students encounter in their E-Learning course. They incorporated database questions for relevance. Multiple choice and short answer will most likely be the most common quiz types. Sequencing is where you rearrange the steps correctly using drag-and-drop.
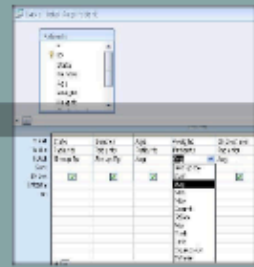
Figure 8. Sequence Quiz Type

Figure 9. Multiple Choice Quiz Type

Figure 10. True/False Quiz Type

Figure 11. Short Answer Quiz Type

The following is a brief overview of the entire methodology. These were the major milestones and task that needed to be done:

1. Research the subjects in regards to E-Learning, video tutorials, Microsoft Access and ASP.NET
2. Gain access to a server to build the website
3. Build web application using ASP.NET
   a. User interface
   b. Log In
   c. Security
   d. Link to database
4. Creating video tutorials that meet all the requirements and features
   a. Student must finish watching tutorial and pass assessment test before moving on to the next tutorial
   b. If the student does not pass assessment test at the end of the tutorial, the program sends the student back to the beginning of the same tutorial video to re-learn material
   c. The student must take a assessment test again but with different questions
   d. Questions at the end of the tutorial test is randomize and pulled in from Microsoft Access Database
   e. Results are sent Microsoft Access Database so that professor can keep track of the scores
5. Store videos onto website/server
6. Create assessment/quizzes using Adobe Captivate 9
7. Store assessment/quizzes onto website/server
8. Finish Report

Developing

Testing to see if the program worked was done after every step of the way throughout the process. The program has to work as according to the design before Jonathan Choi and Christopher Hom move on to the next step. This way, problems could be address quickly. It was easier to find problems with the platform if they tested the program after completing each task. The creators do testing in the in initial phases of the project. The creators would figure out a new part of the project. Testing the design was done by seeing if the program worked without any problems or errors. To do this,

participants and volunteers played with the E-learning platform that was developed. They were then asked to evaluate the design and find any errors.

This project is not like other project because it did not involve data. This project is a research project intended to find breakthroughs. The breakthroughs that were figured out are integrating all four softwares. The other breakthroughs are the features the E-Learning platform incorporates. These features have not been created this way in the past with these specific softwares.

WIX Hosting

WIX is a cloud development platform where users can make their own websites. It is a great way to share work over the web. WIX can be used for an array of reasons such as E-Commerce, forums, social media and education. For this project's purposes, WIX is used for educational purposes. WIX can be used as a way to store and share the tutorials so that students may have easy access to the resource. Because WIX is built on a free business model, it will be accessible to any student or faculty. WIX uses a platform based on Adobe Flash. The addition of WampServer is beneficial because it is a Windows web development environment that has the capability to create web applications with MySQL database. There were functionalities with WampServer. Some including the ability to manage MySQL services, manage server settings, access setting files, and switch the server to everyone or only the localhost. WampServer was used as a way to experiment with internal servers and how it can be used to host all the tutorial videos. After doing research, an internal server seemed like the most beneficial platform for the project.

V. Results and Discussion

The prototype for an E-Learning platform designed with Microsoft Visual Studios, Microsoft Access, Adobe Captivate, and Camtasia is the final product of this project. The results of research and application of the knowledge lead to a platform for future students to create their own tutorial. There is no data to be analyzed in the project. The project is to build a prototype. The whole project is an experiment in integrating fives softwares and E-Learning. The overall project was very successful. The result of this project or experiment was a solid foundation that will have the potential to advance E-Learning. Future students can build upon this experiment that Jonathan Choi and Christopher Hom have started. This project has capacity to become or develop into something bigger. Not only can this platform be integrated into schools and universities but also businesses. An E-Learning platform will enable employers to train more of their employees at a cheaper cost.

The prototype is not complete. The idea of the project is to find ways to incorporate features. The task was to figure out how to do them and demo a very basic way of how it works. To complete the platform, the authors would need experience coders and graphic designers to make it more refined. The result of the project is a very simple and basic E-Learning platform that does have all the features. The results came out exactly as Jonathan Choi and Christopher Hom expected. The end goal of the project is to have a working prototype that is basic. The prototype developed could be further improved and advanced with more time and experience. The limitation on developing this prototype is that the creators did not have much coding experience. Working with these four programs and integrating them took advanced knowledge in computers and

logic. It was complicated to construct this prototype because of a general lack of the knowledge in the fields of coding and logic. No unusual conditions arose throughout the project. This does not mean that the project did not have problems. It was difficult to implement the features. The hardest features to implement were integrating Adobe Captive to Microsoft Access. It was difficult to find a way to save and send results to a different program. Another difficult part of the project was to randomize the questions asked at the end of the tutorial videos. The results of the project were not hard to interpret. The developers analyzed the prototype to see if it functioned correctly. The results were either a yes or no. The prototype did end up working as planned. The prototype is still in the very early stages of development. It is nowhere near complete. The prototype developed has many opportunities to be improved. However, Jonathan Choi and Christopher Hom are satisfied with the results. The creators were able to solve some challenging problems. Breakthroughs in E-Learning software will always be improving and in progression. From this experiment in building an E-Learning platform and integrating multiple softwares, the creators are proud to present their prototype. With the help of future students, this E-Learning platform can be further developed into a more refined platform.

VI. Summary

The two-quarter long project consisted of four phases. Research, Design, Testing, and Implementation. Before starting the phases, Jonathan Choi and Christopher Hom needed to address the problem to see if the project was feasible. The problem statement was that the current video series on database fundamentals were both dull and ineffective because it lacks structure, interaction, assessments, and competency tests. The ultimate goal for this project was to create an interactive, easy-to-follow E-Learning platform so that both professors and future IE/IT students can construct their own videos and E-Learning course. The solution approach was to incorporate newer software and use code to link the softwares together. The authors designed, developed, and tested the framework for creating tutorials the most efficient way.

After the completion of the project, they evaluated on what went right and what went wrong. The creator determined the most important result to be the quiz function that sets a minimum passing score before moving on to the next segment. Other important features of the project include the Microsoft Access database that stores all the necessary and relevant information from the quizzes and the ASP.NET web form that allows for user-interface and interactivity.

Based on the experimental results and research, Jonathan Choi and Christopher Hom can say that designing an E-Learning course is very time consuming and must have a perfect structure and back-end design. They simply did not have enough time to create actual tutorial videos so they opted for creating a foundation or platform for creating tutorial videos. The design of the platform consists of code, macros, and expression that link multiple softwares together. There are a variety of features that they implemented

from scratch to allow for the full E-Learning experience. Given the two-quarter time frame, they were able to accomplish each and every objective listed in the introduction. There is more potential for the platform design that future students could build off of.

The senior project has taught the authors to be very disciplined. This is unlike any other project because of the fact that they were able to choose a topic to the creators' liking and interest. For this reason, Jonathan Choi and Christopher Hom needed to make sure to stay on top of things by scheduling weekly updates, researching, and performing tests. This project has the potential to go beyond on its design. More features can be implemented that will aid in learning. One idea that the creators would try next is to implement the video tutorials onto PolyLearn for more accessibility and convenience. PolyLearn may have the capability to not only host the videos but also update the grade received from the video quizzes.

Based on the findings, the authors recommend the project to be updated with newer and useful features. Overall, Jonathan Choi and Christopher Hom are very happy with the end result of the project. The design of the platform will not only support the development of E-Learning but also aid in future student's learning. *Trust and have faith in the future generations!*

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