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Cyber-communication : can virtual server technologies serve as effective media delivery tools for human performance enhancement?

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Cyber-communication : can virtual server technologies serve as effective media delivery tools for human performance enhancement?

Abstract

This project involved exploring whether or not virtual server technologies are viable and effective tools for human performance enhancement. The goal of this project was to conduct a comparative analysis of three specific virtual servers (i.e., YouTube, TeacherTube, and iTunesU) to determine whether or not either of these would serve as effective assets for improving the media development and delivery capabilities of the staff and faculty members at Hawkeye Community College. Four collaborative multimedia development projects were produced, monitored and evaluated to determine the levels of consistency, reliability, and user-friendliness in departmental media delivery processes. The research team of Hawkeye's Brobst Center for Teaching and Learning Services adapted quickly in developing best practices for assisting faculty/staff in preparing content for virtual server media delivery. Student feedback and statistical data from each of the multimedia projects have verified that TeacherTube, YouTube, and iTunesU are effective tools for consistent, predictable, and user-friendly media delivery. Yet, more research must be conducted before it can be determined which of these is the most effective solution for campus-wide implementation. Currently, the collaborators are satisfied with the quality of the video modules that have been produced. Furthermore, these virtual servers have enabled them to reach a broad audience via the Internet. To be precise, 13 videos were produced and uploaded to YouTube. In turn, these videos received 284 views. The 24 videos that were produced and uploaded to TeacherTube, have received 19,309 views. Separately, 390 videos were produced and uploaded to iTunesU. All of the research team's videos are now available online for anyone to experience at any time from any global location that possesses Internet access. However, more possibilities for human performance enhancement and campus-wide implementation must be pursued.

CYBER-COMMUNICATION:
CAN VIRTUAL SERVER TECHNOLOGIES SERVE AS
EFFECTIVE MEDIA DELIVERY TOOLS FOR
HUMAN PERFORMANCE ENHANCEMENT?

A Graduate Project

Submitted to the

Division of Instructional Technology

Department of Curriculum and Instruction

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts

UNIVERSITY OF NORTHERN IOWA

by

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ABSTRACT

This project involved exploring whether or not virtual server technologies are viable and effective tools for human performance enhancement. The goal of this project was to conduct a comparative analysis of three specific virtual servers (i.e., YouTube, TeacherTube, and iTunesU) to determine whether or not either of these would serve as effective assets for improving the media development and delivery capabilities of the staff and faculty members at Hawkeye Community College. Four collaborative multimedia development projects were produced, monitored and evaluated to determine the levels of consistency, reliability, and user-friendliness in departmental media delivery processes. The research team of Hawkeye's Brobst Center for Teaching and Learning Services adapted quickly in developing best practices for assisting faculty/staff in preparing content for virtual server media delivery. Student feedback and statistical data from each of the multimedia projects have verified that TeacherTube, YouTube, and iTunesU are effective tools for consistent, predictable, and user-friendly media delivery. Yet, more research must be conducted before it can be determined which of these is the most effective solution for campus-wide implementation. Currently, the collaborators are satisfied with the quality of the video modules that have been produced. Furthermore, these virtual servers have enabled them to reach a broad audience via the Internet. To be precise, 13 videos were produced and uploaded to YouTube. In turn, these videos received 284 views. The 24 videos that were produced and uploaded to TeacherTube, have received 19,309 views. Separately, 390 videos were produced and uploaded to iTunesU. All of the research team's videos are now available online for anyone to experience at any time from any global location that possesses Internet access. However, more possibilities for human performance enhancement and campus-wide implementation must be pursued.

TABLE OF CONTENTS

ABSTRACT.....	iii
INTRODUCTION	2
Introduction of the Project	2
Importance of the Project.....	2
Literature Review	8
The Emergence of the Participatory Culture	8
Learners’ Interactions with Virtual Servers and New Media Technologies.....	10
Implications of Applying Virtual Server Technology in the Classroom	15
Benefits of Using Virtual Server Technology for Distance Learning	17
METHODOLOGY	18
Design	18
Development	20
Utilization	21
Management.....	22
Project Management	22
Resource Management.....	24
Delivery System Management.....	24
Information Management	25
Evaluation	25
Yes You Can – Document Signage Project	26
Virtual Focus On Friday – Promotional Modules..	30

The Mathlab and Learning Objects Projects.....	31
PROJECT.....	33
Project Challenges (Virtual Servers)	33
Production Achievements	34
The “Yes You Can” Signage Project.....	34
The “Virtual Focus on Friday” Project.....	35
The "Learning Objects" Project.....	35
The “Math Lab” Project (Use of iTunesU).....	35
CONCLUSIONS AND RECOMMENDATIONS	37
REFERENCES	39
APPENDIX.....	42

INTRODUCTION

Introduction of the Project

From the Internet to mobile hand-held devices, technology has become the cornerstone of the ways in which we communicate. From Internet communities to viral videos, music, and blogs, today's students are sharing ideas and expressing views via online information sources and mobile devices that reach far beyond the current capabilities of the classroom. It is for this reason that educators must strive to enhance their technological capabilities to meet the ever changing needs of their students. At Hawkeye Community College, a small, but progressive midwest technical institution, the technical staff strives to provide services and learning experiences at the technological level that will continuously engage and retain their students. Furthermore, their goal is to develop and deploy reliable media content via the Internet that is both consistently accessible any time, and effective in regards to both human performance and cognitive enhancement. It is vital that hardware and software systems are provided that support a platform on which faculty, staff, and students can collaboratively create and share media-rich content. It is for this reason that several colleagues co-wrote and developed the *Cyber-Communication Project*, an Innovation Project Grant that involved the creation, development, and management of four separate, collaborative media development and delivery projects. In turn, these projects were developed with the use of the virtual servers YouTube, TeacherTube, and iTunesU.

Hawkeye's staff and faculty are focused on delivering instructional content to any student, at any time, regardless of the distance. However, there are several technical obstacles that have arisen on and off campus that must be addressed before this goal can be attained.

These obstacles and the importance of the *Cyber-Communication Project* will be discussed within the following paragraphs.

Importance of the Project

Prior to the *Cyber-Communication Project*, the appropriate hardware and software were not available at the college to create or develop the desired content to meet the learning needs of current or prospective students. Initially, the technical staff had received two media PCs that aided in the creation of audio-based projects, but they did not have the capabilities to create videos or merge audio files with video content. To create the preferred multimedia content and media-rich projects, they would need to acquire Apple computers with the latest software and operating systems. There was a significant need to further study, explore, and experience virtual server (iTunesU or similar) technology to identify its potential uses to benefit their students, community and educational partners in K-12 and higher education. Consistency, predictability and user-friendliness were the end results that needed to be achieved.

Faculty and staff members request the Brobst Center staff's assistance at Hawkeye's Digital Resource Lab, for producing an array of solutions spanning from media development and delivery to video streaming projects. At their previous technical capacity, however, the Brobst Center's research team was unable to provide services that were consistent in operation, predictably reliable, and user friendly. To be specific, they were using a content/streaming video server that was originally meant to provide media content (instructional videos, tutorials, video modules, curriculum enhancing tools, projects designated by Staff and Faculty) that could be accessed any time from anywhere. Unfortunately, this server proved to be unreliable over a period of time.

On several occasions, the Brobst Center's research team has uploaded instructor-requested video content to the server and the result has been that these videos could be viewed on campus via the Internet, but were not accessible off campus. Furthermore, these videos were only available on a sporadic basis. Viewers experienced operational errors on several occasions that the requested media content was not operable via their Cherub Learning Management System implementation, staff presentations, and during faculty/staff opportunities to recruit prospective students or advertise programs at the college. A specific example of this is a situation that occurred with Landry Rowe, Hawkeye's resident Heating Ventilation and Air Condition Master Trainer.

Mr. Rowe contacted the Brobst Center staff and mentioned that he was scheduled to present at a national conference regarding Hawkeye's (HVAC) Heating Ventilation and Air Conditioning Program. With this in mind, he suggested it would be a great opportunity to market college services by showing an HVAC video that the Brobst Center staff produced. In agreement, they uploaded this video to the streaming server and tested the video several times via Internet access on several on-campus Mac and PC computers, and verified that the video was operable, accessible, and reliable. Landry emailed the video's web address to 99+ constituents in various states. Despite all preparation, none of them could access this video off-campus. Situations, such as this are both unacceptable and a hindrance to the reputation of the college.

The *Cyber-Communication Project* grant was written and developed to address consistency, predictability, and user-friendliness in the media delivery processes. To this end, the Brobst Center research team's primary project goal was to study the current collaborative media delivery capabilities of virtual servers, such as iTunesU, an Apple service readily

available for Macs and PCs, that provides hundreds of colleges and universities with a platform for sharing media content such as streaming videos, music, podcasts, lectures, and instructional projects. This project includes indentifying the potential applications of this software throughout the college, and providing findings about what they have learned and recommendations regarding their experiences in using the technology that can be used to determine an effective solution for Hawkeye Community College.

Students come to Hawkeye Community College with a variety of issues that affect their success including time demands and preferred learning styles. They can benefit from having online materials available for review and remediation. Though they may have a desire to review a concept with an instructor, their tight schedules, and off-campus demands such as work or childcare, may limit access to remediation. Separately, there are students who may desire to access information via learning sources such as online tutoring. However, they may not have access to visual representations, learning tools, or multimedia examples of their instructors' course concepts. These learning tools could be used to enhance the notes that these students have taken in class, assist them in gaining insights on how to solve similar functions in their homework, or assist them in forming critical analyses of concepts.

Hawkeye has relied on an outdated instructional delivery model that places the students' ability to review learning through note taking and their textbooks. However, what possibilities lie for the students who miss vital learning opportunities due to their inability to attend courses on campus? It is this question that introduces several other questions based within the context of distance learning. What if the students could see or hear their instructor's explanations and review content anytime, anywhere--on their cell phones, iPods, car stereos or computers? What if a person who is unable to attend campus tours could

receive a virtual campus experience from the confines of his/her home? What if a student struggling in developmental courses could access asynchronous, visual tutorials for required course content and apply this new-found knowledge? These are the types of questions that prompted this project.

The Horizon Report (2008), produced by the EDUCAUSE Learning Initiatives Program and the New Media Consortium, lists the top five items each year upon which institutions of higher learning should be focusing. Number one on their radar screen for 2008 was Grassroots Video. The Horizon Report describes Grass Roots Video as a process in which virtually anyone can capture, edit, and share video clips, using inexpensive equipment (such as a cell phone) and free or nearly free software. This phenomenon has been exploding across the world as YouTube and iTunes have altered our viewing habits and the ways in which our students access information (Horizon Report, 2008). The streaming of video from virtual servers that are distant from their content producers is enabling global perspectives and letting varied voices tell their stories to a world audience, an audience that is largely comprised of teens. According to Lenhart, Madden, Macgill, and Smith (2007), “. . . 57% of online teens say that they watch videos on video sharing sites such as YouTube” (Lenhart et al., 2007, p. ii). Teen exposure to the use of virtual servers and video sharing sites is steadily increasing.

There are many viable reasons for using virtual servers such as YouTube and iTunesU for media delivery, training, and review. However, there are those who may still pose the question: What constitutes a virtual server? A virtual server is usually a web server that shares computer resources with other virtual servers. In this context, the *virtual* part simply means that it is not a dedicated server -- that is, the entire computer is not dedicated to

running the server software. Most virtual servers will require an agreement and some method of verification that students should be allowed to access the content, such as an active directory script or link. The institution provides an uplink pathway and the training to access and place media on the server. The ability to link a learning management system to these servers means both visual and text-based content can be delivered to the online student. For the in-class student, access to media built can be delivered around the clock with a minimum of effort from the institution towards implementation.

The implementation of virtual servers has created new, cost-effective teaching, and learning possibilities for individuals as well as educational institutions. The Horizon Report (2008) discusses the implications.

As the costs of production and distribution for video have dropped to nearly zero, many of the barriers to using video in learning and creative situations have fallen away. Rather than investing in expensive infrastructure, universities are beginning to turn to services like YouTube and iTunesU to host their video content for them. As a result, students—whether on campus or across the globe—have access to an unprecedented and growing range of educational video content from small segments on specific topics to full lectures, all available online. Hosting services like YouTube and iTunesU even provide institutional “channels” where content can be collected and branded with video easily produced on all manner of inexpensive devices from phones to pocket cameras, faculty have more options than ever before to incorporate video into their curricula. (Horizon Report, 2008, p. 10)

In other words, the ease of use and cost effectiveness of virtual servers have provided instructors and institutions with the ability to create media rich content, apply it in the classroom, and share content with their students via local and mobile interactions.

Taking into consideration the relevance of the need to create a solution to enhance the overall effectiveness of the media delivery processes at Hawkeye, the Brobst Center research team set out to gather empirical knowledge, data, and literature that would assist them in their creation of the *Cyber-Communication Project*.

Literature Review

This literature review is the culmination of the research that was conducted to answer four specific questions. These are as follows:

1. To what extent are today's learners using virtual servers and New Digital Media technologies (NDM)?
2. Are virtual servers effective tools for cognitive and human performance enhancement?
3. What are the implications of using virtual server technology in the classroom?
4. What are the benefits of using virtual server technology for distance learning?

The related resources will be introduced within the following pages.

The Emergence of the Participatory Culture

From high volume social media sites such as Twitter and Facebook, to the interactive video sharing sites YouTube and TeacherTube, new digital media have provided platforms for individuals to produce and share media-rich content, collaborate, and learn from one another beyond the boundaries of the classroom. Outside of institutional learning confines, these non-traditional, communication opportunities have introduced an interesting dynamic

in that a new form of culture has developed from the constant use of technology for collaborative and self-educational purposes. Jenkins (2006) referred to this new culture as a “participatory culture” (p. 8). He described a participatory culture as one in which,

anyone, regardless of skill level, is welcome to contribute to a variety of expressive and community-based practices, or even to start their own. Participatory culture manifests in a multitude of media forms and includes digitally-generated sounds, images, animations, videos and online games as well as text-based fiction and nonfiction work, blog posts, and conversational exchanges on social networking sites. In essence, participation is positioned as the opposite of more passive types of media engagement such as watching TV or other manifestations of mass media. (Jenkins, 2006, p. 8)

In some cases, examples of the participatory culture have been noted to be more prevalent with teens. Results of a study from the Pew Internet and American Life project support this notion (Lenhardt & Madden, 2005):

More than one-half of all teens have created media content, and roughly one-third of teens who use the Internet have shared content that they have produced. The participatory culture is conducive to teen interaction, as it places no boundaries on artistic expression. In fact, the sharing of one’s creations, contributions, and assistance in the mentorship of others, are both highly respected and encouraged. (Lenhardt & Madden, 2005, p. 3)

The passing of knowledge from the experienced participant to the novice is highly prevalent.

The teens of today have also been described as active learners. As expressed by Dede (2005), these new learners are “more active based on real and simulated experience, visually

oriented, self-reflective, social, fluent in multiple media, adept at navigating diverse information sources, and appreciative of co-designed learning experiences that are personalized to individual needs and preferences” (p. 15). In other words, today’s learners are very astute with the use of various types of virtual servers and new digital media.

Learners’ Interactions with Virtual Servers and New Media Technologies

From YouTube video uploads to interactive cell phone applications, learners now have access to various types of emerging technologies. Yet, in which ways are they using these technologies? How are these learners using these technologies to interact with one another? As mentioned in the EDUCAUSE Horizon Report (2008),

With video capture and editing tools in the hands of more and more people all the time, we are at the point where virtually any event may be caught on video, by virtually anyone. The proliferation of video is due in large part to how easy it has become to share clips. In January 2007 alone, 7.2 billion videos were viewed online by nearly 123 million Americans, or 70 percent of the total Internet audience in the U.S. Video content is as easy to post to the Internet as is text, and in some cases, even easier. Sharing sites like YouTube, Google Video, Viddler, or Blip.tv accept a variety of common formats, and transparently handle the intricacies of conversion and distribution. (p. 6)

In agreement with this development, Shirky wrote, “. . . the new tools of social media create unprecedented opportunities to share, to cooperate with one another, and to take collective action, all outside of the framework of traditional institutions and organizations” (2008, p. 21). Learners’ opportunities for creative expression are now more vast.

As new, more effective and compact modes of communication are introduced, teens are encouraged to express themselves in new ways. This new wave of self-expression is fueled by various tools known as “NDM” or “New Digital Media.” As discussed by Rideout, Vandewater, and Wartella (2003), “. . . the new digital media have harnessed the power of the computer and domesticated it; fast, attractive, cheap and accessible, the NDM and the internet seem made for youth engagement” (p. 19). Two NDM servers that are prime players in this engagement are YouTube and Flickr. Rideout et al. (2003) note,

Two popular sites for uploading and showcasing creative user-generated content are YouTube (videos) and Flickr (photography and 2D artwork). Founded in September 2005, YouTube is the site that hosts virtually everything available in short video format, ranging from goofy amateur, self-conscious teen productions to commercials, movie trailers, old driver’s education filmstrips, and classic Louis Armstrong performances. Flickr, unlike YouTube, has stayed resolutely consumer-driven and offers users a forum for uploading and organizing digital images. Creators more inclined towards text expressions may start a blog, or “web log”, a place to post text (and images) ranging from personal diary entries to political activism and commentary. (p. 24)

The engagement and learning possibilities are endless with these types of new digital media.

Virtual Servers as Tools for Cognitive and Human Performance Enhancement

From interactive YouTube channels to real-time gaming streams, the interconnectedness with new digital media technologies is impacting the ways in which individuals communicate. A new immersive culture has spawned from this interaction with technology, but is it also affecting the ways in which we think and act? Dede (2005)

suggests, “People’s daily use of new devices is shifting their lifestyles toward frequent mediated immersion, which in turn is shaping their learning styles towards neomillennial characteristics” (p. 15.1). “Characteristics such as these further verify the evidence of a participatory culture. Participatory culture is emerging as the culture absorbs and responds to the explosion of new media technologies that make it possible for average consumers to archive, annotate, appropriate, and reproduce media content in powerful new ways” (Dede, 2005, p. 8). Blau (2005) agrees, “through these various forms of participatory culture, young people are acquiring skills that will serve them well in the future. Participatory culture is reworking the rules by which school, cultural expression, civic life, and work operate” (p. 9).

It is interactions within participatory culture that are inducing a new form of cognition, which has shifted in nature from the individual experience to that of a collaborative nature. Clark (2003) refers to this form of cognition as *Distributed Cognition*. He defines distributed cognition as, “the ability to interact meaningfully with tools that expand our mental capacities” (p. 37). In addition, Clark interpolates,

we can understand cognitive activity as shared among a number of people and artifacts, and cognitive acts as learning to think with other people and artifacts. Following this theory, students need to know how to think with and through their tools as much as they need to record information in their heads. (Clark, 2003, p. 37)

In agreement with this notion, Heikkinen and Weigel (2007) add,

. . . applications of the distributed cognition perspective to education suggest that students must learn the affordances of different tools and information technologies, and know which functions tools and technologies excel at and in what contexts they can be trusted. Students need to acquire patterns of thought that regularly cycle

through available sources of information as they make sense of developments in the world around them. (p. 38)

Students must develop strong understandings of the inner workings, effectiveness, strengths, weakness, and learning assistance potential of their digital media tools. The greater the extent of their technical knowledge regarding the utilization of these tools, the more powerful their contributions will be towards the betterment of the culture as a whole.

The roles of virtual servers and NDM as they apply to cognition and interactive collaboration, are being redefined as technology evolves. Simultaneously, the possibilities of their implications for human performance enhancement are molding the capabilities of the digitally immersed user. Currently, children and adults are developing socio-technological skills via their interactions within knowledge-based communities (Kress, 2003). As expressed in EDUCAUSE'S Horizon Report,

placing people and relationships at the center of informational space will have a profound influence at all levels of academia. It will change the way we relate to knowledge and information; the way we research and evaluate credibility; the way educators and students interact with each other; and the way students learn to be professionals in their chosen disciplines. (Horizon Report, 2008, p. 27)

Heikkenen and Weigel (2007) suggest that NDM activities such as individualized online training, games simulations, and collective learning activities can be effective learning tools if implemented properly. They add that NDM are widely used in educational settings of non-learning disabled learners. In these settings NDM have proven to be effective methods for inducing positive change in student achievement. Separately, there is evidence that cognition

can be affected per interactions with NDM. However, what is to be shared of the learned behaviors that produce enhancements both in performance, and one's sense of identity?

To understand the human performance enhancement capabilities of virtual servers, we must first understand the effect that these collaborative spaces have on human behavior and identity. Boyd (2007) notes, "social network sites are a type of networked public with four properties that are not typically present in face-to-face public life: persistence, searchability, exact copyability, and invisible audiences. These properties fundamentally alter social dynamics, complicating the ways in which people interact" (p. 2). Of the properties discussed, invisible audiences tend to have a lasting effect on human behavior. Boyd suggests that children learn that actions prompt reactions by adults; as they grow older, they learn to adjust their behavior. People are assisted in developing these skills when they interact within diverse social environments because they force individuals to re-evaluate the signals they take for granted.

Additionally, in NDM environments, the reactions to one's actions are almost instantaneous. This is especially evident with teens. Lenhart et al. (2007) offer, "once teens have posted photos or videos, conversation and feedback begin. Nearly nine in ten teens who post photos online (89%) say that people comment at least sometimes on the photos they post" (p. iii). Boyd (2007) implies that the key to learning is that all contributions are subject to scrutiny, comment, and improvement by others. And there is social pressure to take the feedback seriously. Learning to make sense of others' responses to our behavior allows us to evaluate how well we have expressed what we intended. We can alter our actions accordingly (Boyd, 2007, p. 11). New cognition and performance enhancement possibilities are emerging for the classroom as well.

Implications of Applying Virtual Server Technology in the Classroom

New digital media technologies are revolutionizing the ways in which students learn, collaborate, and communicate. According to Kennedy, Smith, Wells, & Wellman (2008), “American youth are introduced to digital media at relatively young ages and spend more time engaging with digital media at critical development stages than their older counterparts did” (p. 7).

If schools do not take into serious consideration the full potential of digital media for learning, they risk being discarded as irrelevant in the outside lives of today’s students and the preparation for their future endeavors. Today’s learner has access to unlimited collections of information, which span vast numbers of topics. He or she can learn advanced technical and analytical skills by participating in social networks, forums, and complex games. The result is a feeling of liberation for the learner as he or she can learn these skills completely independent of the educational institution. Yet, it is important to acknowledge that this approach may have negative ramifications. A student’s persistent connection to others may undercut opportunities for reflection, synthesis and integration of knowledge as he or she increasingly rely on each other for what we need to know (Weigel & Carrie, 2009). Stone (2008) suggests there may be risks, in a broader cognitive sense, when learners and learning are distributed across real and virtual spaces that are supported by various devices.

In opposition, others attest that informal learning can encourage inspiration in learners given that they are voluntarily involved in activities of their choosing. In informal learning, there is more of a focus on the collective synergy of a group, than individual prospects (Ito, 2008; Jenkins et al., 2006). With the Internet providing opportunities for self-directed learning for all, while schools increasingly do not—indeed cannot—handle the

burgeoning educational requirements of a growing, ever more diverse population (Weigel & Carrie, 2009, p. 9). Brown (2006) expresses, “[A] capacity for independent learning is essential to [students’] future wellbeing, since they are likely to have multiple careers and will need to continually learn new skills they were not taught in college” (p. 18). There are plausible arguments which lie on both sides of the spectrum. However, there is one question that remains: Are there any ways in which educational institutions can integrate virtual server and NDM technologies to meet the needs of today’s students?

The implementation of new digital media technologies requires a slightly different thought process when developing curricula. Faculty members will have a plethora of beneficial tools at their disposal that will not only be painless to integrate, but quite cost effective as well. Faculty now have an immense number of options for incorporating video into their curricula with video easily produced on a multitude of inexpensive devices spanning pocket cameras to cell phones...Class-wide video capture can be a very effective data collection strategy for field work or as a way to document learning projects. Video papers and projects are increasingly becoming commonplace. Student-produced clips on current topics are an avenue for students to research and develop an idea, design and execute it visually, and broadcast their opinion beyond the boundaries of the classroom. These examples are evidence that the possibilities for NDM technology integration in classrooms and curriculum enhancement are endless (Horizon Report, 2008).

Benefits of Using Virtual Server Technology for Distance Learning

Today, communication and collaboration are no longer spectator sports in which capabilities are limited to sitting at desktop computer stations. Individuals can now produce films, complete multi-million dollar mergers, or solve online mathematics problems in real

time, from opposite sides of the globe. Through the combination of social networking and mobility individuals can collaborate from anywhere using collaboration tools that provide access to materials when away from their home computers (Horizon Report, 2008). Klopfer, Squire, and Jenkins (2002) add that with enhanced text and graphics, mobile handheld tools such as cell phones and mobile computers now have the capabilities to empower and provide students with learning experiences that exceed the boundaries of the classroom. The individual learning experience has been substantially enhanced with interactive mobility.

METHODOLOGY

The creation, development, and execution of the *Cyber-Communication Project* was an extensive task that spanned August 2008 to May 2009. The intent of this project was to conduct a comparative analysis of three specific virtual servers (i.e., YouTube, TeacherTube, and iTunesU) to determine whether or not either of these would serve as effective assets for improving the media development and delivery capabilities of the staff and faculty members at Hawkeye Community College. The following paragraphs will explain the project's planning process following the format of the five Domains of Instructional Technology: (a) Design, (b) Develop, (c) Utilization, (d) Manage, and (e) Evaluation. (Seels & Richey, 1994)

Design

To begin the Design phase of the *Cyber-Communication Project*, nine Hawkeye Community College employees from various departments were gathered as a team of collaborators with the purpose of producing four distinctly different, media-rich projects. Each of these projects would be produced with the use of virtual server technology (i.e. iTunesU, YouTube, and TeacherTube). The goal was to research such technology with the purpose of determining whether or not it would enhance the consistency, predictability, and user-friendliness of the current media development and delivery capabilities (streaming video, podcasting, web-based video presentation) at Hawkeye Community College.

Four of the colleagues were staff members from Hawkeye's Brobst Center for Teaching and Learning Services. Their roles were to provide technical expertise, assisting the other collaborators with the development of a standardized process that would provide a consistent, predictable, and user-friendly platform for future endeavors in media

development, delivery, and collaboration. Given their expertise in particular focus areas, the collaborators would serve as strong assets to this project.

In turn, the roles of other collaborators (faculty members) were to provide content that pertained to the immediate media delivery needs in their perspective departments.

Overall, I managed the entire project.

Together, the collaborators determined objectives for the project. These were as follows: By the end of the project period, the group would be able to provide

1. Training to others in the utilization of virtual server technology and its potential for integration into departments and classrooms.
2. Statistical findings from four distinctly different projects (“Virtual Focus On Fridays”, “Yes You Can” Media Presentation/Document Signage, “Learning Objects”, and “Mathlab Materials”) which determined whether or not the use of virtual servers enhanced the levels of consistency, predictability, and user-friendliness in the collaborators’ media delivery processes.
3. A comparative analysis of virtual servers (iTunesU, YouTube, and TeacherTube).
4. A list of differentiated applications for classroom instruction, professional development, public relations, marketing, and community education.
5. Information about “lessons learned” that would guide our colleagues in the effective and efficient use of virtual server technology.

The collaborators in turn, developed “intended outcomes” for the project. These outcomes entailed that they would provide:

- a. Recommendations of applications for Hawkeye Community College and enhanced learning for our students.

- b. Criteria for media development and delivery quality.
- c. Faculty development for virtual server technology.
- d. Documented results of four separate, collaborative projects that have been created with the use of virtual server technology.
- e. Recommendations of virtual server technology regarding the best value for application.
- f. Nine people throughout the Hawkeye campus, who have a strong working knowledge of how to use Virtual Server technology and specific ideas for applications throughout the college.

All of our decisions for the development of the objectives and intended outcomes of the *Cyber-Communication Project* were greatly influenced by the research that was gathered for the literature review of this project. The most important factors in the entire project were the students. Therefore, we tailored the project to fit their technological needs and utilization expectations.

Development

Four separate teams of collaborators were comprised to develop each of the four collaborative projects: A. “Yes You Can” Media Presentation/Document Signage, a project that involved developing instructional video modules to teach students how to properly sign and process academic and financial aid reinstatement documents. B. “Virtual Focus on Fridays”, a project that involved developing promotional videos that would be presented during “Focus on Friday” campus visit days to motivate prospective students to attend Hawkeye. C. “Learning Objects”, a project that entailed producing instructional mathematics

modules that would be used for one instructor's course. D. "Mathlab Materials", a similar project that involved producing instructional Mathematics materials for a separate course.

Organizational meetings were conducted with each team to gather baseline information, determine production timelines for completion, and designate methods of assessment. Completion dates for virtual server research were determined. And training dates were set for instructing the collaborators on the utilization of the virtual servers.

Vital pieces of the project were the software and hardware that were needed to produce all of the video modules. Software packages of iWork '08, Final Cut Studio 2, and Adobe Master Suite were ordered as well as three Wacom tablets, four Apple Care Protection Plan Enrollments for iMac, four iMac computers, and iTunesU hosting. Upon arrival, all of the received hardware/software items were organized, documented, and installed in the Hawkeye Community College Digital Resources Lab. Further training and production schedules were determined based upon faculty and staff availability.

Utilization

Software and hardware requested were instrumental to being able to carry out the projects. The previous software applications and hardware on campus would not provide the access, consistency, predictability, or user-friendliness that was the focus of this project. If the software could not be provided to make it easier for the faculty and staff to be creative in services and learning, creating these student-focused access points would not happen. New computers were needed to enable efficiency for the creation of these projects given that the operating systems in the Brobst Center research team's current computers could not run the software that was needed. The four iMacs were used in the production of all of the video modules and uploading content to the virtual servers. They increased the overall production

speed and quality of these modules exponentially. In turn, this equipment has enhanced the possibilities of Hawkeye's progression towards High Definition (HD) production. The Final Cut Studio 2, Adobe Master Collection, and iWork 08' application suites and Wacom Tablets were all utilized in the creation of the video modules for this project.

Management

To assure successful execution and completion of the four collaborative projects, a management plan was organized and developed according to the four Sub-Domains of Management (Seels & Richey, 1994). These Sub-Domains are Project Management, Resource Management, Delivery System Management, and Information Management. A discussion of these sub-domains follows.

Project Management

In order to develop four successful production schedules for the collaborative projects and manage them simultaneously, it was important for the Brobst Center research team's Project Manager to designate specific project roles for the Brobst Center research team, faculty, and staff collaborators. The roles of the Brobst Center research team members were to provide production and technical expertise in assisting the other collaborators in the Digital Resource Lab, with the development of a standardized process that would provide a consistent, predictable, and user-friendly platform for future endeavors in media development, delivery, and collaboration. In turn, the roles of the assisting collaborators were to serve as both content experts and strengthening assets for this project given the extensive knowledge and expertise that they possess in their particular areas of focus. The role of the Project Manager was to serve as the video editor for the majority of production projects, and actively engage in facilitating meetings regarding the overall progress of staff activity. In

addition, he would submit both a Midterm and Final Report at the conclusion the project. To increase the efficiency and ease of managing the four collaborative projects, the Project Manager appointed certain Brobst Center research team members to assist with the production and development of each of the collaborative projects. These team members would share progress reports with him during monthly organizational meetings, as well as provide production footage for editing purposes.

Given that the *Cyber-Communication Project Grant* was officially set for an allotted time period that ran between the dates of August 2008 and May 2009, the Project Manager developed an initial, overall schedule for the project. An overview of this schedule is as follows:

May 2008 – (Monthly Meetings Begin) Organizational Meetings with the Brobst Center research team

July 2008 – Order Software, Hardware, and Supplies

July 2008 – (Brobst Center Research Team) Complete research on virtual servers

August 2008 – (Monthly Meetings Begin) Organizational Meetings with the Faculty and Staff collaborators

August 2008 – (Virtual Server Technology Training) Training sessions with collaborators 1-3

November 2008 - (Virtual Server Technology Training) Training sessions with collaborators 4 & 5

Following the creation of this schedule, separate training and production schedules were created via Gantt Charts and set to adhere to employee staff availability (See Appendix).

Resource Management

A budget of \$12,882.00 was allotted for the *Cyber-Communication Project*. Four iMacs, Final Cut Studio 2, Adobe Master Collection CS3, and iWork 08' software application suites were ordered. Three Wacom Intuos 3 Tablets, an Applecare Plan, and iTunesU hosting were all ordered as well. All items arrived on time and were promptly installed. The Project Manager and the Brobst Center research team allotted a substantial amount of testing time to become acclimated to the Final Cut Studio 2 and Adobe Master Collection CS3 software suites as the learning curves for both were high. The results were substantial as the production quality of the project videos and the efficiency of the workflow increased exponentially. Scheduling the training sessions for the faculty/staff collaborators was problematic at times due to availability conflicts. Yet, the Brobst Center research team members adapted to each situation.

Delivery System Management

YouTube, TeacherTube, and iTunesU have proven to be effective media delivery systems. However, the development of delivery system management processes has been difficult due to ongoing accessibility issues on the Hawkeye Community College campus. The Project Manager and the Brobst Center research team conducted several testing sessions for the purpose of developing a comparative analysis. During the virtual server testing and development sessions, the Brobst Center research team found that TeacherTube provided the greatest ease of use due to its level of accessibility on and off campus, its embeddable video player, and the high quality of its video play. However, the Brobst Center research team was unable to produce an accurate comparison of the three virtual servers given the college's bandwidth and accessibility difficulties. They have worked closely with Hawkeye's

Computer Information Systems Department to rectify these issues.

Information Management

To monitor the consistency, user-friendliness, and predictability attributes of the virtual servers, the Project Manager used several tools to gather quantitative evidence. Firstly, he disseminated preliminary questionnaires to the project collaborators to determine the levels at which they were producing and delivering media in their classrooms or departments. Secondly, he developed preliminary, formative, and summative questionnaires that were delivered to students and focus groups at designated time periods throughout the duration of the *Cyber-Communication Project* to measure the before and after effects of virtual server technology implementation in these consecutive areas. Separately, statistical evidence was gathered from each of the virtual servers that pertained to the amounts of project video uploads and Internet plays/views.

Evaluation

The process was evaluated by tracking completion dates and creating notes of each meeting, training, and sessions with collaborators. Given the fact that each collaborative project was different in nature and context, the teams determined that certain faculty/staff members would develop separate evaluation processes based upon the needs of their various departments. For statistical data gathering preliminary, formative, and summative questionnaires were used in each of the projects. Finally, Plus/Deltas were produced from these experiences to make improvements to the faculty training, planning, and application. From these assessment pieces, and with the ongoing notes from research and practice, the collaborators created findings and recommendation reports. The project results and outcomes are as follows:

Yes You Can – Document Signage Project

Per organizational meeting notes and communication with the Yes You Can Staff, the two main informational priorities of the *Yes You Can* presentation are:

1. Clarifying the differentiation between Academic Suspension and Financial Aid Suspension Processes.
2. Verifying Academic and Financial Aid Reinstatement processes.

Furthermore, the goals of this project were to improve the level of student preparedness and documentation signage prior to their attendance at the Yes You Can Orientation Session. In accordance with these goals, three video modules were produced: “Academic Suspension to Reinstatement,” “Financial Aid Appeal Form Signage,” and “Academic Planning Worksheet Signage.”

Students who were involved in the “Yes You Can” program were provided with Formative Evaluation Questionnaires between the dates of April 1st and 31st. The data collected provided the Brobst Center research team with substantial information regarding the effectiveness of these video modules regarding the categories of consistency, predictability, and user-friendliness. Our findings are as follows:

Questionnaire Feedback:

Question #1: *“Did you view the optional “Yes You Can” informational videos prior to attending/viewing the “Yes You Can-Moving from Suspension to Success” session/video?”*

- 54% Viewed the YYC Informational videos prior to attending the session.
- 44% Did not view them
- 1% Gave no answer

(Per the students who viewed the video: Distance learning is now a factor as 33% of the

students viewed these videos “off campus.” Only 1% viewed them “on campus.” Yet, 56% gave no answer regarding their viewing location.)

Question #2: *“By which source did you view the “Yes You Can” informational videos?”*

- 1% = Viewed the videos on YouTube
- 0% = iTunesU
- 99% = Via Hawkeye Website (TeacherTube Embedded Videos)
- 0% = Via Email

(The Yes You Can group predominantly notified students of video placement on the Hawkeye Community College website.)

Question #3: *“Did you experience any difficulties with viewing any of these videos?”*

- 22% = Experienced difficulties with viewing the videos
- 88% = Experienced no difficulties

Question #4: *“Did you view the “Yes You Can” Informational videos on a “personal” or campus computer? Please mark each characteristic below that applies to the computer that you used.”*

- 67% = Viewed the videos on personal computers
- 0% = Viewed the videos “on” campus
- 0% = Viewed on Macs
- 33% = Viewed on the PCs
- 33% = Viewed on Laptops
- 22% = Viewed via wireless connections
- 44% = Viewed via internet/cable connections

Question #5: *“Did you experience any interruptions (continuous starting and stopping) while*

viewing any of these videos?

- 1% = Experienced interruptions
- 78% = Experienced no interruptions
- 1% = No answer

Question #6: *“On a scale of 1 – 5, 5 being the greatest, did these videos provide you with a clear understanding of how to locate and sign the required suspension reinstatement forms?”*

- 0% = Ratings of 1 or 2
- 1% = Rating of 3
- 44% = Rating of 4
- 33% = Rating of 5
- 1% = No Answer

Question #7: *“Did you arrive at the LIVE “Yes You Can” session with the following forms signed: The Appeal Form and the Academic Planning Worksheet?”*

- 1% = Students arrived at YYC Session with forms signed
- 22% = Students did not arrive with forms signed
- 67% = No answer

(The following questions refer to the content of the videos.)

“The information helped me understand the correct process for successful completion of the form.”

- YYC Seminar: 56% Agreed / 44% Strongly Agreed
- Fill Out Appeal Form: 66% Agreed / 22% Strongly Agreed / 1% No Answer
- Fill Out Academic Plan: 1% Neutral / 33% Agreed / 33% Strongly Agreed / 22% No

- Answer

“The presenters were clear and knowledgeable.”

- YYC Seminar: 33% Agreed / 66% Strongly Agreed
- Fill Out an Appeal Form: 33% Agreed / 33% Strongly Agreed / 22% No Answer
- Fill Out an Academic Plan: 22% Agreed / 33% Strongly Agreed / 22% No Answer

“The layout of the content of the video was organized well and it was easy to follow.”

- YYC Seminar: 66% Agreed / 33% Strongly Agreed
- Fill Out an Appeal Form: 56% Agreed / 1% Strongly Agreed / 33% No Answer
- Fill Out an Academic Plan: 44% Agreed / 22% Strongly Agreed / 33% No Answer

(Note: None of the students disagreed with the content in questions I – III)

Yes You Can” Project Summary:

- Per staff feedback, this media delivery process provided the YYC Team with enhanced communication capabilities that surpassed the regular usage of PowerPoint and VHS tapes.
- The Formative Evaluation Questionnaires served as useful measurement tools for this project.
- Based upon student feedback, this project succeeded in providing students with a clear understanding of the Yes You Can Program, Academic and Financial Aid Suspension and Reinstatement processes, the difference between these processes, and the steps needed to ensure success. Furthermore, they found the video content to be very informative. However, few to none of the students arrived at the Yes You Can Session with the required forms pre-signed. In regards to the consistency, predictability, and user-friendliness of the media delivered, a majority of the

students were able to access and view the video content and operate the video players with no difficulties. All but 1% of the students chose to access the videos off campus.

D. The time needed to learn the new software for these productions was extensive.

However, it yielded substantial improvements in the quality of these productions and enhanced our level of cinematic capabilities. We were also pleasantly surprised per the level of outside exposure that these video modules received. Combined, the three “Yes You Can” Modules were viewed a total of 992 times via the Internet.

E. There are no methodology changes, however for future study I would like to create a comparative analysis between this questionnaire information (Spring) and data gathered throughout the Fall Semester.

Virtual Focus On Friday – Promotional Modules

Per preliminary communications with the “Virtual Focus on Friday” team, their original methods of marketing, advertising, and attracting prospective students were: Print, direct mail, e-mail, the HCC website, promotional events (e.g. Focus on Friday), college fairs, high school visits, and slides on the Hawkeye’s Mediacom cable channel. Some motivational DVDs were used during their “Focus on Friday” sessions. However, they were lacking reliable, media-rich, web-based content that could reach a much broader audience.

Therefore the goal of this project was to develop three promotional video modules. Unfortunately, schedule conflicts and staff absences resulted in the production of just one module, “Why Hawkeye?” Yet, due to its high production quality, the “Why Hawkeye?” module was widely accepted by the prospective students, parents, and Hawkeye Staff according to the “Virtual Focus On Friday” team. Furthermore, the Admissions Department

Staff has used it as a permanent staple in each of their “Focus On Friday” sessions with no viewing difficulties. “Why Hawkeye?” was also featured in their first ever “Virtual Focus on Friday” session that was delivered via the ICN.

Student feedback data collection was hindered due to schedule conflicts. However, audience-tracking data (per view) was collected. “Why Hawkeye?” is available on each of the three virtual servers. This data is listed below:

- Teachertube: 231 Views
- Youtube: 85 Views
- iTunesU: Interactions within iTunesU were not tallied on a per/view basis, but the videos can be accessed via any computer that has downloaded iTunes and has access to the iTunes Store. Students can also download this file directly to their ipods.

Given the success of the “Why Hawkeye?” video, the “Virtual Focus On Friday” team recently proposed the production of a video that showcases the highlights of life in “Student Housing.” This video is currently in production. The Brobst Center research team would look forward to further research regarding the marketing effectiveness of these videos.

The Mathlab and Learning Objects Projects

Both of the collaborators for these projects had extensive experience with using the Camtasia software to produce media-rich content. Therefore, they chose to produce their own content. The premise behind both of these projects was to produce interactive video modules to assist Pre Algebra and Algebra students in understanding various mathematical concepts. They each chose iTunesU as the virtual server for their projects based on the high volume of videos that they would need to produce. Separately, iTunesU offers a capability that is not available on the other virtual servers. There is an administrative login mechanism that

enables instructors and institutions to determine which viewers can view their content. As a result, only Hawkeye instructors and students could view this content.

Statistical data was extremely difficult to consistently track as each of these projects was plagued with the same reoccurring problem of accessibility loss. This problem did not lie with iTunesU. Internal campus accessibility issues caused sporadic accessibility periods in which students and instructors would be able to access iTunesU on and off campus. Then suddenly, these capabilities would cease for long periods of time. Fortunately, students and instructors were able to access iTunesU from home, upload, and download videos. It is accessibility from home that allowed these instructors to create and upload 390+ videos to iTunesU.

PROJECT

Project Challenges (Virtual Servers)

Early in the project process, the collaborators experienced certain accessibility challenges that hindered progress initially. Based upon extensive research and cooperation with our Information Technology (IT) department, they discovered difficulties with accessing YouTube on campus. Faculty and Staff had to request access privileges from Hawkeye's IT department to utilize YouTube. Yet, access was sporadic at times due to bandwidth problems. Planning delays also occurred due to intellectual property protection issues.

TeacherTube proved to be a very reliable source for delivering media (on and off campus). However, it was discovered that video files on TeacherTube must be no longer than 15 minutes in length. This factor has not affected the use of 3-5 minute video modules for this project. Yet, different approaches for using 15+ minute videos have been taken into consideration for future use.

The process for building an iTunesU site began in late August of 2008. Documentation for agreements and a contract with Apple for the site space took longer than expected due to some confusion regarding authorizations and who could or could not sign the agreements. Both Apple and Hawkeye Community College had small issues, which contributed to the production delay. Separately, efforts to find a significant block of time to further the investigation had been hampered by staff absences due to prolonged illness. However, further research and production continued.

The Brobst Center research team discovered the iTunesU provides administrative capabilities that are not found in open-source virtual servers such as YouTube and

TeacherTube. iTunesU is designed to fit seamlessly with any existing web authentication and authorization system and is compatible with Windows and Mac operating systems (Apple Education, 2008). Through research, the Brobst Center research team also discovered that iTunesU offers advanced access capabilities that allow an institution to display a public interface for public content, and a private interface for private content. The Brobst Center research team created a public Hawkeye Community College site for testing, but more research must be conducted regarding privacy capabilities. Instructors were allowed to upload their video files in .mp4 (MPEG-4 with H.264 compression) and .m4v formats for best use with iPods (.mov files are also accepted, but not recommended for iPods). Overall, iTunesU had the best output resolution of the virtual servers at 640 x 480 pixels and a frame rate of 30 frames per second. Yet, campus accessibility issues must definitely be addressed.

Production Achievements

Despite certain setbacks that occurred in the beginning, the collaborators were able to create high quality video modules for all of the collaborative projects. A summary of the project outcomes is described in the next section.

The “Yes You Can” Signage Project

Organizational meetings and regular communications occurred. The three designated video modules (“Academic Suspension to Reinstatement”, “Financial Aid Appeal Form Signage,” and “Academic Planning Worksheet Signage”) were produced and are available on the Hawkeye Community College website, TeacherTube, YouTube, and iTunesU. Example URLs are available below: <http://www.hawkeyecollege.edu/financialaid/forms/sap.aspx>
 “Yes You Can Program Video” (Academic Suspension & Reinstatement):
http://teachertube.com/members/viewVideo.php?video_id=47110&title=HCC_Yes_You_Ca

n_Program

The “Virtual Focus on Friday” Project

The video module “Why Hawkeye?” was produced and is available on TeacherTube, YouTube, and iTunesU. The Admissions group has used this video during various Focus on Friday sessions including a virtual ICN session. A second video “Living It Up At Hawkeye!” was produced, but is currently under review due to staff employment changes. An example of the “Why Hawkeye?” video is available at:

http://teachertube.com/members/viewVideo.php?video_id=62630&title=HCC_Why_Hawkeye

The “Learning Objects” Project (Utilization of iTunesU)

A test iTunesU site has been built and classes from the first set of investigators were included in the first testbed. An additional course was housed as a private access site due to academic and copyright issues until all agreements could be worked out. Compression and delivery standards were developed and are being tested. This site is working much as we had hoped, delivering content to those who need access, but more research needs to be done regarding larger focus groups, private and public access files, and on campus/off campus accessibility. An example of the iTunesU site is available below:

<http://deimos.apple.com/WebObjects/Core.woa/Browse/hawkeyecollege.edu>

The “Math Lab” Project (Use of iTunesU)

Production on this project was delayed initially due to progress delays with the iTunesU site. The instructor’s project was very similar to the layout of the Learning Objects project. Of the three virtual servers, she chose to utilize iTunesU. Production on this project was delayed due to schedule conflicts and staff absences. Furthermore, her project was also

directly affected by the interconnectivity/accessibility problems that plagued the Learning Objects project. The instructor utilized several MathLab tutorial podcasts that were focused upon enhancing the impact of her course content. Her students described these video modules as very informative and helpful. Furthermore, they could access these videos from anywhere.

Examples of these videos can be accessed at:

<http://deimos.apple.com/WebObjects/Core.woa/Browse/hawkeyecollege.edu>

This instructor's content has been set to private, but can be accessed upon request.

CONCLUSIONS AND RECOMMENDATIONS

The Cyber-Communication Project grant had a dual focus: to address faculty and staff expectations towards delivering instructional content to any student, anywhere, at any time despite the distance; and to determine the extent of Hawkeye's media delivery capabilities based on the categories of consistency, predictability, and user-friendliness. The Hawkeye Community College Brobst Center research team's primary project goal was to study the current collaborative media delivery capabilities of virtual servers (ie. YouTube, iTunesU, and TeacherTube) that can provide platforms for sharing media content such as streaming videos, music, podcasts, lectures, and instructional projects. Based upon results of the design, development, and management of four distinctly different media-rich projects, the Brobst Center research team was able to indentify the potential applications of software and virtual server implementation throughout the college, and provided findings and recommendations in using the technology to determine effective media delivery solutions for Hawkeye Community College.

As the Project Director, I am very pleased with the quality of the video modules that the research team has been able to produce using our new hardware and software. Our current production capabilities have far surpassed those of past days in which we could barely merge video content with audio files or provide media-rich content that was consistently available to students both on and off campus. Although we have encountered high learning curves in using certain software applications, our team adapted quickly in developing best practices for assisting faculty/staff in preparing content for virtual server media delivery. But there is still much to learn. We plan to continue gathering data for each of the collaborative projects. Student feedback has verified that TeacherTube, YouTube, and

iTunesU are effective tools for consistent, predictable, and user-friendly media delivery. Yet, more research must be conducted before we can determine which of these is the most effective solution for campus-wide utilization.

Currently, the collaborators are elated with the quality of the video modules that have been produced. Their knowledge of virtual server applications for instructional delivery increased exponentially. Separately, these virtual servers have enabled us to reach a broad audience via the internet (YouTube = 13 Videos Online/ 284 Views, TeacherTube = 24 Videos Online/19,309 Views, iTunesU = 390+ Videos Available Online/Views to be determined).

Given their level of versatility, the team has recommended using virtual servers to several faculty/staff members who are eager to produce content both for their courses, and as marketing tools to attract prospective students. The administration has also used TeacherTube.com to post Iowa Representative Bruce Braley's keynote address for the Hawkeye Community College Spring Graduation Commencement 2008 and the videos of the AQIP Check-Up Team's visit to the college. We presented *The Cyber-Communication Think Tank: Catapulting the Effectiveness of Educational Media Delivery with Virtual Servers* (YouTube, TeacherTube, and iTunesU) at a break-out session for the Iowa Association of Communication Technology (IACT) Fall Conference 2008. My recommendation is that the college administration continues to support this research and the progression towards further virtual server applications campus-wide. Distance learning and educational technologies are constantly evolving and we now have the tools to reach a vast range of prospective students. The possibilities are endless.

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APPENDIX

Example of a Gantt Chart for the Cyber-Communication Project

Project Gantt Chart | Cyber-Communication Project | May 2008-May 2009

Manager:

Jason Dorris

Activity	Month	May	June	June	July	July	Aug	Aug
Begins: O		30th	15th	30th	15th	30th	15th	30th

Activity

Completed:

X

Project

Activities: "Yes

You Can"

Supplemental

Modules

Set date/ reserve site
for the June 08'

0 X

Organizational Meeting
Research most feasible
virtual server for media
delivery of this project

0 X

Meet for Monthly
Organizational Meeting

X

Video Production and
Editing for 3 Initial

0 X

Video Modules
Finalization, uploads,
and confirmed
availability /
accessibility of modules
online

0 X

Set date/ reserve site
for the July 08'

0 X

Organizational Meeting
Meet for Monthly

X

Organizational Meeting
Reflection and

0 X

evaluation of initial
production process

0 X

Determine dates for
virtual server /

0 X

equipment training
(Quentin H. / Gisella

B.)

Virtual Server /
Equipment Training
Sessions (Quentin H. /
Gisella B.)

X