ABSTRACT OF CAPSTONE

Christopher D. Howes

The Graduate School

Morehead State University

April 13, 2018

CREATIVE COLLABORTION IN HIGHER EDUCATION:
A GUIDE FOR DISTANCE LEARNING TECHNOLOGIES

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Abstract of Capstone

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A capstone submitted in partial fulfillment of the
Requirements for the degree of Doctor of Education in the
College of Education
At Morehead State University

By

Christopher D. Howes

Lexington, Kentucky

Committee Chair: John H. Curry, Associate Professor

Morehead, Kentucky

April 13, 2018

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CREATIVE COLLABORTION IN HIGHER EDUCATION:
A GUIDE FOR DISTANCE LEARNING TECHNOLOGIES

Synchronous video-based distance learning at Morehead State University (MSU) has a strong history and promising future. The primary service region of MSU includes 22 counties in eastern Kentucky. Barriers to higher education for culturally and geographically diverse students can be reduced with distance learning technologies. The synchronous distance education program at MSU drives efficiencies, reduces geographic barriers, and promotes accessible higher education beyond to the MSU service region and beyond. This carries with it the implied personal, professional, and economic benefits of higher education.

This capstone, with the larger enterprise distance learning project, provides a technology environment that expands and enhances distance learning offerings beyond traditional models. The genesis of this capstone began with the desire to offer students at MSU an improved distance learning experience and push the boundaries of traditional site based synchronous video instruction. A guiding principle of the enterprise project was to develop and implement an advanced technology solution that seamlessly enhanced the learning environment.

The new distance learning platform at MSU is operationally, technically, and overall fundamentally different than the prior environment. Failure to understand the use and integration of technology tools can have a negative impact on instruction, especially within the context of synchronous multimodal courses that depend on real-

time collaborative technology. This capstone will address this need and develop an

instructional guide to provide a technology overview and operational guidelines of

the new synchronous distance learning environment.

KEYWORDS: collaboration, distance learning, synchronous, videoconferencing

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Candidate Signature

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Date

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A GUIDE FOR DISTANCE LEARNING TECHNOLOGIES

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DEDICATION

This capstone is dedicated to my family.

For my wife, Rebecca. Whose constant support and encouragement made this possible. Your uncompromising love and care for our family eased the load of completing a doctoral program. As with life, we did this together.

For my children, Emilia and Jude. You are my inspiration and reason to persevere. This began as a desire to show you the importance of education and lifelong learning. Your trips to visit me at the library were always a welcome surprise and helped push me forward. Thank you for your smiles, laughs, and hugs. This is for you.

For my parents, thank you for everything.

The days were long, but the years were short.

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

What is the core of this capstone?

Advances in communication and collaboration technologies provide institutions of higher education the opportunity to offer innovative distance learning experiences (Batte, Forster, & Larson, 2003; M. Bower, 2011; Gillies, 2008; Jung, Irons, & Keel, 2002; Knipe & Lee, 2003; Martin, 2005; Smyth, 2005, 2011; Stewart, Harlow, & Debacco, 2012). The core of this capstone project is development of an instructional guide for new distance learning technologies at Morehead State University (MSU). The target audience for the instructional guide are MSU faculty members, associated support personnel from the Office of Information Technology (OIT), and the Office of Distance Education and Instructional Design (ODEID). Building upon distance learning best practices from Hastie, Chen, & Kuo (2008), this guide will provide easily accessible reference materials for new distance learning technologies. The guide will include the following modules:

1. Introduction to new distance learning technologies at MSU.

2. An overview of technology components of new learning spaces at MSU.

3. Guide for scheduling, initiating, and hosting a distance learning course at MSU.

Communication in learning environments can be synchronous or asynchronous (Koppelman & Vranken, 2008). This project focuses on synchronous communication delivered by web and videoconferencing technologies.

Adopting and integrating new communication and collaboration tools, such as web conferencing, attracts students that prefer synchronous instruction but are unable to be on campus (Ellingson & Notbohm, 2012). Poley (1998) elevates the importance new technologies play in the future delivery of higher education by stating "it is clear that public higher education will only thrive and survive by meeting the learning needs of citizens throughout their life cycle…and incorporating the possibilities of new technology…into organization and delivery systems" (Poley, 1998, p.973). The new distance learning technologies at MSU are designed to encourage life-long learning by providing anywhere, any device access to synchronous instruction.

Distance Learning at MSU

The primary service region of MSU includes twenty-two counties in Eastern Kentucky. As Groeschen (2015) details, this area has some of the lowest educational achievement rates in the United States. The economical sustainability of this region has been highly dependent on the coal industry. Coal production in these counties have significantly declined in recent years impacting an already poverty afflicted area (Groeschen, 2015). Providing a high quality and affordable higher education in this region continues to confirm MSU as a "light to the mountains" ("Morehead State University :: About," 2017).

Distance education in the context of network technology enabled instruction is a relatively recent innovation. However, the concept of "learning at a distance" has a long history, dating back centuries. Early formal distance education courses began to appear in the nineteenth century Germany, England, and the United States in the mid-

nineteenth century (Neal, 1999; Williams, Nicholas, & Gunter, 2005). Many theories

and definitions of distance education exist, but for this capstone the Association for

Educational Communications and Technology (AECT) definition will be used:

"Institution-based, formal education where the learning group is separated, and where

interactive telecommunications systems are used to connect learners, resources, and

instructors" ("Defining Distance Education," n.d.).
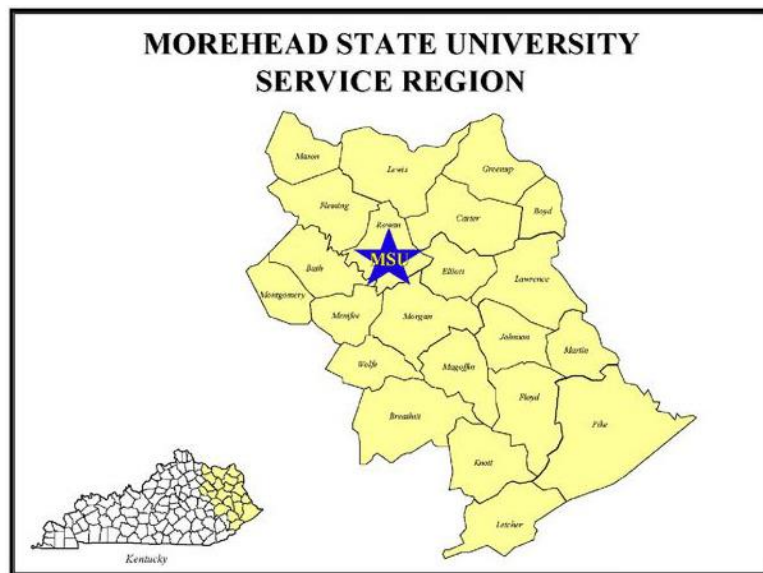
Figure 1. Morehead State University Service Region

The synchronous distance learning program at MSU facilitates instructional

partnerships with other Kentucky higher education institutions, including the

University of Kentucky (UK) and the Kentucky Community and Technical College

System (KCTCS). Studies have shown videoconferencing has tremendous potential

for teaching clinical skills (Regan & Youn, 2008). The UK Physician Assistant

Studies Program is a joint program that offers students the opportunity to complete

required courses on the MSU campus. MSU regional campuses with synchronous

distance learning options include MSU at Ashland, Kentucky, MSU at Mt. Sterling,

Kentucky, MSU at Prestonsburg, Kentucky, and the University Center of the

Mountains in Hazard, Kentucky.

Need for an Instructional Guide

The new distance learning platform at MSU is operationally, technically, and

overall fundamentally different than the existing environment. Higher education

institutions often find faculty member training and adoption to be one of the biggest

challenges when introducing new technologies (Ellingson & Notbohm, 2012). Bower

(2011) highlights the importance of technological training in developing necessary

competencies when teaching using web conferencing technologies. Failure to

understand the use and integration of technology tools can have a negative impact on

instruction, especially within the context of synchronous multimodal courses that

depend on real-time collaborative technology. This capstone will address this need

and develop an instructional guide to provide a technology overview and operational

guidelines of the new synchronous distance learning environment.

Who is the capstone meant to impact?

This capstone will impact the faculty, staff, and students participating in

distance learning courses at MSU. The purpose of the capstone is to provide faculty

and staff an instructional guide that highlights the benefits of using the new

collaboration technologies. Synchronous distance learning and web conferencing

technologies provide multimodal opportunities that allow for increased engagement

and participation (Bower, 2011). Qualitative and quantitative research from Charbonneau-Gowdy and Cechova (2009) suggest that high-definition web conferencing technologies have a significant impact on enriching interactions in learning environments.

The instructional guide will not address pedagogical integration of the new technologies. The integration of these technologies into course design will be determined by faculty and instructional design professionals. As Smyth (2005) notes, faculty need time to investigate, trial, and reflect upon new technologies before significant changes to pedagogy. Gillies (2008) refers to the extensive study of Darabi, Sikorski, and Harvey (2006) in evaluating the need for pedagogical changes in synchronous distance education. They find that "pedagogical and logistical roles of distance education instructors are satisfactorily performed if they are technologically experienced and keenly aware of the significance of interaction as the building block of distance education" (p. 115). Indeed, Gillies (2008) suggests that while transferring live classroom techniques to synchronous distance education is inadequate, a pedagogical revolution is not necessary.

Videoconferencing technologies have been shown to have a positive impact on distance learning participants. As Stewart et al. (2012) note, "It is widely acknowledged that videoconferencing technologies in the classroom can benefit students and instructors who otherwise would not be able to interact synchronously (p. 361)." Ellingson and Notbohm (2012) found that web conference based distance learning courses provided students the ability to attend synchronous course meetings

from any location with minimal equipment requirements. This offers significant

opportunities for expansion of distance learning at MSU. Batte, Foster, and Larson

(2003) found that students perceived distance learning courses offered at regional

campus positively. The students were pleased with the opportunity to take courses

close to home.

　　　The distance learning project provided MSU faculty and students access to

next-generation collaboration tools. Student feedback indicates a preference for

distance learning environments that use new communication and collaboration

technologies (Marsh, Mitchell, & Adamczyk, 2010; Martin, 2005). The distance

learning environment at MSU has been updated with new technologies, including

platform, interface, and equipment. Videoconferencing provides new opportunities

for synchronous collaboration with outside industry and professional subject matter

experts (Laurillard, 1993).

　　　Research by Peterson (2006) highlighted the technical challenges with using

distance learning technologies. Students reported technical difficulties at a higher

rate when asked about disadvantages associated with the distance learning

experience. Noted issues included sound problems, service disruptions, and

participants who lacked adequate experience with the technology. Video, audio, and

connectivity disruptions can significantly impact the flow and effectiveness of

instruction. Karal, Cebi, and Turgut (2011) observed interruptions to video and audio

feeds went unnoticed by the instructor and students at remote sites missed certain

content. The instructional guide will support faculty, staff, and students in use of the new environment and assist in mitigation of technical issues.

Initiating a distance learning course with current technologies is a complex process, requiring extra facilitators for onsite administration and support. According to Rogers (1982), if the new distance learning technologies are perceived as complex, the innovation will diffuse more slowly. It is important that faculty and staff view the new solution as user friendly and reliable. Charbonneau-Gowdy and Cechova (2009) suggest that new tools alone are insufficient in producing positive outcomes. Participants, both faculty and students, should embrace the changes and opportunities offered by new synchronous distance learning technologies.

As Milrad et al. (2013) note, seamless learning activities are supported by the integration of technology solutions. The MSU synchronous distance education solution was designed to intuitively enhance the learning experience without inhibiting instruction, collaboration, or social interaction.

How was the capstone project implemented?

The Office of Information Technology (OIT) partnered with the Office of the Provost, Academic Affairs, and the Office of Distance Education and Instructional Design (ODEID) to identify parameters for design of learning spaces and technologies. Research by Czarapata and Friskney (2014), show that a "well-planned learning space design can positively impact the ease and effectiveness of interaction and collaboration amongst teachers and students" (p. 51).

The OIT and Academic area partnership supports the existing MSU
Information Technology Governance (ITG) guidelines. ITG is the process by which
resources and objectives of an organization's information technology function are
agreed upon, directed, and controlled. Adoption of ITG frameworks maximize
benefits and mitigate risks (Lorences & Avila, 2013). The lack of strategic alignment
between information technology and business objectives causes competitive losses
and negatively impacts organizational performance. Organizations use enterprise
governance of information technology to ensure alignment with strategic goals
(Debreceny & Gray, 2013).

A guiding principle for technology at MSU is to implement solutions based on
industry best practices, standards, and frameworks. A number of factors have
compelled organizations to evaluate and adopt standards based frameworks (Conger,
Venkataraman, Hernandez, & Probst, 2009; Teo, Manaf, & Choong, 2013).
Organizations continue to place a high value on IT services, recognizing
organizational data as strategic assets (Teo et al., 2013). Technology investments
continue to be a significant percentage of organizational capital spending (Debreceny,
2013).

The MSU team worked with companies that specialize in the design and
installation of audio, video, and web collaboration services. A similar approach at the
Auburn University Harrison School of Pharmacy was described by Fox, et al. (2011).
The MSU solution is based on Cisco videoconferencing equipment and Cisco
WebEx/Spark collaboration technologies. Seamless integration with the MSU

Blackboard Learn learning management system is accomplished with CirQlive. This

provides Single Sign-On to WebEx directly from the MSU LMS, access to recorded

and streaming sessions, and advanced web conference scheduling within the course

shell ("Cisco WebEx LMS Integration," 2017).

Instructional Guide Design

The instructional guide was designed using tools from Adobe Systems

Incorporated, specifically Adobe Illustrator CC 2018 and Adobe Photoshop CC 2018.

Adobe Illustrator is a vector graphics editing tool used for developing content for

print, web, and mobile devices. Adobe Photoshop is a raster graphics editing tool and

an industry leader in graphics editing. These tools were complimentary throughout
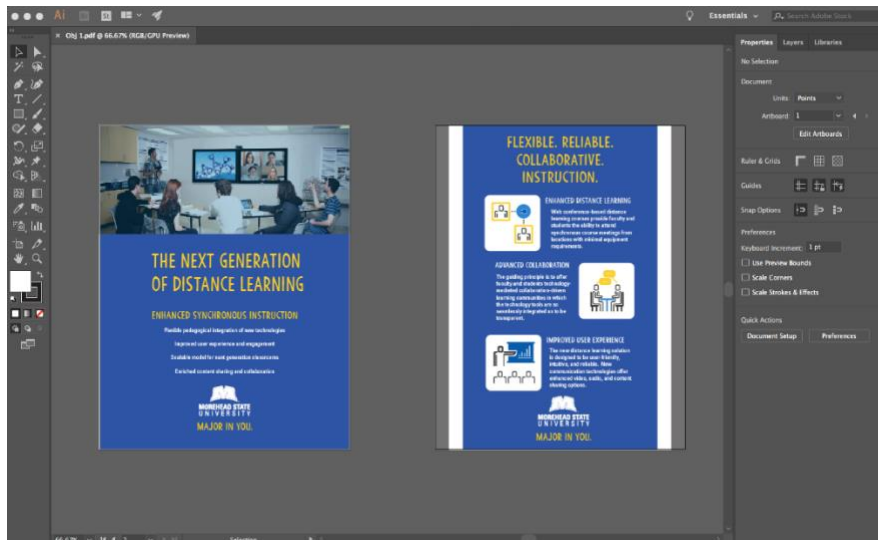
development of the instructional guide.

Figure 2. Adobe Illustrator CC 2018

Introduction to new distance learning environment.

The new synchronous distance learning environment offers significant user experience enhancements. A brief introduction to the new platform was developed, focusing on the areas of enhancements, collaboration, and user experience. Web conference-based distance learning courses provide faculty and students the ability to attend synchronous course meetings from locations with minimal equipment requirements.

The solution was designed to offer participants technology based collaboration tools that are seamlessly integrated into the learning communities. The software and hardware components were selected for transparent integration for an overall holistic collaboration solution. The new communication technologies offer enhanced video, audio, and content sharing options.

Overview of Combs 211 technology components.

The Combs 211 distance learning room was designed with next generation collaboration software and hardware. The room contains many different technology components, all of which work together to present an automated and engaging experience. The core of the distance learning solution is the Cisco WebEx collaboration platform.

Cisco WebEx collaboration platform.

Cisco WebEx is an industry leader in video and web conferencing. Cisco WebEx provides the foundation for the next generation of MSU synchronous distance learning programs. As a cloud hosted solution, Cisco WebEx allows faculty and

students to see, hear, and view the same information at the same time with integration of voice, video, and content sharing.

Videoconferencing.

Morehead State University's distance learning programs use videoconferencing to encourage engagement and participation in course activities. The Cisco WebEx platform, when combined with high definition displays, offers outstanding clarity and resolution. This provides an in-person like experience and creates an immersive learning environment.

Intuitive user experience.

A guiding principle for the next generation of distance learning at MSU was ease of use and integration with existing technologies. A modern user interface provides intuitive controls for hosting, joining, and actively participating in meetings. Cisco WebEx meetings can be created and scheduled through the web-based interface or desktop application suite. Cisco WebEx has support for Office 365 applications, including Microsoft Exchange and Outlook (MSU's email platform).

Interactive document, application, and screen sharing.

Content sharing is important in traditional classrooms, but even more so when participants are geographically dispersed. The next generation of synchronous distance learning at MSU includes unified content sharing for faculty and students. The integration of multimedia, including PowerPoint, Flash animations, audio, web-based, and video files is supported. The solution was designed to drive collaboration

and partnership through the sharing of documents, applications, and screens. The user interface offers chat and real-time polling features to all participants.

Personal collaboration rooms.

Faculty have the option of hosting non-class meetings in a permanent, personal, online conference room. The room can be scheduled to align with office and advising hours or on an ad-hoc basis.

Secure, scalable, and reliable service.

Morehead State University has made significant investments to upgrade and provide a next generation technology infrastructure. The combination of new infrastructure components and web-hosted solutions offer a reliable, engaging, consistent, and secure distance learning platform for faculty and students.

Cisco Telepresence Management Suite.

The Cisco Telepresence Management Suite (TMS) provides robust and flexible management of distance learning technology components. Cisco TMS allows administrators to automatically provision, schedule, and connect distance learning courses. The solution also provides detailed reports on technology performance for ongoing review and improvement. This robust and centralized solution allows technology to fade to the background while faculty and students focus on course content.

Cisco telepresence system components.

The Cisco Telepresence System is a powerful and flexible solution designed to provide the ultimate video collaboration experience. The Cisco hardware and

software components are tightly integrated as one holistic solution to create an

immersive and engaging learning environment.

Cisco SX80 codec.

The SX80 Codec is the audio and video engine for the distance learning

classroom. The device supports next generation video standards for optimized

bandwidth use across multiple sites. The SX80 is the bridge between room

components and the WebEx platform.

Cisco Telepresence 60 high definition camera.

Cisco Telepresence Precision cameras offer exceptional clarity and industry

leading image quality. The 10X optical zoom camera is ideal for the large distance

learning classroom. The cameras use advanced technologies Cisco brands as

Presenter Track Technology and Speaker Track Technology. This active speaker

technology automatically focuses on and displays the current speaker's video feed.

The Presenter Track Technology allows an instructor to remain stationary or move

about freely while presenting. The Speaker Track Technology changes camera focus

to the current student speaking during class discussions. This active speaker

technology is available in the Bert T. Combs Building 211 distance learning room.

Cisco Touch 10 touch panel controls.

The Cisco Touch 10 control unit offers an intuitive interface for controlling

Cisco collaboration systems. The unit is touch sensitive and provides a familiar user

experience for users accustomed to using other touch screen devices. With the touch

of a single button, the Touch 10 is used to begin and end Cisco WebEx meetings in the distance learning classroom.

Cisco ceiling microphone.

The Cisco ceiling microphones provide high definition and crystal-clear audio for distance learning participants. This next generation microphone effectively captures dialogue from different participants and is ideal for the large class room.

Compute.

The distance learning room includes a Dell workstation for presentation and content sharing. This workstation is integrated into the overall class room solution and seamlessly shares content across multiple connected sites.

Presentation and content sharing system.

The Crestron DigitialMedia Presentation System compliments the Cisco SX80 Codec to control audio and video room components. A key feature of the distance learning room is automation and usability. The Crestron system provides integration and automation features to enable automatic power control of different room components.

Digital display system.

A laser projection system was installed in the Combs 211 distance learning classroom. Laser projection systems offer superior clarity and life-like color reproduction. Unlike traditional projectors, the E-Vision Laser 6500 does not use a bulb lamp. This allows the laser project to operate significantly quieter than bulb-based models. The laser system also increases reliability and device lifetime. The

clarity, color reproduction, and quiet operation are ideal features for use in a classroom environment.

The Combs 211 distance learning room includes an advanced Stewart Filmscreen CIMA ElectriScreen. The oversized 123" projection screen pairs seamlessly with the laser projector to provide an exceptional viewing experience for the large classroom. Shared content is easily viewable, as well as remote classroom participants. The electric screen is integrated into the overall learning system and automatically retracts based on room use.

Guide for scheduling, initiating, and hosting a distance learning course at MSU

The purpose of this guide is to provide the operational steps necessary for scheduling, initiating, and hosting distance learning courses and ad hoc meetings at MSU.

Room and meeting control.

The Cisco Touch 10 control panel.

The Cisco Touch 10 control unit offers an intuitive interface for controlling Cisco collaboration systems. The unit is touch sensitive and provides a familiar user experience for users accustomed to using other touch screen devices. With the touch of a single button, the Touch 10 is used to begin and end Cisco WebEx meetings in the distance learning classroom.

Joining a scheduled WebEx meeting with the Touch 10 Panel.

Distance learning classes will be automatically scheduled and connected via the Cisco TMS software. However, for faculty scheduled meetings, the Touch 10

Panel will display a green "Join Meeting" button prior to the meeting start time. To join the meeting, simply click the green "Join Meeting" button. This one-button solution highlights the focus on delivering an intuitive user experience for faculty and students.

Sharing content with the Touch 10 Panel.

Distance learning instructors often share content with local and remote participants. The Cisco Touch 10 simplifies content sharing with seamless integration into the Combs 211 environment. A Dell workstation is provided for content sharing. To share content from this workstation to all connected sites, faculty and students simply click "Share" on the Cisco Touch 10.

Pre-scheduled distance learning course.

Distance learning courses at MSU are planned and scheduled in advance. Based on this course plan, The Office of Distance Education and Instructional Design schedule and reserve the distance learning classrooms. No actions are required from distance learning faculty or students for the scheduling process. The Cisco Telepresence Management solution provides an automated process for initiating distance learning classes. At a predetermined time (usually set at 10 minutes), the Cisco TMS system will automatically power on all classroom components and connect all remote sites. When faculty and students arrive to the classrooms, the technology components are ready for instruction and collaboration. The technology components in the Combs 211 room were designed to provide an intuitive user

experience while hosting distance learning courses. Faculty and students can share content using the Dell workstation located at the podium.

Ad hoc meetings.

Faculty are encouraged to use the WebEx platform outside of normal distance learning courses to meet with students and colleagues. Morehead State University has partnered with Cisco to offer a WebEx account to all faculty and staff.

Why were this capstone and related strategies selected?

Public higher education in Kentucky is undergoing a historic paradigm shift. General Fund appropriations for postsecondary education in Kentucky have declined significantly over the past decade. This declining support is due to limited resources and competing demands for those resources. MSU is not alone in this challenging environment. These changes are forcing all public institutions to find innovative ways to generate revenue and reduce costs. The funding landscape continues to undergo tremendous change with Performance Based Funding on the horizon ("Performance and outcomes-based funding," 2016). All public higher education organizations in Kentucky must adjust to this new appropriation model.

A majority of Kentucky jobs will require some postsecondary education by 2020 ("Performance and outcomes-based funding," 2016).   Enhancing Distance Education programs in Kentucky can be an effective way for institutions to generate revenue and provide accessible education. According to Owusu-Ansah, Neill, and Haralson (2011), distance education can increase enrollments in higher education, have a positive financial impact, and increase access for post-secondary students.

The relative advantages for adoption of new distance learning technologies are substantial. The prior technology infrastructure used for distance learning was antiquated and had reached end of life. The university could no longer obtain support for the aging infrastructure, which limited access to updates and new features.

Literature has long cited a lack of technical skills as a barrier for faculty adopting new distance learning technologies (B. L. Bower, 2002; Johnsrud, Harada, & Tabata, 2006; Lackey, 2012; Magnussen, 2008; Pina, 2010). When faculty transition into new instructional roles, they may lack the technical awareness to manage the course and meet the needs of the distance education learner (Lackey, 2012). The instructional materials developed by this capstone will aid faculty and staff during the transition to a new distance learning environment.

Improvements to technology infrastructure and platforms are not sufficient to ensure success in distance education environments (Irani, Telg, & Place, 2003). Research by Wiesenmayer, Kupczynski, and Ice (2015) showed that inadequate training and support programs prevent institutions from fully realizing benefits from distance education programs. Most faculty need meaningful support and training in the use of technology based distance education (Owusu-Ansah et al., 2011). This capstone developed instructional materials as part of a larger training and support program for faculty and staff.

The dynamic nature of technology keep pressure on faculty to remain proficient with new educational technologies. This has driven an increase in faculty requests for additional technical training opportunities (Lackey, 2012). Schmidt,

Tschida, and Hodge (2016) found self-directed learning opportunities to be helpful and recommend they be made available for faculty to consume on their own schedule.

Rogers' (1982) Diffusion of Innovation research is applicable to the implementation and adoption of the new distance learning technologies. An innovation is defined as "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1982, p. 11). Rogers defines diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1982, p. 4). This capstone is intended to have a positive influence on the innovation-decision process, which is the "process through which an individual passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision" (Rogers, 1982, p. 20).

Compatibility addresses the experience and perceived needs of the intended adopters (Ellsworth, 2000). Service disruptions are common with the existing distance learning technology and directly impact course scheduling, interrupt instructional activities, and increase support costs. This leads to a poor user experience for faculty and students. Rogers (1982) describes the four concepts related to compatibility as technology clusters, naming of innovations, positioning of innovations, and indigenous knowledge systems. The new distance learning innovations at MSU will be introduced as a technology cluster, packaging them as a singular technology solution. Effective positioning of the new technologies will be

important, especially for faculty and students that have encountered poor user experiences with the existing infrastructure.

A key component of the new distance learning technology plan is what Rogers (1982) describes as trialability. This allows intended users to explore the new technologies and get hands-on experience prior to course integration. It was important to develop a space were faculty and staff could try out the new technologies. Lackey (2012) found that faculty preferred technical training that provided opportunities to develop a comfort level with new technologies. These interactive "hands-on" experiences with new technologies prior to the conducting courses enable faculty and staff to become comfortable and confident (Irani et al., 2003). Early adopters will also use this space for actual course development and instruction.

A primary goal of the new distance learning classroom and early adopters is to increase observability of the innovation. The benefits of using the new distance learning technologies will be highly observable by faculty and students. As diffusion of innovation accelerates, potential adopters will want to improve the user experience and reliability of their distance learning courses. This significant improvement in user experience may generate an increased demand for distance learning courses in the regional campuses.

Gillies (2008) evaluated feedback from student participation in a videoconference distance education course. Student feedback was generally positive and fell within two themes of interaction and technology. Moore (Michael Moore,

1989) identified three methods of interaction that play important roles in distance

education environments: a) student-content interaction, b) student-instructor

interaction, c) student-student interaction. Student-content is described as students

interacting with the subject matter to construct meaning, relate it to personal

knowledge, and solve problems. Student-instructor interaction has traditionally

occurred during classroom-based discussions. In distance education environments,

student-instructor interaction may be synchronous via videoconferencing or

asynchronous through other forms of correspondence. Like student-instructor

interactions, student-to-student interactions in distance education may include both

synchronous and asynchronous methods of interaction.

Student perception of overall interaction within the learning environment is a

strong indicator for overall satisfaction (Fulford & Zhang, 1993). Martin (2005)

argues that videoconferencing bridges the transactional gap identified by Moore

(Moore, 1997). Gunawardena (1995) suggests that social presence and immediacy

play a significant role in the instructional effectiveness of distance learning. The new

synchronous videoconferencing technology at MSU allows instructors and students to

increase interaction, collaborate in real time, and enriches the overall learning

experience.

The instructional guide was developed with principles from "Blueprints for

Complex Learning: The 4C/ID-Model" (van Merriënboer, Clark, & de Croock, 2002).

The 4C/ID Model is described by van Merrenboer, Clark, and de Croock (van

Merriënboer et al., 2002):

First, the 4C/ID-model focuses on the integration and coordinated

performance of task-specific constituent skills rather than on knowledge types,

context or presentation-delivery media. Second, the model makes a critical

distinction between supportive information and required just-in-time (JIT)

information (the latter specifies the performance required, not only the type of

knowledge required). And third, traditional models use either part-task or

whole-task practice; the 4C/ID model recommends a mixture where part-task

practice supports very complex, "whole-task" learning. (p. 39-40)

When was the capstone implemented?

The capstone timeline was associated with the overall distance learning

refresh project. The distance learning refresh project timeline was driven by the need

to update and replace the antiquated distance learning technologies. The planning,

design, and installation of the new distance learning technologies were completed in

phased installations during 2017. Beginning with the 2018 Spring semester, all

synchronous distance learning courses at MSU are being scheduled, initiated, and

hosted on the new environment. Feedback from faculty, staff, and students are

positive. Participants are pleased with the overall improvement in experience,

especially with the high definition video.

A lack of instructional materials was identified as a risk to the project and

delay adoption of the new technologies. The introduction of new technologies often

requires new competencies for faculty and staff. Bower (2011) discuss synchronous

collaboration competencies required for effective teaching in web conference

environments. These include operational, interactional, managerial, and design competencies (M. Bower, 2011). Cochrane (1997) asserts "it is naive to assume that merely linking distant groups or individuals at different locations creates an effective learning environment" (p. 320).

This capstone developed a comprehensive guide to address operational competencies that can be used by MSU faculty and technology support staff. The introduction to new distance learning technologies, overview of room technology components, and guide for hosting a distance learning course were designed during 2017 and completed in 2018.

Impact of the capstone

Video and web conferencing are mature technologies. Laurillard (1993) defines videoconferencing as a "One-to-many medium, making it a sensible way to provide access for many sites to a remote academic expert (p.166)." Individuals can synchronously communicate with minimal bandwidth and device requirements. New technology developments will only serve to enhance the user experience (Arnold, Cayley, & Griffith, 2002). The synchronous distance learning solutions at MSU are based on industry leading technologies.

This shift to new delivery technologies has the potential to transform MSU distance learning into a boundaryless learning environment. The existing infrastructure was extremely limited in scope and functionality. Prior ITV courses were point to point, with no opportunity for additional collaboration. The new technologies significantly expand options for course delivery and allow faculty and

students to participate from anywhere with any device. As Stewart, Harlow, &

Debacco (Stewart et al., 2012) notes, web conferencing technologies offer far greater

opportunities for distance learning when compared to traditional interactive television

(ITV) courses. However, faculty can still design courses that reflect traditional ITV

courses, with site to site connectivity. The technology will no longer be a limiting

factor for distance learning course design and participation.

　　　　All participants will benefit from enhanced stability and availability.

Technical issues often disrupt existing distance learning courses and create a poor

instructional environment. Karal, Cebi, and Turgut (2011) found that technical issues

had the highest impact on student perception of distance learning courses.

Technology should be transparent and seamlessly enhance the user experience.

　　　　When technology issues occur, courses are interrupted and faculty must use

instructional time to troubleshoot technical problems. If the issues cannot be resolved

in a timely manner, that course meeting is canceled. Participants in remote locations

are left with little information about the disruption and service restoration. As Gillies

(2008) notes, a risk with synchronous distance education is the fundamental

dependency on real time technologies. Should any part of the technology fail, the live

instruction may be canceled and learning outcomes impacted.

　　　　Advancements in communication technologies address issues previously

identified with synchronous distance education. Significant improvements to the

MSU network infrastructure, both within the university local area network (LAN) and

remote wide area networks (WAN), provide increased performance. Access to high

speed service providers, cloud hosted platforms, and high definition equipment drastically improves the MSU faculty and student experience.

Introduction of high definition videoconferencing technologies offers improvements to social presence, immediacy, and collaboration (Ryan, Freeman, & Patel, 2000; Smyth, 2005). The quality of the videoconference experience is important and impacts the quality of education and the level of social interaction (Bates, 2005). An advantage of synchronous video distance education is that the instructor can immediately observe verbal and non-verbal student feedback (Lou, Bernard, & Abrami, 2006). However, low screen and image quality have been found to limit social interaction, especially eye contact and non-verbal cues, in synchronous distance education courses (Karal et al., 2011). Knipe and Lee (2003) note "Distance learning methods free students from the constraints of time and place and allow for more personal feedback than could be achieved from the traditional university teaching system (p. 301)."

Videoconferencing reduces costs by connecting instructors and students without the need to be physically present in the same room (Karal et al., 2011). Twigg (2001) identifies cost saving strategies for teaching and learning in distributed environments, including centralized module based course development and best practice content sharing among faculty. Access and delivery costs are reduced by offering courses to larger student populations.

Video and web-based conferencing technologies can increase access to synchronous instruction for students in disparate geographic regions. Increasing

access to higher education, especially for students unable to physically be on campus, is an important driver for growing distance learning programs. Cochran (1997) identified the benefits of using videoconferencing as ". . . providing access to learners in remote areas, ensuring that students are exposed to a technology which is increasingly used in professional practice . . . (p. 318)."

Limitations of the study

This capstone was associated with the larger distance learning refresh project at MSU. While this capstone focused on a single distance learning environment, the limitations of the capstone were inherently tied to the scope, risk, and challenges of the enterprise project. Implementation of these technologies into new and existing learning spaces, integration into course schedules, and participant training and adoption continued throughout the project. This work laid the foundation for the next generation of synchronous distance learning at MSU.

As previously noted, this capstone does not include guidance on pedagogical integration. Smyth (2005) asserts that technologies should be the servants of pedagogy rather than drive pedagogy. Integration into existing distance learning courses will be guided by faculty and instructional design professionals. Web conferencing environments can be more complex than traditional synchronous video courses. Faculty must determine what works best for their teaching style and course requirements (Ellingson & Notbohm, 2012).

While the new distance learning technologies offer an enhanced participant experience, research does not support a significant impact on learning outcomes. Lou

et al (2006) found that participant location in synchronous distance education has no significant difference on student learning. Indeed, as Russell (2001) concludes, technology has no significant difference for learning outcomes. When properly deployed and with appropriate pedagogical integration, synchronous distance learning technologies are no better or no worse than traditional classroom instruction.

The long-term distance learning strategy continues to be evaluated, in part due to these new technologies. Traditional synchronous distance education courses at MSU have been geographically dispersed with point-to-point or point-to-multipoint configurations. Advancements in videoconferencing, web conferencing, and mobile device-based conferencing offer far greater opportunities for growth and access (Stewart et al., 2012).

Reflections

The genesis of this capstone began with the desire to offer students at MSU an improved distance learning experience and push the boundaries of traditional site based synchronous video instruction. According to Stewart, Harlow, and Debacco (Stewart et al., 2012), "higher education providers are challenged to create a new classroom environment that retains what is good about face-to-face interaction and incorporates online access to information and participation, allowing for flexible student learning experiences (p. 358)."

A guiding principle of the project was to develop and implement an advanced technology solution that seamlessly enhanced the learning environment. A focus on user experience required the solution to be intuitive for all participants. Research has

shown students at remote sites rely heavily on correct room setup and appropriate technology configurations (Knipe & Lee, 2003). The technologies are tightly integrated and presented as a holistic instructional system. Centralized management and automation allows faculty and students to focus on instruction and learning, rather than technology management and support.

Much of the initial capstone project was used to evaluate development and publishing tools. The focus was narrowed to the Adobe Creative Cloud suite of tools, including Adobe InDesign CC, Adobe Illustrator CC, Adobe Photoshop CC, and Adobe Stock. Ultimately, Adobe Illustrator CC was selected as the primary development tool for the capstone. Limited experience with Adobe Creative Cloud suite products was accompanied with a notable learning curve.

Lou et al (2006) recommend future research focus on how synchronous video technologies, especially desktop and portable device conferencing, can enhance student-student and student-instructor interactions. These technologies provide the foundation to grow beyond the traditional site-based videoconferencing model. Future instructional and course design should explore using web conferencing technologies, including desktop and portable device conferencing. A hybrid course with site-based and web-based conferencing technologies could introduce faculty and students to the new technology and instructional models.

The distributed synchronous classroom has significant potential for enhancing student-to-student interaction and collaboration on course projects. Indeed, synchronous video in distance education at MSU has focused on instructor led

presentations. Since Moore (1989), other theorists have described additional methods

of interaction. Hillman, Willis, and Gunawardena (1994) suggested addition of

student-interface interactions. Anderson (2004) expands the research by including

instructor-instructor interaction, instructor-content interaction, and content-content

interaction.

Synchronous video-based distance learning at MSU has a strong history and

promising future. Bates (2005) suggested the traditional classroom model has been

the default standard with which to measure technology innovations. This capstone,

with the larger enterprise project, provides a technology environment that expands

and enhances distance learning offerings beyond traditional models.

Leadership

Leadership theories have been a focus of research and literature, leading to the

categorization of different leadership styles. Leadership styles include autocratic,

bureaucratic, laissez-faire, charismatic, democratic, participative, situational,

transactional, and transformational (Rad & Hossein Yarmohammadian, 2006). The

servant leadership style was introduced in contemporary literature by Robert

Greenleaf in 1970 (Greenleaf, 2008). Literature continues to examine and debate the

most effective leadership style for achieving desired organizational outcomes.

Servant leadership is a concept that has been around for centuries, dating back

to ancient civilization and religions. The practice of servant leadership is often

promoted as an alternative approach for successfully leading teams and organizations.

Greenleaf's *The Servant as Leader* kick-started an alternative discussion on leadership in 1970 that continues today. Greenleaf (2008) defined servant leadership:

> The servant-leader is servant first . . . It begins with the natural feeling that one wants to serve, to serve first. Then conscious choice brings one to aspire to lead. That person is sharply different from one who is leader first, perhaps because of the need to assuage an unusual power drive or to acquire material possessions. For such it will be a later choice to serve - after leadership is established . . . The difference manifests itself in the care taken by the servant-first to make sure that people's highest priority needs are being served. (p. 6)

Greenleaf later expanded his thoughts on servant leadership with his 1977 book, *Servant Leadership: A Journey into the Nature of Legitimate Power and Greatness*. This book is considered a seminal work on the theory of servant leadership. Despite his death in 1990, Greenleaf's works continue to drive a paradigm shift and provoke thoughtful discussions in leadership theories. While service leadership is a difficult theory to measure, Greenleaf did provide specific characteristics of servant leaders (Anderson, 2008). Servant leaders

- exhibit care;
- know their followers well;
- focus on followers and their needs;
- grow and develop followers;
- listen;

- provide vision;

- persuade;

- build strong and loving relationships with followers;

- empower others;

- build a sense of community;

- display humility.

Leaders at institutions of higher education are increasingly competing for the prospective students searching for distance learning programs. To drive recruitment and increase retention, organizations are investing in distance learning technologies that captivate and engage learners (Peterson, 2006). Mavridis, Tsiatos, and Tegos (2011) conclude that web conferencing platforms are capable and effective of supporting collaborative learning activities.

Barriers to higher education for culturally and geographically diverse students can be reduced with distance learning technologies. Synchronous distance education with video and web conferencing technologies can mitigate challenges created by geographic isolation (Gillies, 2008). Videoconferencing technologies can be used to increase access and provide quality instruction to a geographically dispersed population (Greenberg & Colbert, 2004). Instructor led point-to-point videoconferencing provide similar characteristics when compared to a traditional classroom experience (Simonson, Schlosser, & Hanson, 1999). As Stewart et al. (2012) note, "It is widely acknowledged that videoconferencing technologies in the

classroom can benefit students and instructors who otherwise would not be able to interact synchronously (p. 361)."

Leaders have a fiduciary duty to ensure effective appropriation and use of institutional resources. Owen and Aworuw (2003) find that investments in educational technology can provide substantial return on investments if the technology is appropriately deployed and adopted. Distance education programs increase accessibility to education opportunities and often lead to higher enrollments (Ellingson & Notbohm, 2012).

The opportunity to increase demand for higher education through distance learning should take precedence over loyalties to traditional delivery methods (Batte et al., 2003). Leaders must explore innovation and embrace technologies that improve access and delivery of higher education. As Gillie (2008) noted, "It may be, as technology develops and educational institutions evolve, that we find – in the videoconference and in other forms of communication technology – methods of working which will enhance teaching and learning in ways far superior to the traditional, classroom model (p.161)".

Institutions of higher education have an obligation to provide widely accessible educational opportunities (Dibiase, 2003). The synchronous distance education program at MSU drives efficiencies, reduces geographic barriers, and promotes accessible higher education to the MSU service region and beyond. This carries with it the implied personal, professional, and economic benefits of higher education. Stewart et al. (2012) conclude that synchronous distributed education

environments will progressively enable culturally and geographically diverse students increased access to higher education.

Personal experience has shown many technology investments sit idle due to the misconception that procurement and installation of the technology were the most important aspects of deployment and adoption. Greenberg and Colbert (2004) support this observation and add that the real work of deployment and adoption of new technologies are critically dependent on planning and training. MSU has a long history of providing distance learning courses at geographically diverse locations throughout eastern Kentucky. The instructional materials developed in this capstone drive training, adoption, and use of the next generation of synchronous distance learning technologies at MSU.

Capstone

Objective 1

Objective 2

THE NEXT GENERATION OF DISTANCE LEARNING

TECHNOLOGY OVERVIEW

COMBS 211 CLASSROOM

MOREHEAD STATE UNIVERSITY

TECHNOLOGY OVERVIEW

Cisco WebEx Collaboration Platform

Cisco WebEx is an industry leader in video and web conferencing. Cisco WebEx provides the foundation for the next generation of Morehead State University's (MSU) synchronous distance learning programs. As a cloud hosted solution, Cisco WebEx allows faculty and students to see, hear, and view the same information at the same time with seamless integration of voice, video, and content sharing.

Video Conferencing

Morehead State Universities distance learning programs use video conferencing to encourage engagement and participation in course activities. The Cisco WebEx platform, when combined with high definition displays, offers outstanding clarity and resolution. This provides an in-person like experience and creates an immersive learning environment.

User Experience

A guiding principle for the next generation of distance learning at MSU is ease of use and seamless integration into existing technologies. A modern user interface provides intuitive controls for hosting, joining, and actively participating in meetings. Cisco WebEx meetings can be created and scheduled through the web based interface or desktop application suite. Cisco WebEx has support for Office 365 applications, including Microsoft Exchange and Outlook (MSU's email platform).

1

TECHNOLOGY OVERVIEW

Interactive Document, Application, and Screen Sharing
Content sharing is important in traditional classrooms, but even more so when participants are geographically dispersed. The next generation of synchronous distance learning at MSU includes unified content sharing for faculty and students. The integration of multimedia, including PowerPoint, Flash animations, audio, web-based, and video files is supported. The solution is designed to drive collaboration and partnership through the sharing of documents, applications, and screens.

WebEx Personal Rooms
Faculty have the option of hosting non-class meetings in a permanent, personal room. The room can be scheduled to align with office and advising hours or on an ad-hoc basis. The room be left open or locked to admit participants as they arrive.

Secure, Scalable, and Reliable Service
Morehead State University has made significant investments to upgrade and provide a next generation technology infrastructure. The combination of new infrastructure components and web-hosted solutions offer a reliable, engaging, consistent, and secure distance learning platform for faculty and students.

Cisco Telepresence Management Suite
The Cisco Telepresence Management Suite (TMS) provides robust and flexible management of distance learning technology components. Cisco TMS allows administrators to automatically provision, schedule, and connect distance learning courses. The solution also provides detailed reports on technology performance for ongoing review and improvement. This allows technology to fade to the background while faculty and students to focus on course content.

2

TECHNOLOGY OVERVIEW

Cisco Telepresence System Components

The Cisco Telepresence System is a powerful and flexible solution designed to provide the ultimate video collaboration experience. The Cisco hardware and software components are tightly integrated as one holistic solution to create an immersive and engaging learning environment.

Cisco SX80 Codec

The SX80 Codec is the audio and video engine for the distance learning classroom. The device supports next generation video standards for optimized bandwidth use across multiple sites. The SX80 is the bridge between room components and the WebEx platform.

Cisco Telepresence 60 High Definition Camera

Cisco Telepresence Precision cameras offer exceptional clarity and offers industry leading image quality. The 10X optical zoom camera is ideal for the large distance learning classroom. The cameras use advanced technologies Cisco brands as Presenter Track Technology and Speaker Track Technology. This active speaker technology automatically focuses on and displays the current speaker's video feed. The Presenter Track Technology allows an instructor to remain stationary or move about freely while presenting. The Speaker Track Technology changes camera focus to the current student speaking during class discussions. This active speaker technology is available in the Combs 211 distance learning room.

Touch 10 Touch Panel Controls

The Cisco Touch 10 control unit offers an intuitive interface for controlling Cisco collaboration systems. The unit is touch sensitive and provides a familiar user experience for users accustomed to using other touch screen devices. With the touch of a single button, the Touch 10 is used to begin and end Cisco WebEx meetings in the distance learning classroom.

3

TECHNOLOGY OVERVIEW

Cisco Ceiling Microphone

The Cisco ceiling microphones provide high definition and crystal-clear audio for distance learning participants. This next generation microphone effectively captures dialogue from different participants and is ideal for the large class room.

Additional Room Components

Dell Workstation

The distance learning room includes a Dell workstation for presentation and content sharing. This workstation is integrated into the overall class room solution and seamlessly shares content across multiple connected sites.

Presentation and Content Sharing System

Crestron DMPS3-300-C-Series DigitialMedia Presentation System 300
The Crestron system compliments the Cisco SX80 Codec to control audio and video room components. A key feature of the distance learning room is automation and usability. The Crestron system provides integration and automation features to enable power control of different room components.
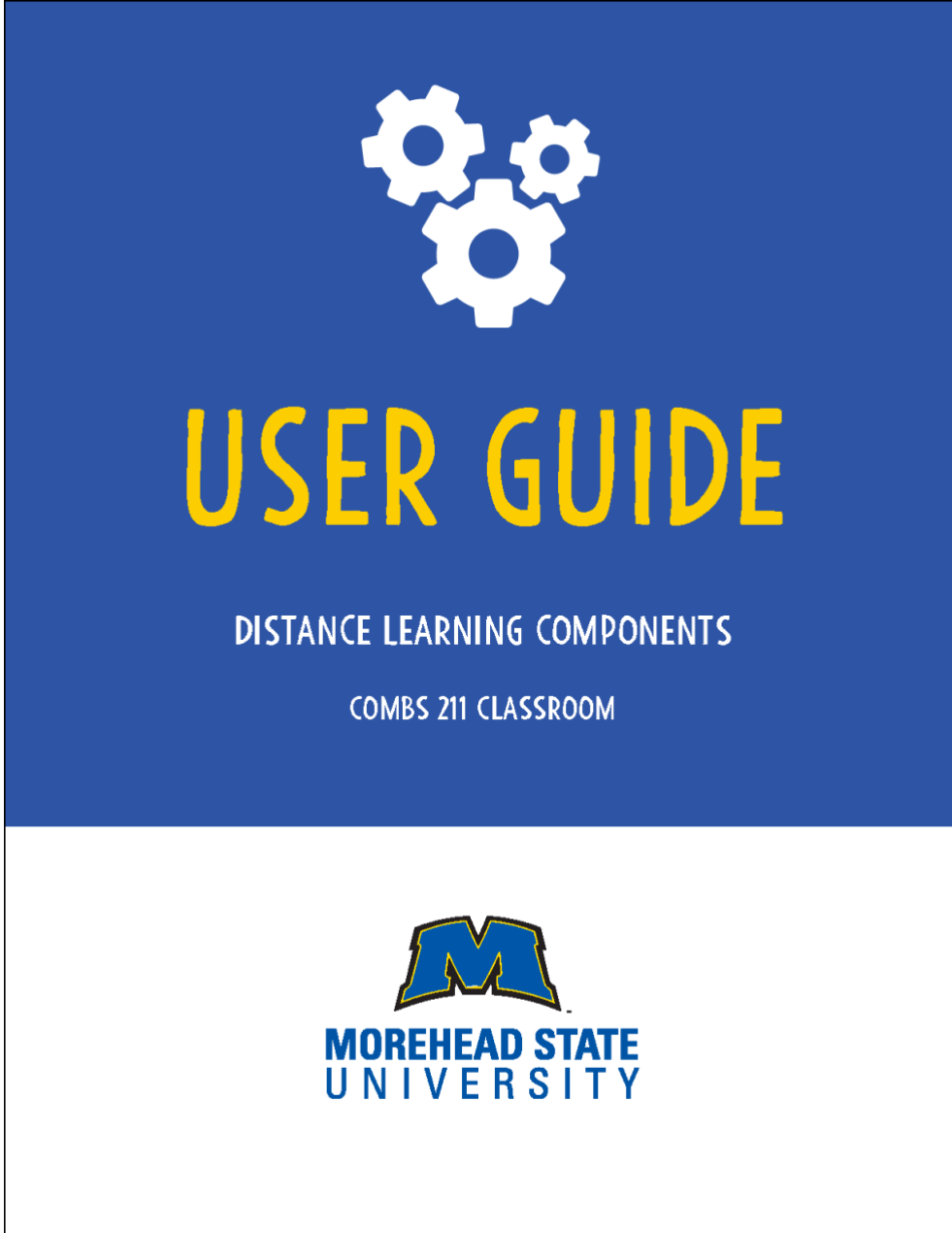
Digital Project E-Vision Laser 6500 Projector

Laser projection systems offer superior clarity and life-like color reproduction. Unlike traditional projectors, the E-Vision Laser 6500 does not use a bulb lamp. This allows the laser project to operate significantly quieter than bulb based models. The laser system also increases reliability and device lifetime. The clarity, color reproduction, and quiet operation are ideal features for use in a classroom environment.

Stewart Filmscreen CIMA ElectriScreen

The oversized 123" projection screen pairs seamlessly with the laser projector to provide an exceptional viewing experience for the large classroom. Shared content is easily viewable, as well as remote classroom participants. The electric screen is integrated into the overall learning system and automatically retracts based on room use.

4

Objective 3

Introduction

The new distance learning platform at MSU is operationally, technically, and overall fundamentally different than the existing Interactive Television (ITV) environment. The purpose of this guide is to provide the operational steps necessary for scheduling, initiating, and hosting distance learning courses and ad hoc meetings at MSU. The guide will not address pedagogical integration of the new distance learning technologies. The integration of these technologies into course design will be determined by faculty and instructional design professionals.
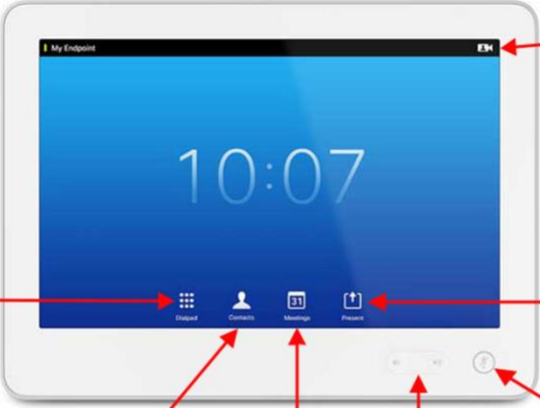
Room and Meeting Control: Cisco Touch 10 Control Panel

The Cisco Touch 10 control unit offers an intuitive interface for controlling Cisco collaboration systems. The unit is touch sensitive and provides a familiar user experience for users accustomed to using other touch screen devices. With the touch of a single button, the Touch 10 is used to begin and end Cisco WebEx meetings in the distance learning classroom.

1

Join a Scheduled Distance Learning Class

Distance learning classes will be automatically scheduled and connected via the Cisco TMS software. However, for faculty scheduled meetings, the Touch 10 Panel will display a green "**Join Meeting**" button prior to the meeting start time. To join the meeting, simply click the green "**Join Meeting**" button. This one-button solution provides an intuitive user experience for faculty and students.

USER GUIDE
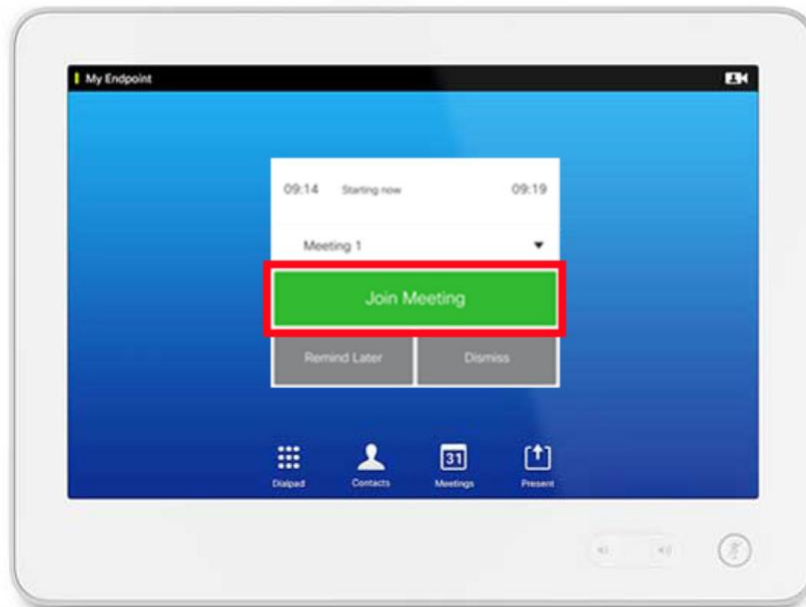
Sharing Content with the Touch 10 Control Panel

Distance learning instructors often share content with local and remote participants. The Cisco Touch 10 simplifies content sharing with seamless integration into the Combs 211 environment. A Dell workstation is provided for content sharing. To share content from this workstation to all connected sites, faculty and students simply click "**Share**" on the Cisco Touch 10.

My Endpoint

10:07

Dialpad   Contacts   Meetings   Present

4

USER GUIDE
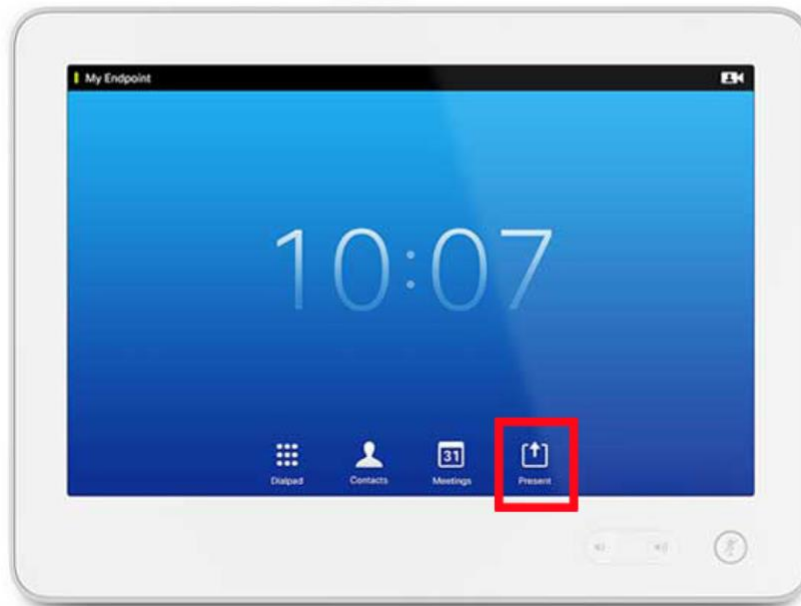
Ad Hoc Meetings

Faculty are encouraged to use the WebEx platform outside of normal distance learning courses to meet with students and colleagues. Morehead State University has partnered with Cisco to offer a WebEx account to all faculty and staff. These instructions are applicable to WebEx meetings scheduled, joined, and administered from a personal computer. For example, a faculty device or the Dell workstation located in the Combs 211 distance learning classroom.

Access to the MSU Cisco WebEx Website

To access the MSU WebEx site and schedule a WebEx meeting:
1. Access the MSU WebEx site at
   https://moreheadstate.webex.com/
2. To Login use the MSU EagleID
   a. Username example: m0341234@moreheadstate.edu
   b. Password: MSU EagleID Password
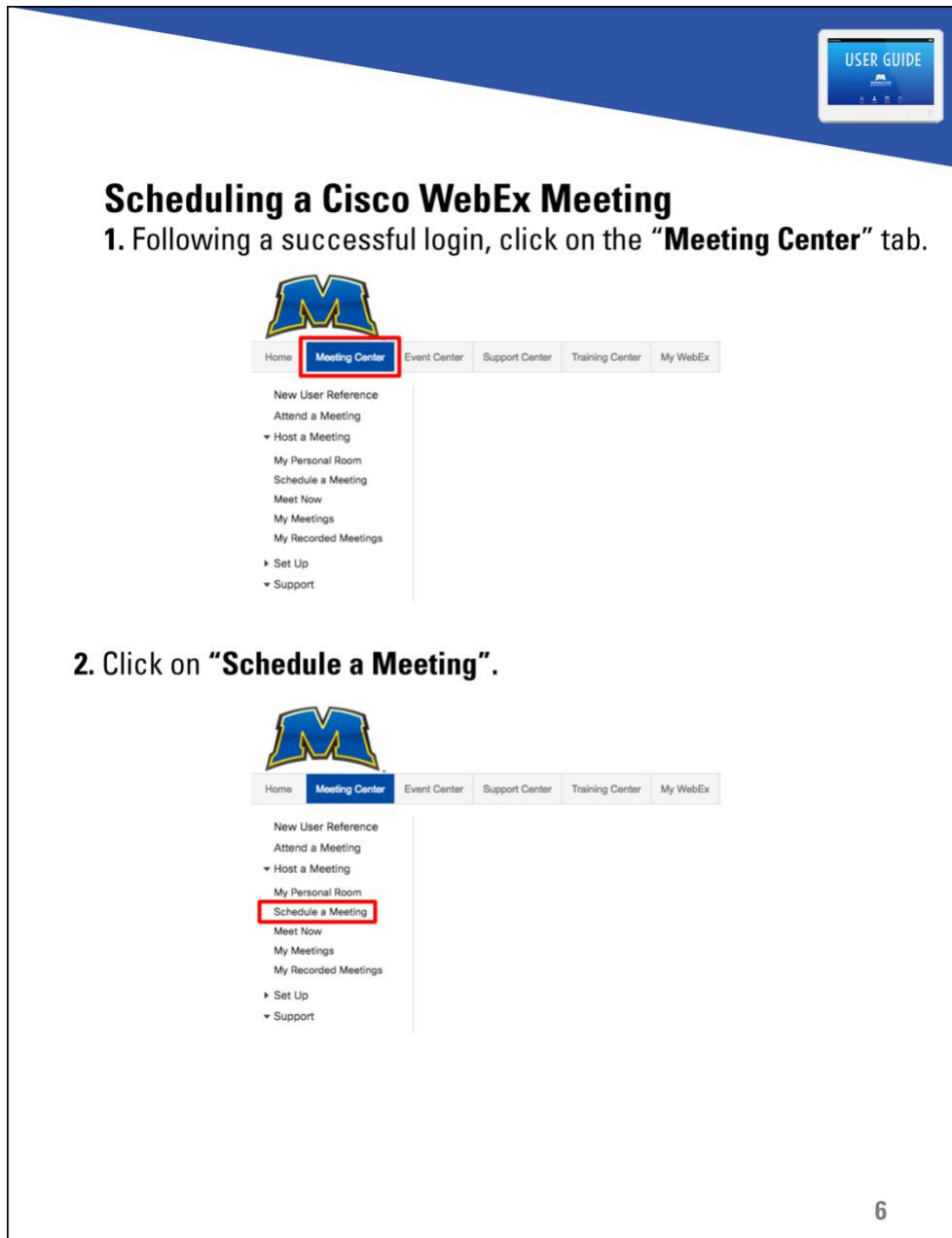
MY | MOREHEAD STATE

Sign in with your organizational account
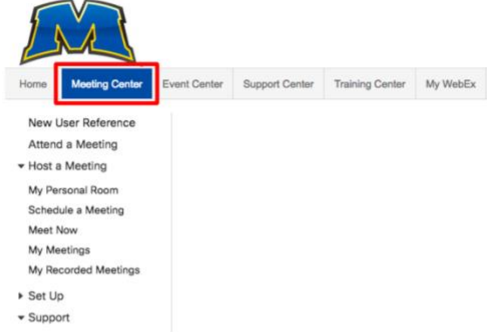
m1231234@moreheadstate.edu

••••••••••

Sign in

5

USER GUIDE

Starting and Joining a Cisco WebEx Meeting

1. Access and Login to the MSU WebEx Site at
https://moreheadstate.webex.com/

2. Click on the "**My WebEx**" tab

| Home | Meeting Center | Event Center | Support Center | Training Center | My WebEx |

My Meetings
My Personal Room
My Files
My Contacts
My Profile
Preferences
My Reports
Training
Support
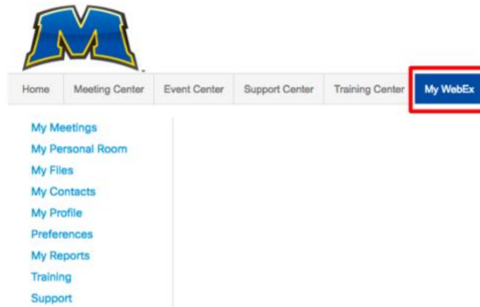
3. A list of scheduled meetings will be displayed for the specific date. Click on the green "**Start**" button to begin the scheduled meeting.

My WebEx Meetings   English : New York Time

| Daily | Weekly | Monthly | All Meetings |

< May 12, 2018 >

The meetings you host   ☐ Show past meetings

Time ▼	Topic	Type	Requests Status	
☐ 9:00 am	MSU WebEx Meeting	Meeting	N/A	Start

8

USER GUIDE
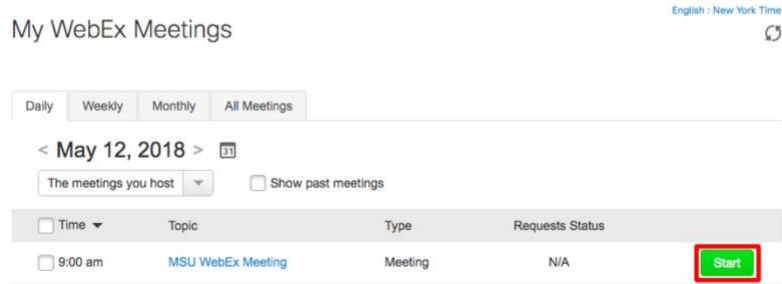
5. The audio and video options for the meeting will be displayed. Select the preferred **Audio** connection method and choose to enable or disable **Video**. Click "**Connect Audio**".

Connect to Audio using traditional phone dial-in.

Audio and Video Connection ✕

I Will Call In

Connect to Audio using computer microphone and speakers.

Call Using Computer
Change settings

The meeting will join Audio and Video by dialing a Cisco telepresence system.

Call My Video System
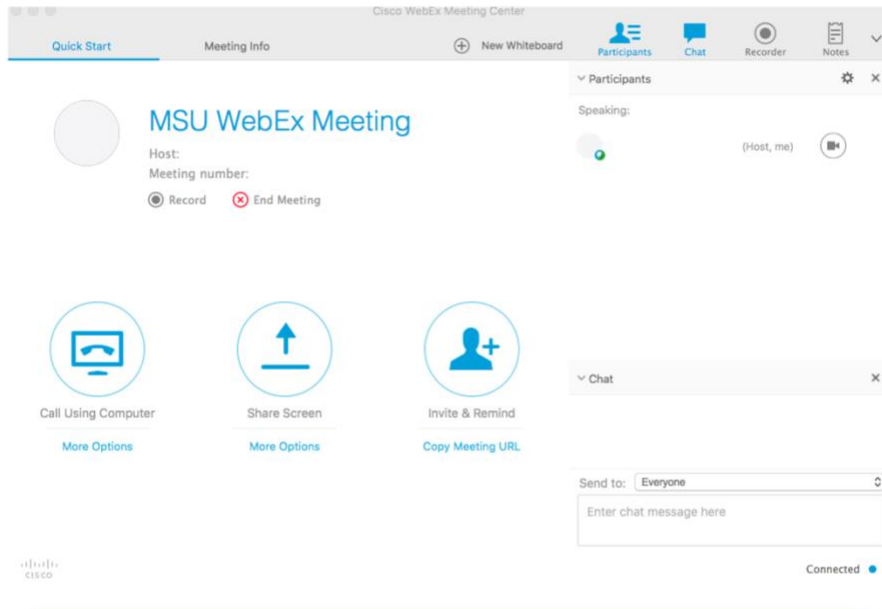
✕

Audio and Video Connection

Select Audio Connection

Call Using Computer ⌄ ⚙

Select Video Connection

No Video ⌄

Connect Audio

Skip

9

USER GUIDE

Additional Information

Distance learning courses at Morehead State University are planned and scheduled in advance.

Scheduling

Based on the distance learning course plan, The Office of Distance Education and Instructional Design schedule and reserve the distance learning classrooms. No actions are required from distance learning faculty or students for the scheduling process.

Initiating

The Cisco Telepresence Management solution provides an automated process for initiating distance learning classes. At a predetermined time (usually set at 10 minutes), the Cisco TMS system will automatically power on all classroom components and connect all remote sites. When faculty and students arrive to the classrooms, the technology components are ready for instruction and collaboration.

Hosting and Administering

The technology components in the Combs 211 room were designed to provide an intuitive user experience while hosting distance learning courses. Faculty and students can share content using the Dell workstation located at the podium.

MOREHEAD STATE
UNIVERSITY

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