Blended course design for multi-campus technology instruction: An expository study

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ABSTRACT

This manuscript shares the results of an experimental blended course design that combines online and synchronous technology instruction across four geographically dispersed computer classrooms using ITV technology. Lessons learned include equipment requirements, both in the main classroom and remote classrooms, taking insufficient bandwidth into account, remote communications, and accounting for small class sizes. The successes include reaching students where they are, not where we want them to be, and increased enrollment and sustainability. The future of this study includes initiating a policy that requires students to purchase and maintain their own hardware with programs like Microsoft Developer Network Academic Alliance (MSDNAA) and Dreamspark supplying the software. Additionally, students that are embracing a field in technology need to have Internet access based on the ubiquitous availability and inexpensive pricing structure for minimal high-speed bandwidth. Finally, students need an alternate plan that requires both access to a computer and Internet access.
Keywords: technology education, hybrid education, multi-campus education, classroom communications

INTRODUCTION

Providing high quality instruction and equitable course offerings for all students can be a daunting task for any university with multiple, geographically dispersed campuses (McCall, Dunham, & Lyons, 2013). For many universities, this is addressed with online courses and a limited number of face-to-face courses at each campus. In an effort to provide students at remote campuses with more Bachelor degree options, the Information Systems Department at a medium size Midwestern University revised its Business Informatics program to enable regional campus students to complete their major courses jointly with their main campus classmates. Beginning in Spring 2014, Business Informatics courses employed an innovative blended course design that combines online components with synchronous instruction across computer classrooms on four geographically dispersed campuses using Interactive Video Services (IVS) conferencing. This initiative took months of preparation, discussion, planning, and testing, as a variety of potential problems had to be addressed due to the technology-intensive nature of these courses. This manuscript addresses one year (two 17-week semesters) using this blended approach.

COURSE DELIVERY

A single faculty member on the main campus teaches a complex, highly interactive course that requires students at all four locations to complete computer-based activities and projects both simultaneously with the instructor and on their own outside of class. For instance, a typical face-to-face class session may require students to complete an Excel spreadsheet assignment with the instructor, as he/she works through each step. This in-class activity is reinforced by an outside assignment or project of a similar nature to be completed individually or in teams. While this may seem fairly standard for technology education, doing so in this instance requires that every computer in every computer classroom has a standard set of applications, the same look and feel, and the same navigation (Martin & Parker, 2014). In addition, the face-to-face sessions are conducted through IVS, meaning that students at three of the four campuses participate remotely, without easy access to a faculty member in the same classroom. In addition to IVS, faculty and students employ a number of resources to enable interaction and communication in and out of the classroom, such as TeamViewer, Camtasia, Blackboard, Skype, Adobe Connect, PortableApps, and social media. These applications plus Etherpad and Piazza for written communication assist in integrating technology, pedagogy, and content (Roseth, Alcaoglu, & Zellner, 2013) that support cooperative learning. Martin and Parker (2014), posit that not only do synchronous virtual classrooms allow remote students to attend classes but community is also promoted. Because the Business Informatics (BI) program is contained within a college of business that is accredited by the Association to Advance Collegiate Schools of Business (AACSB), it is imperative to create community (Peacock, 2013).

The BI courses are delivered in a Just in Time (JIT) format based on the student's level of BI knowledge, subject complexity, and the professor's familiarity with the IVS system. This uncommon technique has shown to not only benefit students with focus in problem-solving but also allows students to handle more difficult and real-world situations (Bangs, 2012). This caused classes to be prepared, and in some cases, rewritten, slightly before the delivery of the particular class. In one BI class, Visual Analytics, students grasped the material sooner than expected, so the professor decided to introduce a visual analytics software program four weeks ahead of when it was scheduled. This required a massive course rewrite with a staggered

implementation of the visual analytics software in order to reduce confusion and remain as transparent as possible. While this feat is demanding in only one delivery format, it was extremely arduous when employing the blended delivery mechanism. The different approaches to teaching consist of "institutional strategy, pedagogical and technological support, time required, teacher skills for using e-learning, and student abilities and willingness for using learning technology" (Gonzalez, 2012. P. 975).

LESSONS LEARNED

Classroom Facilities

The main campus classroom was ill-prepared for this format. Although this particular classroom had previously been used, on occasion, for IVS sessions, it was simply not designed for regularly scheduled IVS class sessions. The lack of student microphones made it impossible for remote campuses to interact effectively with main campus students. It also tied the professor to the podium to ensure all students could hear. The placement of main campus monitors was not conducive to effective communication with the remote campuses. The instructor was not able to make eye contact with remote students while also viewing their body language and nonverbal cues. This can cause isolation and alienation (Wei, Chen, & Kinshuk, 2012).

There was an overarching assumption that, despite potential bandwidth issues, all of the classrooms were the same in terms of class session monitor size/quantity/placement, microphones, and computer image. With respect to bandwidth, Benson & Morgan (2013), introduce the necessity for bandwidth sufficient enough for wireless and cloud applications. They continue by drawing education to a mobile virtual environment. The lack of main campus microphones coupled with the remote campuses having a variety of monitor and screen sizes, made it difficult in some classrooms for students to see the instructor's work clearly.

Classroom Communications

In-class communication was difficult and unnatural. Delays in bandwidth made interaction strained and not as casual and natural as a traditional face to face class session. In addition, students at remote campuses were less likely to speak up and ask questions because it felt awkward to them. This awkwardness compelled some of them to entertain themselves with smartphones or even Internet surfing. In a model developed by Wei, et al (2012), the students' learning interaction as well as their learning performance was highly correlated by a strong social presence in the classroom. A remote classroom proctor might have helped here.

Small class sizes were both a blessing and a curse. It was helpful to work through this first semester and its issues with small class sizes, as it made it easier to maintain flexibility and to adapt as the classes progressed. However, the small class sizes meant that some campuses had only 1 or 2 students in a classroom. This detracted greatly from interaction, teamwork, support, and the overall atmosphere of the class. While it could be implied that it negatively impacted attendance, as students found it awkward to be the only student in a large computer classroom, McCall, et al (2013), stated that class size was not significant with respect to the effectiveness of the university class.

Student Knowledge

It was assumed that students know how to use computers adequately for this level of instruction, but this was not always the case. While some labs have computers, others do not; so students cannot always work along with the professor. Also, some students were tech savvy enough to bring their notebook and actively follow along while others just sat idly throughout the session. Some students appeared to be embarrassed so they either texted, thumbed through their books, daydreamed, or even left the classroom. Trying to teach to the face-to-face class, as well as the ITV class was tough as computer literacy among college students is directly related to their social interaction and group behavior techniques (King & He, 2006). An added complexity was the online component that students without a computer and working students found difficulty to complete. These two components, plus the basic unfamiliarity with this program, caused additional stress and actually caused a few students to withdraw from the course. One positive note though is that in one class, the text and ancillaries were provided at no cost to the students, thus making things more palatable. It should be noted that a few unprepared students can really slow down an otherwise productive session. Remote Campus Communications - Communication with the remote campuses during synchronous sessions proved to be a challenge. Available bandwidth and WAN connections varied greatly in connection quality and speed. The original IVS equipment is currently limited by the weakest remote campus connection. Resolution is currently set to a visual acuity of 1024x768 pixels for most sessions, and remote campus viewing and audio quality were inconsistent with this setting, causing a visual impediment for both the remote and origin classrooms.

The campus information technology support personnel had to reconfigure images and software packages at all of the locations. This process was time consuming, and frequently involved licensing and configuration issues that normally would not be a problem on an individual computer. Access to standardized lab computers was not available 24/7 at the regional campuses, and this was a problem for those students without adequate personal computers, consistent Internet access, or time to utilize the university labs within the available time slots. This put an even greater emphasis on the importance of the synchronous sessions (Martin & Parker, 2014). Hardware & Internet access requirements may be reinstated to alleviate some of these issues.

It was not taken into account that computer labs at regional campuses were not available 24/7. In addition, during a class session, it was impossible for the instructor to see the work being completed by students at those campuses. For the main campus, where the professor can be found, Net Ops was employed allowing the student's individual screen to be observed. For the regional campuses this service does not exist, but there are workarounds like having the student email an attachment or by asking students to help one another. This made interaction and class flow very difficult, and it slowed down the class sessions significantly on many occasions. In addition, students indicated that they are not as comfortable interacting with the instructor in online or IVS settings as they are in traditional classroom settings. This could be an invalid excuse as Mann & Henneberry (2014) argue that students select online classes only out of convenience; and while they enjoy videos for online classes, they like them to be of short duration. One could interpret from this argument that students want to take the easy way out.

General Inconsistencies Across Campuses

The community colleges that feed into the regional campuses typically do not have Friday class sessions, thus allowing working students a full workday on Fridays. Nonetheless, BI classes were still scheduled on Fridays, resulting in a large number of absences for Friday sessions. This was adaptable though by making Friday sessions lab only. These no-Friday classes are in direct conflict with the act of developmental education that is prevalent in community colleges (Saxon & Slate, 2013). It would seem that community colleges would utilize all five days of the week.

In addition to the technology requirements for each course, faculty needed to consider a highly flexible course design to allow for problems that may occur, such as a single campus closed for bad weather, problems with network access in one or more classrooms, or a classroom computer [hard drive] image that gets altered without notice. As anyone who has used technology for instruction can attest, things do happen that require quick thinking and a backup plan. But, imagine multiplying the problems of a single classroom by four, and this will provide an idea of the myriad of problems that may be experienced across four campuses throughout a semester. Thus, faculty are building redundancy and remediation into their course designs, such as recording class sessions to post on Blackboard, creating supplemental instructions and lectures, keeping the class schedule dynamic, using social media for quick communication, and periodically evaluating student progress to make necessary adjustments.

Also, despite using IVS and other technology resources to create recorded class sessions, this placed students at regional campuses at a disadvantage because they did not necessarily have access to the bandwidth and resources necessary to view the session and to complete the assignments. This resulted in a digital divide that caused even more problems (Atkinson & Coleman, 2011a). Finally, it was learned that the IVS videos were simply unusable from any location other than a campus computer lab. For the remainder of the semester the videos were prepared, rendered, and uploaded to YouTube.

Student Equipment

This particular department does not currently have hardware requirements for students. This approach was originally designed to eliminate any “barriers to entry”, but has proven in many instances, to be a “barrier to success”. Students in these classes have widely varying technical backgrounds; and while many have computers, they are outdated both in hardware and software which causes problems properly running the required applications and configurations. This has created have and have-nots for students and can lead to student deficiency in the digital world that we live in (Yelland & Neal, 2013).

Finally, the mindset of most remote campus students was not realized until well into the first semester. Many of these students are jointly enrolled in community college courses and are working in addition to attending college. The time constraints for students taking only BI classes is significant; but students attempting to take other college classes, as well as work, found the time issue to very binding and in some cases, counter-productive to a successful program experience for both the student and professor. However, Kinzie (2011), annotates that universities must learn to assimilate working students into classroom activities.

SUCCESSES

The major successes for this endeavor are the growth of the major and the student sustainment as indicated in Figure 1 (Appendix). Colleges and universities need to meet students where they are, not where the institutions would like them to be. IVS technology is antiquated and not ideal for this type of program; but until education, particularly post-secondary institutions are able to find something else that allows students to remain in their communities for classes, IVS will work. Students want social interaction to include chat, video, and interactivity (Martin & Parker, 2014). These components can be realized through IVS.

Some students have the discipline to engage in online education and are prepared to devote the required amount of time (Thrasher, Coleman, & Atkinson, 2011). Typically, online sections fill quicker and the classroom ended up at about 60% capacity. This does not always hold true though as in one instance, when the classroom section students were given the option to complete their activities online, four of them chose that route and indicated that they wanted the online section originally, but couldn't get a seat due to enrollment caps. Only one of the online students chose to attend classroom sessions when given the opportunity. In this case the online students, overall, were the least prepared, and had widely varying technical backgrounds and a lack of computing resources. The classroom students that actually preferred that setting were, overall, engaged and prepared- both from the hardware and motivational standpoints.

During the Spring 2014 semester a "buffet" approach was offered for assignments and worked with each student individually based on their existing technical skillset and interests. While this was time-consuming, students were very appreciative of the recorded class sessions, as communication outside the classroom was very difficult.

Other than email or phone, students at regional campuses were disadvantaged in that they could not sit down in a faculty office to get help with the assignments. Many times email and phone are just not conducive to assisting with technology assignments, so the class session recordings served as tutorials and assistive resources as well. However, this allowed another model to be tested so merit was found. Another faculty member has just implemented a similar model that allows a student to self-select and vary the amount of student effort put into assignments. The student selects whether s/he wants to engage in the most rigor, a moderate amount of rigor, or minimal rigor, thus resulting in a possible grade of A, B, or C.

WHERE WE GO FROM HERE

This longitudinal study that began in the Spring semester of 2014 will continue to enlighten faculty, administrators, and more importantly, the students in blended delivery of programs. Several lessons learned were noted in this study and attempts will be made to address each of them in the coming semesters.

Technology students need their own hardware and software. At a minimum, students need a Windows 7/8 computer with 8G of RAM and enough hard disk to load the required software annotated on each course syllabus. Most post-secondary institutions offer the latest operating system and one of the office suites. Additionally, programs like MSDNAA or Dreamspark offer other software products at a greatly reduced price or even free. Finally, students can learn how to use software using products like Lynda that has byte [bite]-sized lessons via video that demonstrate and educate on software programs.

Technology students need Internet access. While some students complain at the expense of Internet access, the requirements for 3Mbps or better are very affordable in Kentucky, costing a minimum of $30/month for DSL Lite. While students will not be able to stream video as well as they could with cable, they will be able to conduct classes from their homes. Studies have demonstrated that satellite communications is feasible and if only used for online communications for college classes, is cost effective (Atkinson & Coleman, 2011b) allowing students to complete their online classes.

Technology students need to be able to both possess and implement an alternate in the event of a malfunction with their computers or a failure of their Internet access. Most students, except for a very small percentage, reside within 10 miles of a public library, college campus, or other institutions that offer both acceptable hardware/software and Internet access at very nominal rates to include free use. This lack of access creates an artificial digital divide and put the student at an extreme disadvantage (Yelland & Neal, 2013).

CONCLUSION

Education institutions, especially public post-secondary institutions have to meet the student where they are, not where the institutions want them to be. While this blended approach has been very demanding, it has been demonstrated that taking this approach both increases the numbers in a new program and also provides sustainability. Recommended future studies include extracting grade distributions from hybrid classes and comparing to traditional face to face as well as online classes.

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APPENDIX

Figure 1 – Enrolled and Sustained BI Students.