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AN EVALUATION OF A NEW COURSE MODALITY: A PILOT STUDY OF
CROSS-LISTED COURSES AT DEVRY UNIVERSITY

by

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A dissertation in practice submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
in the College of Education and Human Performance
at the University of Central Florida
Orlando, Florida

Summer Term
2015

Major Professor: Carolyn Walker Hopp

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ABSTRACT

Devry University, a private for-profit higher education institution, generates its revenue exclusively by students' tuition. In addition, DeVry University offers courses via two modalities: blended and online. Unfortunately, DeVry University has seen its student enrollments decline over the last few years. Because of lower student enrollment levels, DeVry University has had to limit its course offerings. The problem of practice addressed in this dissertation is an insufficient number of blended course offerings for current DeVry students.

To remedy this problem, an initiative was started at DeVry University to address the insufficient number of blended course offerings and to pilot a new course modality, cross-listed (C-L) courses, in the March 2014 session at four campus locations. More specifically, this initiative involved offering several sections of CIS115 (Logic and Design with Lab) in its C-L modality. C-L courses combine students registered in more than one modality: in this case, blended and online modalities. Upon completion of the pilot offering of C-L courses, an evaluation was conducted to determine if the new C-L modality had a positive impact on addressing the stated problem of practice.

This evaluation used an outcome-oriented post-test only design with non-equivalent groups (quasi-experiment) coupled with qualitative components. The quasi-experiment compares outcomes of students enrolled in C-L courses (the treatment group) with students enrolled in blended and online courses (comparison groups) using post-achievement data.

The results of the evaluation revealed that students who completed the C-L CIS115 courses performed as well as students who completed blended or online CIS115 courses, considering their course satisfaction levels and course outcomes. Professors' perceptions of the C-L modality were also analyzed; results indicate that professors are willing to endorse the new modality but not without suggesting some improvements. The evaluation also revealed that there was an increase in the number of blended courses offered at DeVry University campuses, suggesting that the problem of practice may be addressed by this initiative. Recommendations for further studies include repeating the pilot offering in the C-L modality, with the inclusion of professors' suggestions for improvement identified in this study. These improvements include providing campus-based professors with an ability to broadcast and record their classroom lectures for the benefit of all students enrolled in C-L courses.

This work is dedicated to my wife for her unwavering love and support.

ACKNOWLEDGMENTS

I want to acknowledge all the professors whom I had the pleasure of meeting during the last three years as I was completing this doctoral program. Further, I want to acknowledge my DeVry University friends and colleagues who have encouraged me to pursue this degree. Lastly, I want to especially recognize the following individuals for making a life-changing contribution to my professional career.

Dr. Carolyn Walker Hopp. I feel grateful for starting and finishing this program by being enrolled in a class of yours. Your passion for teaching and care for students truly makes you an amazing educator. I am glad our paths in life have crossed.

Dr. David Boote. The amazing ease with which you infuse science into teaching brings a good measure of honesty and truth to your teaching. I am glad I had a chance to experience this in our classes.

Dr. Bonnie Swan. Your dedication to your profession is evident in everything that you do. Your expertise has been invaluable to me in completing this dissertation work.

Dr. Glenda Gunter. Your expertise in the field of instruction helped me to sharply develop my research focus and make this dissertation shine.

Dr. Mary (Dusty) Maddox. Your friendship and mentorship have been the reasons I was able to complete this program. You have been a part of my life-changing event. Thank you.

You have all contributed to my success, and I simply want to make you proud.

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CHAPTER 1 INTRODUCTION

Defining Problem of Practice

What is the Problem?

Because of decreasing student enrollment levels, DeVry University has had to limit the number of its course offerings. The problem of practice that will be addressed in this dissertation is an insufficient number of blended course offerings for current DeVry students. In order to adequately address the stated problem, the following main research question will be answered: What is the impact of implementing cross-listed (C-L) modality on blended course offerings, students and professors at DeVry University? The answer to this research question will be informed by the results of an evaluation of a C-L modality that was piloted at DeVry University in the March 2014 session.

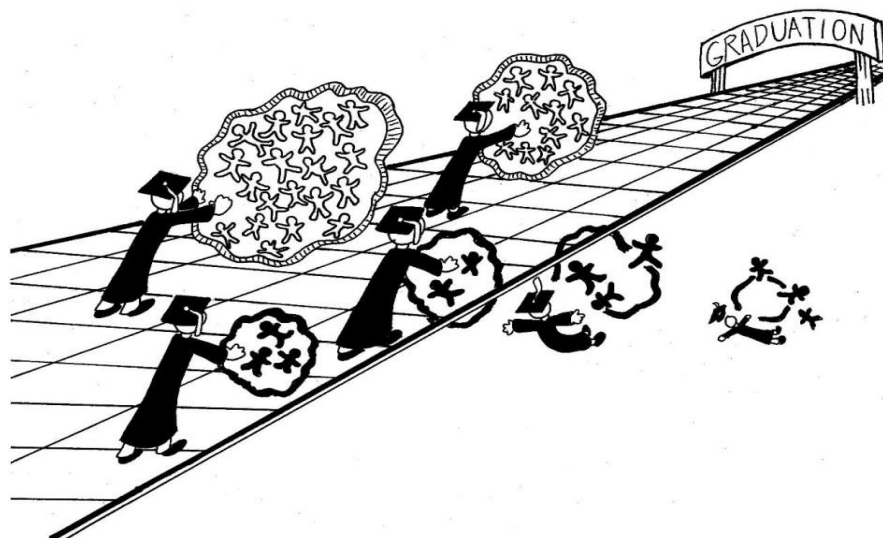


Figure 1. Depiction of the problem of practice illustrating cancelations of blended courses. Copyright 2015 by Daniel Traynor.

DeVry University is a private, for-profit institution of higher education, whose exclusive source of revenue is student tuition. DeVry University offers two course modalities: blended and online. Blended modality is an educational delivery method that involves a combination of face-to-face and online interactions between professors and students (Staker & Horn, 2012). At DeVry University, blended learning refers to “courses that combine face-to-face classroom instruction with online learning and reduced classroom contact hours” (Dziuban, Hartman, & Moskal, 2004, p. 2). The National Dean of the College of Engineering and Information Sciences stated that each blended or online course must have a minimum enrollment of seven students before it can be offered (A. Naumaan, personal communication, July 15, 2013). Given the gradual decrease of 40% in total student enrollment between 2011 and 2014 at DeVry University (“DeVry Annual Report,” 2012; “DeVry Annual Report,” 2014), and the minimum seven students required to avoid course cancellation due to low enrollment, academic administrators have been forced to limit course offerings; this problem is of particular concern in cases where limited course offerings delay student graduation dates. The limiting of course offerings can negatively impact student satisfaction levels, which leads to higher student attrition, which leads to lower tuition revenues (A. Naumaan, personal communication, July 15, 2013). Courses offered via the online modality have benefited from students who are geographically diverse and numerous. The average CIS115 online course enrollment was 20 students in the March 2014 session. However, the average CIS115 blended course enrollment was only 7.5 students in the March 2014 session. The lower average

blended course enrollment levels make blended course offerings particularly susceptible to course cancellations due to low course enrollments.

Who Is Affected by the Problem?

The problem of an insufficient number of blended course offerings has far-reaching and negative implications: Students are not able to progress with their plans of studies if the program-required blended courses are not available to them during the sessions that they are needed. In some cases, students' length of time to complete their programs of study is extended when students must wait for the program-required courses to be available. In addition, declining blended course offerings impact DeVry University's profitability by precipitating higher student dissatisfaction levels, leading to higher attrition and loss of tuition revenue (Campbell & Mislavy, 2012).

Students often choose to enroll in a program of study at a campus location, as opposed to online, because they prefer characteristics associated with a blended modality (Aly, 2013; Boston, Ice, & Gibson, 2011). Examples of these characteristics are campus-based lectures, lab sessions, and ability to meet in person with professors, academic advisors, and fellow classmates. By limiting blended course offerings, students become dissatisfied with their options when program-required blended courses are not offered on campus; these options include enrolling in online courses or waiting for the needed blended courses to be offered at the campus during the next session or two (Aly, 2013; W. Wheeler, personal communication, June 20, 2014). DeVry University offers its courses on a session basis. Each session is eight weeks long, thus there are six-sessions

in a year (Table 1). In some cases, campus-based students are reimbursed for their tuition by the U.S. Department of Veteran Affairs (VA) and must demonstrate that some courses for which they request reimbursement are delivered on campus (Bell, Boland, Dudgeon, & Johnson, 2013). Dr. Maddox, Assistant Dean of Academics Affairs for the DeVry Orlando campus, stated that such students are negatively impacted by a limited number of blended course offerings; their only option is to wait until the needed course is offered in the next session (D. Maddox, personal communication, July 30, 2013). In other cases, DeVry students are classified as international students and, as such, have restrictions on the number of online course credit hours in which they can enroll (“Title 8,” 2007). These students are also negatively impacted by limited blended course offerings, and, again, their only option is to wait for the needed course to be offered in the next session (D. Maddox, personal communication, July 30, 2013).

Table 1

DeVry University – Session-Based Academic Calendar

Session Number	Session Names	Months of Session
1	January Session	January – February
2	March Session	March – April
3	May Session	May – June
4	July Session	July – August
5	September Session	September – October
6	November Session	November – December

The problem of a declining number of blended course offerings on campuses also impacts full-time campus-based professors, who must teach a required number of credit hours each year. The Assistant National Dean for the College of Engineering and Information Sciences stated that DeVry full-time professors are expected to teach between 42 and 47 credit hours each calendar year (W. Stephens, personal communication, September 30, 2013). With fewer blended course offerings, meeting this requirement is difficult (D. Maddox, personal communication, July 30, 2013). The inability to fulfill teaching requirements leads to some campus professors transferring to teaching exclusively online, and in some cases, necessitates an unpopular but necessary reduction in the number of professors at DeVry University locations (“DeVry News Release,” 2015; R. Miksosky, personal communication, September 30, 2013).

As a for-profit institution of higher education, DeVry University has been negatively impacted by limited campus course offerings that result in higher attrition levels by campus-based students who are dissatisfied with the situation in which they are not able to complete all or most of their required courses via a blended modality. Students who have enrolled at a campus location have the expectation of completing all or most of their required courses via a blended modality (Aly, 2013; Boston et al., 2011; R. Miksosky, personal communication, July 30, 2013). Since DeVry University’s source of revenue is exclusively from students’ tuition, students who drop out have a direct and negative impact on DeVry’s revenue (A. Naumaan, personal communication, April 5, 2014).

Definition of Terms

Asynchronous: In relation blended and online learning, this term generally refers to the ability of students and professors to use online learning resources to facilitate information sharing outside the constraints of time and place (Hrastinski, 2008; Mayadas, 1997).

Blended Modality: An educational delivery method that involves a combination of face-to-face and online interactions between professors and students (Staker & Horn, 2012). At DeVry University, blended modality refers to “courses that combine face-to-face classroom instruction with online learning and reduced classroom contact hours” (Dziuban, Hartman, & Moskal, 2004, p. 2).

Cross-Listed Modality: An educational delivery method unique to DeVry University that involves combining students registered in more than one modality: in this case, blended and online modalities.

DeVry University Campus: A relatively large location offering a full suite of programs available at DeVry University.

DeVry University Center: A relatively small location offering a limited suite of programs available at DeVry University.

Face-to-Face Modality: An educational delivery method used to describe courses in which students and professors meet in a physical classroom or a laboratory. In the literature, face-to-face modality is also referred to as traditional learning or traditional instruction (Karam, Clymer, Elias, & Calahan, 2014).

For-Profit University: A post-secondary education institution that focuses on delivery of educational services to make a profit for its stakeholders. Stakeholders may include shareholders or business owners.

Online Campus: A virtual campus where students attend classes via the internet. An online campus is supported by real infrastructures such as admissions, registrar, and academic groups.

Online Modality: An educational delivery method that relies on the internet to access learning materials, to interact with course content, to facilitate professor and student interaction, and to obtain support during the learning process (Courtney & Wilhoite-Mathews, 2015).

Physical Campus or Center: A location where students attend classes in person. A physical campus is supported by real infrastructures such as admissions, registrar, and academic groups.

Private University: A post-secondary education institution that is mainly funded by tuition funds and private contributions.

Public University: A post-secondary education institution that is mainly funded by tuition and public funds. State appointed boards and trustees oversee the operation of Public Universities within the state.

Session: Eight-week period of time during which DeVry University offers its courses.

Synchronous: In relation to online and blended learning, this term generally refers to the ability of students and professors to facilitate information sharing in real

time. Synchronous learning activities may include physical classroom meetings, participating in conference calls, online chats, or teleconferences (Hrastinski, 2008; Roblyer, Freeman, Donaldson, & Maddox, 2007).

Threaded Asynchronous Discussion: This term refers to a component of the Learning Management System where students post responses to the professor's questions and respond to classmates' postings in a blog-like fashion.

Veteran Affairs Student: Student who is reimbursed for tuition or housing allowance by the United States Department of Veteran Affairs (VA).

Organizational Context

DeVry University as an Organization

DeVry University is a member of DeVry Education Group. DeVry Education Group, an international provider of educational services, focuses on empowering its students to achieve their educational and career goals. DeVry Education Group Inc. is a publically held company and a member of the MidCap 400 Index, trading on the New York stock exchange under the symbol DV.

The company serves as the parent organization of the following institutions:

- DeVry University
- Keller Graduate School of Management,
- American University of the Caribbean School of Medicine,
- Carrington College,

- Becker Professional Education,
- Chamberlain College of Nursing,
- DeVry Brasil,
- Ross University School of Medicine, and
- Ross University School of Veterinary Medicine.

These educational institutions provide educational services in the areas of business, technology, healthcare, accounting, and finance.

DeVry University is one of the largest degree-granting higher education institutions in North America and is comprised of five colleges:

- College of Business and Management,
- College of Engineering and Information Sciences,
- College of Health Sciences,
- College of Liberal Arts and Sciences, and
- College of Media Arts and Technology.

In addition to these colleges, DeVry University also operates Keller Graduate School of Management. Through this system of colleges, DeVry University delivers high-quality, career-oriented degree programs at the associate, bachelor, and master levels in technology, science, and business. During the July 2013 academic session, DeVry University served 42,374 students at its 97 DeVry University locations, as well as through DeVry University's online campus (“DeVry Annual Report,” 2014). DeVry University’s larger campuses offer a complete suite of academic programs, while DeVry University Centers are smaller facilities that offer a reduced suite of academic programs.

The mission of DeVry University is to “foster student learning through high-quality, career-oriented education integrating technology, science, business and the arts. The university delivers practitioner-oriented undergraduate and graduate programs onsite and online to meet the needs of a diverse and geographically dispersed student population” (“DeVry University,” 2014, Mission section, para. 1). DeVry University is managed by its president; reporting to the president of the university are the Provost, Vice President (VP) of Academic Affairs, Chief Marketing Officer, Chief Operating Officer, VP of Enrollment Management, VP of Human Resources, and VP of Operations. Each college within DeVry University is managed by a national college dean who is responsible for curriculum and instruction of all programs within the college. To meet these responsibilities, the national college deans work with the university’s Central Services group and academic staff at each location offering their colleges’ programs, including the online location. The Central Services group is comprised of an assistant national dean, associate national dean, and national academic specialists; the members of this group are responsible for matters related to Academic Affairs, Student Affairs, Operations, Academic Programs, curriculum development/delivery, and Accreditation and Assessment. The delivery of academic programs at each DeVry University location is managed by academic staff comprised of a dean of academic affairs, an assistant dean of academic affairs, and faculty chairs. The local academic staff work with professors and are responsible for program delivery at their location (A. Naumaan, personal communication, July 5, 2014).

Organization of the Curriculum

Academic freedom is perhaps the single most important principle that promotes open and free exchange of ideas in university and college settings. In the past, institutions of higher learning, along with the Supreme Court of the United States, have recognized that academic freedom is necessary for the well-being of not only the academic community but also of a democratic society (Hentschke, Lechuga, & Tierney, 2010). As John Dewey (1936), the first president of the American Association of University Professors (AAUP), wrote, “Since freedom of mind and freedom of expression are at the root of all freedoms, to deny freedom in education is a crime against democracy” (p. 6). Academic freedom in the context of higher education denotes the ability to debate issues and ideas without the fear of punishment such as demotion or loss of employment. While most colleges and universities, both for-profit and non-profit, subscribe to the major tenets of academic freedom, there are disagreements about the interpretation and the extent to which the tenets apply. The main objectives of for-profit educational institutions are to provide students with skills demanded by the current job market and to generate a profit (Ruch, 2001). Academic freedom in an environment such as this may be considered contradictory. The reason for this contradiction is that for-profit institutions of higher education straddle two different types of communities, the community of higher education and the community of business. Ultimately, for-profit institutions of higher education often identify themselves as businesses that happen to be in the business of education. This phenomenon exists because both for-profit educational institutions and businesses are responsible for financial performance to shareholders and

boards of directors (Ruch, 2001). From this point of view, for-profit institutions may regard academic freedom as a stumbling block to achieving both of these objectives. It is not, however, to say that their objectives are not worthy of accomplishment, but it does invite the following question: “to what extent are for-profit educational institutions truly members of higher education communities” as opposed to business communities (Hentschke et al., 2010). Comparison of the processes and drivers for curriculum design within for-profit and traditional higher education institutions will illustrate the validity of this question.

At the turn of the 19th century, traditional American colleges and universities that were supported by faculty educated in European nations shared the ideology that their responsibility as educators was far more than teaching. Consequently, these institutions, devoted to inquiry and the development of knowledge, became professionalized (Hentschke et al., 2010). With the establishment of new faculty roles, higher expectations were placed on faculty in general; while in the past, faculty might have been clerics associated with local congregations or religious orders, the new standards placed requirements for faculty to be scientifically trained and certified as professional educators. With a more highly qualified faculty came increased responsibility and expanded expectations; faculty at public colleges and universities were expected to participate in designing and managing curricula. Faculty, within their communities, had a key role in designing academic programs and determining the way that these programs would be delivered to students (Hentschke et al., 2010). Formed in 1915 in response to these new challenges and responsibilities, the American Association of University

Professors (AAUP) championed the role of college faculty and supported the tenets of academic freedom.

The objectives of the AAUP were to enshrine academic freedom in the *Handbook Declaration of American Higher Education*, professing that education is to be conducted for the following purposes:

- The common good and the search of truth and its free expression;
- The longevity of academic freedom by creating a system of tenure that provided faculty with protection from loss of employment;
- The assurance that academic freedom remains a hallmark of educational institutions by upholding the concept of shared governance between the administration and faculty; and
- The definition of the role of the faculty to include research, teaching, and service as the primary responsibilities.

Faculty, in contrast to traditional laborers, enjoyed a higher level of autonomy concerning the ways their responsibilities were fulfilled. Consequently, academic freedom drove curriculum design. Faculty in traditional American universities and colleges were at liberty, guaranteed by academic freedom, to pursue academic inquiry and to exercise freedom in the classroom. Because of this autonomy, the ability to study, and report the results of the studies, thrived in an environment filled with professionalism and academic consent. This was typical of traditional universities engaged in research and teaching activities (Rudolph & Thelin, 1990). Today, a similar environment, where academic freedom drives curriculum design and faculty responsibilities, continues to

exist in current traditional colleges and universities throughout the United States (Tierney & Lechuga, 2005). Therefore, the focus of traditional educational institutions is to teach by offering courses and programs and to conduct research to further the understanding and knowledge as a whole.

One of the differences between public and for-profit institutions of higher education, such as DeVry University, is a shift in objectives from pure research to the profit-making. This is a focus commonly associated with for-profit institutions. Both institutions share a focus on teaching; however, comparing the two forms of institutions solely on the basis of their common objectives to teach would be equivalent to comparing boats and automobiles simply because of they are modes of transportation. While public universities leverage faculty and their responsibilities, guided by academic freedom, to design curriculum, for-profit institutions, including DeVry University, leverage a keen understanding of in-demand skills and knowledge to inform curriculum design to produce graduates that will be successful in finding jobs in their selected industries (A. Naumaan, personal communication, July 5, 2014). Faculty, in such scenarios, are guided by job market demands to design and deliver the curriculum; this approach has been proven to be very effective in achieving one of the objectives of for-profit institutions, namely making profits by providing curriculum that students need and employers desire. In doing so, for-profit institutions have positioned themselves to be responsive to the changing job market by frequently updating their curriculum to produce graduates that are in demand by employers (Ruch, 2001).

History

History of For-Profit Colleges and Universities

The for-profit model of higher education dates back to 18th century America. During that time, the demand for education exceeded the capacity of educational institutions to deliver (Diner, 2015). In such a young country, fueled by the passions and creativity of its explorers and entrepreneurs, new forms of educational institutions emerged to deliver educational services by teaching in-demand practical trades and skills in addition to reading and writing (Tierney, 2011). These early entrepreneurs were mainly well-educated clergy looking to supplement their income by offering classes in their homes or churches (Hentschke et al., 2010; Ruch, 2001). Benjamin Franklin, himself a product of a European apprenticeship approach to education, was an early champion of for-profit education and opposed the importation of British educational models based on Cambridge and Oxford (Franklin & Best, 1962). The British models of education favored the study of classical literature and languages, including Greek and Latin, philosophy, and theology (Hentschke et al., 2010). Franklin believed that the new world needed a new approach to education; he envisioned an educational system that provided people, mostly men, with opportunities to learn skills and trades to build the economy for a new nation (Franklin & Best, 1962). America's for-profit educational institutions grew in response to demand for practical trades and in-demand skills to satisfy the job market; examples of these trades and skills included surveying and navigation, bookkeeping, engineering, and technical drawing (Ruch, 2001). For-profit

educational institutions, driven by the desire for increased profits, opened their doors to women, people of color, Native Americans, and those with disabilities, especially the blind and deaf (Coleman & Vedder, 2008; Ruch, 2001).

In the 1970s, for-profit colleges and universities became suitable alternatives for students who could not gain access to America's traditional colleges and universities for various reasons. Furthermore, for-profit institutions offered unique career training that was not available in most traditional schools of the time. For-profit institutions of higher education, also referred to as "career colleges," offered certificates and, in some cases, associate degrees, but it was uncommon for them to offer bachelor degrees (Ruch, 2001). In the early 1970s, for-profit colleges and universities enrolled less than 1% of all degree-seeking students in the United States (Gilpin, Saunders, & Stoddard, 2015) and so were clearly a small share of the overall higher education market.

The early success of the DeVry Institute of Technology (now DeVry University) changed everything. DeVry proved that higher education could be a successful, and substantial, for-profit business in the United States. When DeVry Inc., the parent company of DeVry Institute of Technology, began trading on the New York Stock Exchange, several other for-profit schools, including Apollo Group and its University of Phoenix, soon followed. In 2015, about 12 % of American college students attend for-profit schools (Gilpin et al., 2015; Hentschke et al., 2010); the majority of them attend colleges and universities operated by large, publicly traded corporations like DeVry University (Douglass, 2012; Gilpin et al., 2015).

History of the Organization

DeVry University's long history of offering educational services started with its founding school, DeForest Training School, in Chicago in 1931. The mission of the DeForest Training School was to prepare graduates for careers in electronics as well as the motion picture, radio, and television industries. During and following World War II, DeForest Training School partnered with the United States Army to educate instructors and to serve as a training provider under the original G.I. Bill. In 1953, DeForest Training School became DeVry Technical Institute and, soon afterwards, launched its associate degree program in electronic engineering technology, which earned accreditation by the Engineering and Technology Commission of the Accreditation Board for Engineering and Technology (TAC of ABET).

In 1968, DeVry Technical Institute became DeVry Institute of Technology and soon after that began offering a bachelor degree program in electronics engineering technology that featured accreditation by TAC of ABET. Throughout the years, DeVry Institute of Technology expanded its presence by geographical expansion within the United States and Canada and by adding new program offerings such as a bachelor degree in computer information systems. During the 1980s, DeVry Institute of Technology added baccalaureate degree programs in accounting, business, and technology management. In 1995, DeVry Inc., the parent company of DeVry Institute of Technology and Keller Graduate School of Management, began trading on the New York Stock Exchange. DeVry Institute of Technology offered its first fully online degree program in 2000.

In 2002, with approval from the Higher Learning Commission of the North Central Association of Colleges and Schools, DeVry Institute of Technology and Keller Graduate School and Management became DeVry University. In response to demands from industry and potential students for a new academic program, DeVry University, in 2005, launched a bachelor degree program in game and simulation programming. DeVry University expanded its educational services to provide a graduate degree program in educational technology in 2007. In 2013, DeVry University earned accreditation for its business and accounting degree programs by the Accreditation Council for Business Schools and Programs. During the same year, DeVry University received reaffirmation of accreditation of its educational programs from The Higher Learning Commission of the North Central Association of Colleges and Schools. Today, DeVry University is a member of DeVry Education Group. DeVry Education Group serves as the parent organization of DeVry University and its Keller Graduate School of Management, American University of the Caribbean School of Medicine, Carrington College, Becker Professional Education, Chamberlain College of Nursing, DeVry Brasil, Ross University School of Medicine, and Ross University School of Veterinary Medicine. These educational institutions provide educational services in the areas of business, technology, healthcare, accounting, and finance (“DeVry Heritage,” 2014).

History of the Problem

Limited blended course offerings have been a problem for DeVry University since the year 2011. In the previous decade, DeVry University had enjoyed a substantial

level of enrollment in each program and in each of the associated required courses. Total student enrollment at DeVry University in the year 2002 was 56,135 (“DeVry Annual Report,” 2002) while course student enrollment average was estimated at more than 20 students per course (D. Maddox, personal communication, March 7, 2014). During that time, only on rare occasions were blended course offerings limited. By comparison, in 2014, the total student enrollment at DeVry University was 37,922, (“DeVry News Release,” 2015), and course student enrollment average was estimated at 11 students per course (D. Maddox, personal communication, March 7, 2014).

Between the years 2004 and 2007, DeVry University introduced its online program options in addition to its existing campus program offerings. As a result, a number of students who would have previously enrolled in campus programs took advantage of the online program offerings and enrolled in them instead. While the online program offerings attracted more students to DeVry University than the campus programs alone would have, some of the new online students would have enrolled in campus programs. This has caused a decrease in campus student enrollments (“DeVry Annual Report,” 2009).

Between the years 2004 and 2010, the two program delivery units, online and campus, were managed by two separate organizational units within DeVry University. This organizational model led to some internal rivalry between the two organizational units and, in some cases, even to different business practices. Because of these differences, campus students and online students did not enjoy a seamless experience when enrolling in both online and blended courses. The former National Dean for the

College of Engineering and Information Sciences stated that during that time, campus-program students were enrolled in blended courses, while online-program students were enrolled in online courses exclusively (J. Giancola, personal communication, December 20, 2009). Campus programs were not significantly impacted because blended course enrollments were still high enough for campuses to offer robust numbers of courses across programs. However, some of the campus locations, especially the smaller DeVry University Centers, experienced low enrollments that forced reductions in blended course offerings. Dr. Campbell, DeVry University Center Dean, noted that academic leaders at these smaller locations did, however, notice that cancelled courses needed by their students were available online (R. Campbell, personal communication, September 20, 2009). This and other operational implications led to integration of the two organizational units, merging campus and online programs into one organizational unit under the umbrella of DeVry University. Since 2011, campus and online programs have been managed by DeVry University as a single organizational entity (“DeVry Annual Report,” 2011). This operational realignment paved the way for greater synergy between online and campus program delivery. Soon after, the concept of mix-and-match became a reality. The concept of mix-and-match allows all DeVry students to enroll in any course regardless of modality.

The benefits of mix-and-match are substantial and include the following:

- Ability for campus-based students to enroll in online courses and not have to be concerned about scheduling conflicts as the online courses are based on asynchronous participation;

- Ability for online program students to enroll in blended courses to take advantage of professor-led scheduled lectures and campus lab facilities; and
- Ability for DeVry University students to choose from a larger pool of (both online and blended) courses (A. Naumaan, personal communication, July 5, 2014).

Students and university administrators welcomed the mix-and-match program options, and DeVry University enjoyed higher student satisfaction due to the expanded course offerings available to students (J. Giancola, personal communication, June 20, 2009).

Starting in 2011, overall enrollment at DeVry University dropped to levels at which some of the blended courses scheduled to be offered at campuses had to be canceled due to insufficient enrollment (“DeVry Annual Report,” 2012; “DeVry Annual Report,” 2014). Table 2 shows both the total and new student enrollments at DeVry University between 2010 and 2013.

There are a number of possible reasons for an overall decrease in university program enrollments. One driver of lower enrollment relates to the prolonged economic downturn following the banking crisis of 2008 that led to a scarcity of credit available to prospective students. This tightening of credit, in many cases, prevented prospective students from committing to pursuit of higher education (A. Naumaan, personal communication, July 5, 2014; Wetstein, Hays, & Nguyen, 2011). Other reasons include a perception that many high-tech jobs, especially attractive to potential DeVry University

students, have been outsourced and are no longer available in the United States (El-Khawas, 2011).

Table 2

DeVry University July Session Undergraduate Enrollments

<u>Fiscal Year</u>	<u>New Student Enrollment</u>	<u>% Change Over Prior Year</u>
2013	5,674	-24.7%
2012	7,532	-16.6%
2011	9,026	-33.8%
2010	13,627	6.5%
<u>Fiscal Year</u>	<u>Total Student Enrollment</u>	<u>% Change Over Prior Year</u>
2013	42,374	-16.1%
2012	50,503	-15.8%
2011	59,966	-6.5%
2010	64,155	23.4%

Overall, many prospective students chose not to enroll in DeVry University programs because of the perception that the employment opportunities upon graduation were not favorable (McGee, 2005). Yet another reason for a possible downturn in the overall enrollments in DeVry University programs is that DeVry University, like other for-profit institutions, may be perceived to be simply be overpriced compared to its competitors, including private non-profit institutions, public community and state colleges, and public universities (Cellini, 2012; National Center for Education Statistics, 2012). Table 3 shows a comparison of tuition and fees for public and for-profit educational institutions.

Table 3

Tuition and Fees for Public and For-Profit Educational Institutions

Type of Institution	Average annual cost of tuition and fees (U.S. dollars)
Public	6,752
For-Profit	15,700

Regardless of the reasons for overall low enrollment in DeVry University programs, the reality is that blended course offerings are being limited, which negatively impacts students, faculty, and DeVry University.

The problem of course cancellations due to low course enrollments is a national problem caused by issues unique to the United States. Some of these issues include a prolonged downturn in the economy, lack of credit for business and individual investments and development (Basken, 2008; Joon Yoon, 2011; Peicuti, 2014), and increasing governmental regulations that placed a spotlight on a number of for-profit higher education institutions that had high rates of defaults on student loans as compared to public higher education institutions (Heller, 2011; Siple, 2011). Table 4 displays an average student loan default rate comparison between public and for-profit educational institutions.

Table 4

Average Student Loan Default Rate for Public and For-Profit Educational Institutions

Type of Institution	Average Student Loan Default Rate
Public	7.3%
For-Profit	15.2%

Factors such as scarcity of credit, perception of a lack of high-tech jobs, and high tuitions costs are believed to have contributed to lower overall enrollments at for-profit higher education institutions such as DeVry University, leading to the problem of a limited number of blended course offerings.

Factors that Impact the Problem

Broad Perspective

In the United States, colleges and universities, both public and private, feel the pressure to reduce operating costs (El-Khawas, 2011). In addition, institutions of higher learning must ensure that their operational practices comply with sound business principles. As a result of these forces - the imperative to reduce costs while also maintaining sound business practices – administrators frequently must cancel scheduled courses that do not meet minimum enrollment thresholds, and they balk at offering courses that are likely to generate low enrollment numbers. As a matter of course,

community colleges across the U.S. grapple with the problem of course cancellations due to low enrollment (Cavanaugh, 2003). Not surprisingly, the problem of low enrollment ranks highly on the list of challenges noted by administrators and scholars in the field of higher education; numerous studies and proposals regarding how to increase overall student enrollments are well documented in the literature (Ackerman, Kanfer, & Calderwood, 2013; Bettinger, Long, & Oreopoulos, 2007; Department of Education, 2012; Koretz & Barron, 1998).

Solving the problem of low enrollments in colleges and universities is not, however, the focus of this study. The focus of this study consists of examining ways to cope with low student enrollments and their impact on blended course offerings. In recent years, many administrators in higher education consider low student enrollments, especially in science, technology, engineering, and mathematics (STEM) programs, to be the new normal (D'Amico, Katsinas, & Friedel, 2012). In order to increase student enrollments, institutions of higher learning must achieve one of two things: (1) enroll more new students or (2) retain more existing students (Fitzgerald, 2004).

According to Christensen (2011), U.S. colleges and universities need disruptive innovations that shift their focus “away from how to enable more students to afford higher education to how we can make a quality postsecondary education affordable” (Christensen, Horn, Caldera, & Soares, 2011, p. 1). The value of disruptive innovation is to help educators serve a population that has previously been underserved, offering services that are affordable and accessible. Disruptive innovation needs to be supported by two key elements or enablers. The first enabler is technology. Technology needs to be

in place to provide services to those who previously were not served or deemed unworthy of service. In order to be effective, new services must include a cost structure that is favorable to both service provider and recipient. The second element of disruptive innovation involves a new model. The new business model must be, on its own terms, transformative with a substantial impact on how services are provided to recipients. The business models capable of supporting such transformation, generally speaking, need to be managed at the state level for public institutions of higher education or by an autonomous business unit when applied at for-profit institutions (Christensen et al., 2011).

In order to attract new students and retain existing ones, colleges and universities have implemented a number of disruptive innovations. Many of these innovations focused on introducing new course modalities aimed at providing students with flexible options to complete their coursework. One of those methods of course delivery includes the blended modality, which essentially involves a reduction in campus, or face-to-face, instruction hours and the addition of online instruction (Aly, 2013). Blended modality appeals to students who are unable to commit to long hours of face-to-face instruction, leading to increased student retention (Means, Toyama, Murphy, & Baki, 2013). Moreover, “online learners experienced more challenges and obstacles in achieving similar learning levels than the learners in blended delivery group.” (Lim, Morris, & Kupritz, 2007, p. 35). Research suggests that opportunities common to blended modalities such as students’ cohesiveness and collaboration may be unique advantages of blended modality (Arbaugh, 2014; Fearon, Starr, & McLaughlin, 2012). However,

implementing a blended modality has not resulted in the hoped-for increase in overall student enrollments (Cakiroglu, 2012). This approach alone, then, does not adequately address the issue of an insufficient number of blended course offerings.

Some colleges and universities have experimented with course modalities aimed at combining several sections of two or more low-enrollment courses into a single course offering; the approach used to combine these courses varies depending on unique institutional factors (Phillips, 2010). An example of such an approach would be combining an introductory mathematics course (Math101) with an intermediate mathematics course (Math102). Extending this example into the classroom, the professor would teach two different groups of students and two different mathematical concepts in the same classroom scheduled at the same time (Nimmons, 1982). Unfortunately, in practice, this course modality has not generated benefits to learners (Phillips, 2010). Students who completed combined courses have not shown equal or better academic performance compared to students who have completed different levels of courses offered separately (Nimmons, 1982).

Another course modality targeting low enrollment courses constitutes video conferencing that links together multiple sections of a single course, in different locations, via video conferencing technology (Phillips, 2010). A single professor, at the host location, delivers the course content from the host location and is present virtually at the remote locations (Phillips, 2010). Students at the remote locations interact with the professor via videoconferencing technology (Karal, Cebi, & Turgut, 2011). The success of this course modality correlates positively with the quality of the video conferencing

technology (Hu & Wong, 2006). However, students at the remote locations have reported feeling distant and disconnected from the professor (Karal et al., 2011). Likewise, the professor at the host location reported a significant difference in the level and quality of interactions with students at the host location compared to the students at the remote location (Phillips, 2010). Students attending the class remotely reported feeling poorly served by their professor as a result of the physical distance. All of the students in this case, whether in the host location or in remote locations, had an expectation of being able to interact with the professor via a campus or a face-to-face modality; this is why students chose to enroll in a campus-based course. According to students, accessing the course from remote locations and limiting the student-professor interaction to the use of video-conferencing technology did not meet their need for interaction with their professor (Hu & Wong, 2006).

With the proliferation of online education, many colleges and universities offer their courses in two basic modalities: face-to-face and online. The addition of the online modality has given these institutions options to enroll students in online courses when face-to-face courses do not meet the minimum enrollment threshold. On the surface, offering courses in an online modality promises to address the issue of a reduced number of blended course offerings by simply making online courses available. However, students who favor traditional, face-to-face courses have not responded favorably to this approach (Anderson, Boyles, & Rainie, 2012). In most cases, students' dissatisfaction with having to enroll in online courses, without a face-to-face course option, reflected their perception that online courses do not provide the same level of personal attention

and access to professors that face-to-face course offerings provide (Anderson et al., 2012). Students who take face-to-face classes value the personal interaction with their professors and are often unwilling to enroll in online courses unless no other options exist (Phillips, 2010). In other cases, the option to take online courses is simply not available to students regardless of their preferences. Such is the case with students whose tuition is funded by sources that require them to enroll in face-to-face classes. For example, students who receive funding from the VA are under an obligation to complete a course in a face-to-face or blended modality in order to receive housing allowances (Bell et al., 2013; Phillips, 2010). Similarly, international students may be ineligible to enroll in online courses due to provisions of their student visas; these students are limited in the number of online courses in which they may enroll (“Title 8,” 2007).

DeVry University Perspective

The organizational problem of an insufficient number of blended course offerings at DeVry University is mainly structural and symbolic; a possible solution to this problem rests in breaking down the barriers between blended courses and online courses, leading to a more efficient utilization of faculty talent. A structural problem exists when an organization’s leadership inadequately defines policies and procedures. A symbolic problem exists when perceptions do not match realities (Bolman & Deal, 2008). Many steps have been taken to lower the structural and organizational barriers between online and campus management, including promoting DeVry University as one University under which the management of blended and online courses would take place. Still, there

are barriers to seamless integration and collaboration between the two delivery modalities (J. Giancola, personal communication, July 21, 2011). Also, some students and university staff continue to share the belief that online courses are less rigorous and less effective at providing learning opportunities for students (A. Naumaan, personal communication, July 25, 2014).

There is a clear and measurable difference between the average course enrollment levels of online versus campus courses. This difference in enrollment between modalities is an example of a structural problem, defined as the existence of a barrier preventing formation of a synergy that would allow campus courses to reach the minimum enrollment threshold (Bolman & Deal, 2008). One easily identifiable barrier emerges from differences in how the revenue from tuition is attributed; the tuition generated by a student enrolled in a blended course benefits the campus budget in which the face-to-face component takes place, while the tuition generated by an online student benefits the budget for the online campus budget. Specifically, each physical campus, of which there are over 90 locations, is responsible for maintaining its financial viability; the same is true for the online campus. In absence of clear and understandable methods for revenue distribution, neither the onsite campus locations nor the online campus are open to enrolling their students in each other's courses (W. Wheeler, personal communication, June 20, 2014).

In addition to the problem of revenue sharing, perceptions of quality regarding online courses constitute a barrier to integrating the two modalities. Some students and university staff continue to insist that the online learning modality is less effective than

the face-to-face modality in providing students with learning opportunities (A. Naumaan, personal communication, July 25, 2014). This perception does not withstand scholarly investigation. For example, a March 2014 pilot study conducted at DeVry University compared the academic performance of students in two sections of the same course (blended and online modalities) and found no significant difference between the two modalities (A. Naumaan, personal communication, July 25, 2014). Students' inaccurate perception of online course quality and outcomes serves as an example of a symbolic problem in which perception of the value of online education does not match with the measured outcomes that online education provides.

DeVry University's previous attempts to address the negative impact of reduced numbers of blended course offerings on students consisted of enrolling campus-based students in online courses. Given that the two courses, blended and online, are virtually identical in terms of course content, the solution seemed to make sense. However, campus-based students were unwilling to enroll in online courses; they viewed online courses as undesirable in terms of their ability to effectively deliver academic content (Boston et al., 2011; Lim, 2014; W. Wheeler, personal communication, June 20, 2014).

The identified solution to the problem of insufficient number of blended course offerings - enrolling blended students in online courses - has proven to be an ineffective solution. In addition to some students' preference for blended courses, there are additional reasons why this solution - moving students who prefer blended courses into online courses - was not robust. One of these reasons is financial. Approximately 90% of DeVry University students rely on federal financial aid (National Center for Education

Statistics, 2014). Other DeVry students receive reimbursement for their tuition and housing expenses by the VA; the VA requires that students complete their courses via a delivery method that includes a face-to-face instructional component (Bell et al., 2013). International students also face restrictions; federal regulations limit the number of credit hours international students are allowed to complete online (“Title 8,” 2007). For these reasons, the potential solution to managing the negative effects of an insufficient number of blended course offerings, enrolling campus students in online courses, has not been effective. A new and more effective solution is still needed.

Description of the Model

DeVry University’s initiative to address an insufficient number of blended course offerings was piloted in the March 2014 session at four campus locations. A cross-listed (C-L) course model refers to a course that combines students registered in more than one course modality: in this case, blended and online.

While both online and blended-section students are enrolled in the same C-L course within the learning management system (LMS), they are not enrolled in the same course within the university registration system. This registration flexibility gives the C-L courses the unique ability to be fully blended for students who want a traditional face-to-face component and fully online for students who cannot, or will not, attend class on a physical campus.

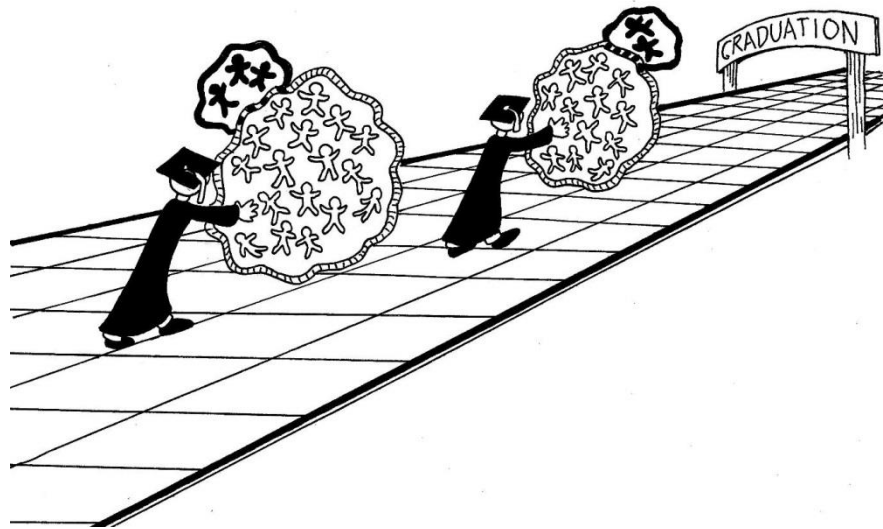


Figure 2. Depiction of the cross-listed modality illustrating combining of blended and online courses. Copyright 2015 by Daniel Traynor.

The key advantage expected of the C-L course approach is to increase course enrollment. Such a scheduling option has the potential of combining higher online course enrollments with lower blended course enrollments to create a C-L course that meets the minimum enrollment threshold to be offered. In principle, this model would appear to satisfy the demand for blended courses in an environment hampered by low blended course enrollments. In this model, students in blended courses enjoy the benefits of meeting with their professors and classmates at a physical campus while online students notice virtually no difference between their online courses and C-L courses. This seamless delivery of both onsite and online instruction occurs because the professor teaching the C-L course moderates online course threaded discussions and completes weekly grading in the same manner as any other professor who is teaching a purely online course would do.

In addition, the C-L modality addresses the needs of students who need blended courses for financial considerations, including VA supported students and international students, and students who may receive tuition reimbursement from employers who do not cover the cost of online courses. The VA supported students (VA students) are required to be enrolled in a face-to-face or blended course in order to satisfy the VA requirements for VA housing allowance (Bell et al., 2013). The C-L course delivery method satisfies the requirement for VA students who need to be enrolled at a physical campus in a blended course, even if low enrollment for the course would otherwise mean that the blended course would be cancelled. Therefore, the C-L course modality expands blended course availability to VA students. VA students can enroll in blended courses and be joined by online students while still retaining registration at a physical campus. Similarly, international students must be enrolled in courses with a face-to-face component in order to satisfy student visa requirements (“Title 8,” 2007). The C-L course delivery method provides a solution to international students in an identical fashion as the solution provided to VA students. The C-L course delivery method allows international students to be enrolled in a physical campus blended course, even if the blended course enrollment is below the required enrollment threshold. This is because blended course enrollments are combined with online course enrollments.

Campus-based students often have a strong preference for completing their courses at a physical campus (Chen, Jones, & Moreland, 2010). The C-L course delivery method provides a solution to the many students who must enroll, or simply prefer to enroll, at a physical campus. Before being fully implemented, however, the new C-L

modality needed to be piloted to ensure the identified outcomes are achieved and any unintended consequences are manageable if not completely solvable. For this reason, a pilot of the C-L course delivery method was conducted in the March 2014 session.

The essence of the March 2014 pilot program was to increase blended course offerings by combining enrollments from courses offered in blended and online modalities. The following table shows the pilot's logic model (Table 5). A logic model is a tool that describes how a program, in this case a pilot of a new C-L course modality, has been implemented. A logic model "characterizes a project through a system of elements that include components and connections, with context being an important qualification" (Frechtling, 2007, p. 1). The application of the logic model to the March 2014 pilot highlights the resources that were necessary for the pilot to occur, the activities necessary to deploy the pilot, the outputs generated, and the expected outcomes.

Students in C-L courses explore the same course content, complete the same assignments and assessments, and share the same professor – only now the course is well above the enrollment threshold and may even be full. Piloting of the C-L course delivery method began in March 2014 at four DeVry University campuses. The pilot concluded in May 2014, at the end of the March 2014 session. Table 6 shows the pilot's timeline and major deliverables.

Table 5

Logic Model for the Pilot of Cross-Listed Modality

Resources	Activities	Output	Outcome
Blended and online courses. At least 15 sections of the identical (CIS115 in this case) course.	Blended and online course sections are C-L to form one course.	At least 4 C-L sections. At least 4 blended sections. At least 4 online sections.	Higher number of blended courses.
Physical campus Professors assigned to C-L course sections.	Professors complete a short orientation to C-L course offerings. Professors meet on a bi-weekly basis with each other and program coordinator to discuss C-L course offering pilot progress.	Meetings scheduled during the March 2014 session. Professors complete the orientation.	Same or higher Net-Promoter-Score for C-L courses. Same or higher student course outcome achievements in C-L courses. Professors endorse C-L modality.
Students enrolled in the identical (CIS115 in this case) online and blended courses.	Three different groups of students complete the CIS115 courses.	At least 100 students enrolled in C-L course sections.	Higher number of blended courses. Same or higher student course outcome achievements in C-L courses.

Operational advantages of C-L courses, such as higher student enrollments per course, are clear; combining blended and online course sections yields higher student enrollments per course. However, student-learning outcomes are also important performance matrices that needed to be evaluated. More specifically, it must be assured

that students enrolled in C-L courses can achieve equivalent student-learning outcomes and satisfaction levels as compared to students enrolled in blended or online courses. In addition, academic leaders at DeVry University must explore and understand professors' perceptions of the C-L modality. This is to ensure that future implementation strategies are well informed and refined to address potential weaknesses highlighted by the evaluation findings.

Table 6

Timeline and Major Deliverables of Pilot

January 2014	February 2014	March-April 2014	May 2014
Select potential courses and campuses to participate in the C-L pilot.	Form C-L courses in the LMS. Assign campus professors to teach C-L courses.	Conduct C-L course offering pilot. Conduct bi-weekly meetings with professors to discuss their concerns and to share best practices.	All participating course sections end. Evaluation data is collected.

CHAPTER 2 EVALUATION DESIGN

Introduction

This study responds to the needs of DeVry University (client) by providing a mixed-method evaluation of a new C-L course modality. The C-L modality combines students from blended and online courses to form a course with higher student enrollment, while preserving separate student registration in blended and online courses. This study aims to determine the impact of four piloted C-L courses on the insufficient number of blended course offerings. DeVry University students, especially students who want or need to enroll in blended courses, may benefit from adoption of this modality. Further, DeVry University professors may realize an increase in blended course offerings that are needed to meet their annual teaching requirements. In the March 2014 session, a pilot of the new C-L modality was conducted at DeVry University. This pilot involved offering 15 sections of a specific course – Logic and Design with Lab (CIS115) – in three distinct modalities: C-L (four sections), blended (seven sections), and online (four sections). If the piloted C-L modality is shown to meet its outcomes, then students enrolling in blended courses will realize a much-needed increase in the number of courses offered via blended modality. In addition, DeVry professors may realize an increase in the number of sections of blended courses available for them to teach. Before this new modality can be considered for further implementation by DeVry University, C-L courses need to be evaluated to ensure they achieve identified outcomes.

Purpose of the Study

Currently, there is virtually no understanding of how courses offered in a C-L modality might impact DeVry University, DeVry professors, and DeVry students. The purpose of this study is to determine the impact of the piloted C-L modality on a current problem involving an insufficient number of blended course offerings. During this study, identified outcomes will be evaluated to determine whether they were achieved.

Research Questions

The study is driven by an overarching research question: What is the impact of the C-L modality on blended course offerings as well as students and professors at DeVry University? In order to assist in answering this question, the following research questions and hypotheses were developed to guide the evaluation process. Research questions 1 through 5 correspond to the comparison of the treatment group (students in C-L courses) with comparison groups (students in blended and online courses). Figure 3 illustrates the relationships between the treatment group and the two comparison groups.

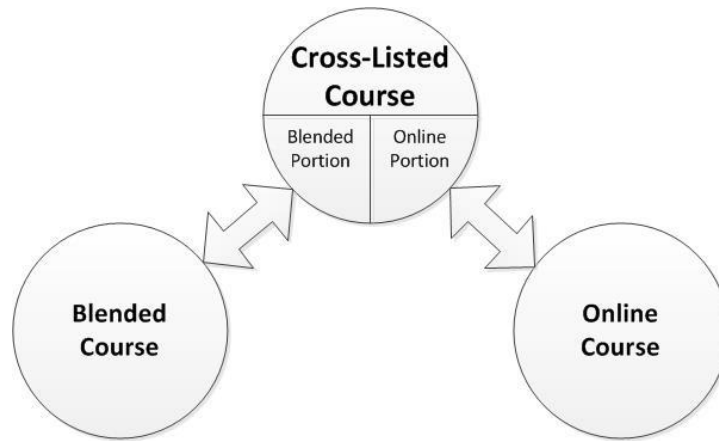


Figure 3. Treatment and comparison groups used in this study.

1. What difference, if any, exists between the numbers of blended CIS115 courses expected to have been offered in the March 2014 session versus the number of blended CIS115 courses that were actually offered in the March 2014 session?

Hypothesis:

H₀₁ There is a statistically significant difference in the numbers of blended CIS115 courses offered in the March 2014 session versus the number of blended and C-L CIS115 courses also offered in the March 2014 session.

2. What difference, if any, exists between the Net-Promoter-Score (NPS) of students who complete:
 - a. C-L course (online portion), versus students who complete the same course in an online modality?
 - b. C-L course (blended portion), versus students who complete the same course in a blended modality?

Hypotheses:

- a. H₀₂ There is no statistically significant difference in NPS between students who complete a C-L course (online portion) versus students who complete the same course in an online modality.
 - b. H₀₃ There is no statistically significant difference in NPS between students who complete a C-L course (blended portion) versus students who complete the same course in a blended modality.
3. What difference, if any, exists between the course final scores of students who complete:
- a. C-L course (online portion), versus students who complete the same course in an online modality?
 - b. C-L course (blended portion), versus students who complete the same course in a blended modality?

Hypotheses:

- a. H₀₄ There is no statistically significant difference in course final scores between students who complete a C-L course (online portion), versus students who complete the same course in an online modality.
- b. H₀₅ There is no statistically significant difference in course final scores between students who complete a C-L course (blended portion), versus students who complete the same course in a blended modality.

4. What difference, if any, exists between the final exam scores of students who complete:
 - a. C-L course (online portion), versus students who complete the same course in an online modality?
 - b. C-L course (blended portion), versus students who complete the same course in a blended modality?

Hypotheses:

- a. H₀₆ There is no statistically significant difference in final exam scores between students who complete a C-L course (online portion), versus students who complete the same course in an online modality.
 - b. H₀₇ There is no statistically significant difference in final exam scores between students who complete a C-L course (blended portion), versus students who complete the same course in a blended modality.
5. What difference, if any, exists between the lab exercise scores of students who complete:
 - a. C-L course (online portion), versus students who complete the same course in an online modality?
 - b. C-L course (blended portion), versus students who complete the same course in a blended modality?

Hypotheses:

- a. H₀₈ There is no statistically significant difference in lab exercise scores between students who complete a C-L course (online portion), versus students who complete the same course in an online modality
- b. H₀₉ There is no statistically significant difference in lab exercise scores between students who complete a C-L course (blended portion), versus students who complete the same course in a blended modality.

6. What are professors' perceptions of the C-L modality?

Hypothesis:

H₁₀ Professors endorse the C-L modality.

Research Methods

This evaluation uses an outcome-oriented post-test only design with non-equivalent groups (quasi-experiment) coupled with qualitative components. The quasi-experiment compares outcomes of students enrolled in C-L courses (the treatment group) with students enrolled in blended and online courses (comparison groups) using post-achievement data. The program under evaluation is a pilot of C-L modality courses. This evaluation features a mixed-method research design. The mixed-method design allows for building understanding of the C-L modality's methods, strengths and weaknesses (Stufflebeam, 2001). In order to validate the existence of the problem, the researcher collected and analyzed quantitative data (Wholey, 1995). The quantitative data included the March 2014 session course enrollment levels for CIS115 Logic and Design with Lab

course offered as a C-L course (including both blended and online students). Further, numerous personal communications with senior DeVry University academic administration personnel support the view that the root cause of the insufficient number of blended course offerings is low student enrollments at the physical DeVry University campuses. Personal communications support the view that an insufficient number of blended course offerings is a significant problem for the university. This study was conducted by Karol Carlo Sapijaszko (researcher), the author of this Dissertation in Practice and an employee of DeVry University (client). Because of the possible bias created by the researcher's status as an employee of the client, a reviewer was used to independently review the quantitative analysis and to independently analyze qualitative data (Denzin, 1970; Morse, Barrett, Mayan, Olson, & Spiers, 2002; Shaffer et al., 2013).

Treatment and Comparison Groups

The treatment group consisted of students and professors who were enrolled in, or were teaching, one of four sections of CIS115 Logic and Design with Lab in the C-L modality in the March 2014 session. The comparison group consists of students who were enrolled in the remaining selected pilot course sections of CIS115 offered as blended courses or as purely online courses. There are two comparison groups: (a) students and professors enrolled in the sections of CIS115 offered via the blended modality and (b) students and professors enrolled in the sections of CIS115 offered via the online modality.

Quantitative Method

The quantitative part of evaluation design features a non-equivalent groups comparison approach. The courses offered in the C-L modality were piloted in the past (March 2014 session), and data used in this research was archival. The data was collected in the past and made available to the researcher in the year 2015 for this study. A non-equivalent design was selected in recognition of the fact that the treatment and comparison groups have not been fully randomized (Boruch, 1994; Campbell & Stanley, 1963; Fitzgerald, 2004); their selection was dictated by the availability and willingness of some DeVry University campuses to participate in the pilot. The number of courses, students' academic outcomes, and NPS formed the quantitative data for comparison between the treatment group and comparison groups.

For this study, a pragmatist approach is appropriate because this study focuses on the C-L modality outcomes and concerns itself with a solution to a problem of practice (Creswell, 2012, Potter, 2006). The statistical test used to analyze the quantitative data is a two-tailed independent sample *t*-test. Using this approach, a presence or absence of statistically significant differences between the averages of populations was detected (Creswell, 2005). More specifically, statistical significance indicates that the difference between group averages is likely to represent an actual difference between treatment and comparison groups (Patton, 2002). Because the selected *t*-test is two-tailed, and if a statistically significant difference exists, then the two-tailed *t*-test would indicate whether there was an increase or a decrease in dependent variables of the treatment group as compared to dependent variables of the comparison groups. The two-tailed independent

sample *t*-test is appropriate in this study because the samples in each group are independent, meaning there is no relationship between the samples in treatment and comparison groups (Creswell, 2012).

Qualitative Methods

The qualitative component of this study focused on evaluating professors' perceptions of the C-L modality. A process of identifying significant statements leading to development of themes, served as the basis for data analysis. Transcripts of interviews with professors who taught the C-L sections of CIS115 constituted the qualitative data. This method utilizes the interpretive approach to human subject research in that reality and professors' perceptions of the piloted modality are constructed by their current beliefs and informed by their prior experiences as professors (Stufflebeam, 2001; Willis, 2007). This interpretive approach, then, allows for the development of a deeper understanding of professors' perspectives, experiences, and expectations of the C-L modality; such understanding is crucial when making judgments about the effectiveness of the C-L course modality (Blanche, 2006; Potter, 2006).

Stakeholders involved in this study, the National Dean of the College of Engineering and Information Science and professors participating in the program, generated all of the program outcomes. The following set of tables (Tables 7, 8 and 9) present a map of pilot outcomes, standards of evaluation, data, evaluation methods, and approaches.

Table 7

Pilot Standards and Outcomes

Outcome	Standard
Outcome 1: Higher number of Blended courses.	Standard 1: The number of actual blended course offerings needs to be higher as compared with the number of blended courses expected to have been offered during the March 2014 session.
Outcome 2: Same of higher Net-Promoter-Score in C-L courses.	Standard 2: The average Net-Promoter-Score in C-L courses needs to remain the same or be higher as compared with an average for blended or online courses offered during the March 2014 session.
Outcome 3: Same or higher student course outcome achievements in C-L courses.	Standard 3: The average student course outcome achievement levels in C-L courses need to remain the same or be higher as compared with an average for blended or online courses offered during the March 2014 session.
Outcome 4: Professors endorse C-L modality.	Standard 4: Professors identified benefit of the C-L modality consistent with its outcomes.

Table 8

Outcomes, Standards, and Research Questions

Outcome	Standard	Research Questions
Outcome 1	Standard 1	1. What difference, if any, exists between the numbers of blended CIS115 courses expected to have been offered in the March 2014 session versus the number of blended CIS115 courses that were actually offered in the March 2014 session?
Outcome 2	Standard 2	2. What difference, if any, exists between the Net-Promoter-Score (NPS) of students who complete: <ol style="list-style-type: none"> a. cross-listed course (online portion), versus students who complete the same course in an online modality? b. cross-listed course (blended portion), versus students who complete the same course in a blended modality?
Outcome 3	Standard 3	3. What difference, if any, exists between the course final scores of students who complete: <ol style="list-style-type: none"> a. cross-listed course (online portion), versus students who complete the same course in an online modality? b. cross-Listed course (blended portion), versus students who complete the same course in a blended modality? 4. What difference, if any, exists between the final exam scores of students who complete: <ol style="list-style-type: none"> a. cross-listed course (online portion), versus students who complete the same course in an online modality? b. cross-Listed course (blended portion), versus students who complete the same course in a blended modality? 5. What difference, if any, exists between the lab exercise scores of students who complete: <ol style="list-style-type: none"> a. cross-listed course (online portion), versus students who complete the same course in an online modality? b. cross-listed course (blended portion), versus students who complete the same course in a blended modality?
Outcome 4	Standard 4	6. What are professors' perceptions of the C-L modality?

Table 9

Research Questions, Data Source, Data Type, and Evaluation Method/Approach

Research Question	Date Source	Data Type	Analysis Method/Approach
Research Question 1	Registrar records of all CIS115 courses offered in the March 2014 session	Number of courses	Percent change
Research Question 2	Net-Promoter-Score data for all students enrolled in CIS115 courses offered in the March 2014 session	Scale 0-10	Two-tailed independent sample <i>t</i> -test
Research Question 3	Grade-book records for all students enrolled in CIS115 courses offered in the March 2014 session	Scale 0-100	Two-tailed Independent sample <i>t</i> -test
Research Question 4			
Research Question 5			
Research Question 6	Interview text transcripts conducted with professors who taught CIS115 C-L courses	Interview transcripts	Identifying significant statements leading to development of themes

Stakeholders

There are three main stakeholders in this evaluative study: (a) DeVry University academic administrators, (b) professors, and (c) students. The academic administrators established the main objectives for the piloted program and served as the driving force behind the approval and implementation of the pilot program. In addition, the academic administrators were involved in identifying and validating evaluation criteria and success

standards. The administrators at DeVry University are charged with, among other responsibilities, seeking effective ways to increase students' satisfaction and retention levels. For this reason, the DeVry University administrators have been heavily involved in this study. DeVry professors, not just the ones who participated in the pilot program, have a vested interest in the outcome of this pilot study. Professors, as stakeholders, were involved in recommending evaluation criteria and success standards; professors who participated in the pilot program also served as subjects during the evaluation process.

Participants

Participants for this study included all students enrolled in selected sections of CIS115 during the March 2014 academic session at DeVry University participated in this research. These students were from geographically diverse locations, including online students who may be located anywhere in the United States. All DeVry University locations (Appendix A) were offered the opportunity to participate in the pilot study. During the March 2014 academic session, there were four course sections of CIS115 offered in the C-L modality, seven offered in the blended modality, and four as online courses. The cross-listed sections of CIS115 took place at the following DeVry University locations:

- Jacksonville, Florida;
- Atlanta, Georgia;
- Arlington, Virginia; and
- North Brunswick, New Jersey.

There were two comparison groups in this research study. The first comparison group consisted of students who were enrolled in online sections of CIS115 during the March 2014 academic session; the total number of students enrolled in these sections was 80. The second comparison group consisted of students who were enrolled in blended sections of CIS115 during the March 2014 academic session; the total number of students enrolled in these sections was 42. Professors teaching at a physical campus of DeVry University delivered the courses offered in the C-L modality; these professors also participated in this research study. A total of 109 students enrolled in the CIS115 sections offered in the C-L modality. Therefore, the total number of students enrolled in the treatment group was 109. Table 10 displays the number of CIS115 course sections and the combined student enrollments in the March 2014 session.

Table 10

Number of Course Sections and Student Enrollment for CIS115 in the March 2014 Session

Group	Number of course sections	Student enrollment
Treatment: C-L (Blended Portion)	4	67
Treatment: C-L (Online Portion)		47
Comparison (Blended)	7	42
Comparison (Online)	4	80

Data Collection

In order to validate the existence of the problem, the researcher collected and analyzed quantitative data. The quantitative data included the March 2014 session course enrollment levels for the CIS115 (Logic and Design with Lab) course offered as a C-L course (including both blended and online students). Further, numerous personal communications with senior DeVry University academic administration personnel support the view that the root cause of the insufficient number of blended course offerings is low student enrollments at the physical DeVry University campuses. Personal communications also support the view that an insufficient number of campus course offerings is a significant problem for the university. Following the March 2014 session pilot of the C-L course modality, data related to this study was collected. Students' grades on various course gradable items, students' course completion rates, as well as students' NPS data were collected; this was done to make quantitative data assessments of students' academic performance, retention, and satisfaction levels in the pilot courses comparable to the same courses offered via blended and online modalities. Summaries of interview data collected from professors who taught the C-L pilot courses were also collected for this study; this qualitative data was collected to assess professors' perceptions of the C-L course modality.

Instrumentation

Approval to conduct this study was granted by the Institutional Review Boards of both the University of Central Florida and DeVry University (Appendices B and C).

Copyright permission to use drawings in figures 1 and 2 was granted by Daniel Traynor (see Appendix D). The quantitative data was obtained from DeVry University staff.

Data records provided the following information, all of which pertained to selected CIS115 courses offered in the March 2014 session:

- Number of course sections and their enrollments,
- Students' course final scores,
- Students' final exam scores,
- Students' lab exercise scores, and
- Net-Promoter-Scores.

The number of CIS115 course sections included delineation for blended, online and C-L course sections. This data was in two sets. The first set reported the number of course sections and their enrollments prior to cross-listing of courses, and the second set reported the number of courses and their enrollments after the cross-listing of course sections was completed. Students' course final scores, final exam scores, and lab exercise scores were provided by an extracted grade-book from a LMS used for all sections of the selected CIS115 course sections. The course final scores, final exam scores, and lab exercise scores were reported as a scale ranging from 0 to 100, with 100 being the best score.

Course final scores are determined by the weighted average of the following graded course components:

- Final exam (40%),
- Lab exercise (30%),
- Threaded discussion (15%), and
- Quizzes (15%).

The course final scores were used as data in this study because they provide a weighted portfolio of gradable items, quizzes, and a portion of the final exam that were auto-graded; labs, threaded discussions, and a portion of the final exam were subjectively graded by professors.

The final exam for the course consists of a comprehensive exam, thus assessing students' academic performance on all course objectives. The final exam is a weighted average of multiple-choice questions worth 70% of the exam score and short answer questions worth 30% of the exam score. The final exam is common to all CIS115 course sections; 70% of the test is auto-graded (multiple-choice questions) and 30% of the test is professor-graded (short answer questions), with common correct answers provided to the professors. This approach makes the scores for the final exam comparable, as they are relatively bias-free. The course final exam qualified as data in this study because it provides an objective evaluation of students' academic performance.

Student scores for lab exercises were included in this study because they provide an assessment of students' practical understanding of the subject matter and are consistent with DeVry's commitment to a practitioner-oriented education. Students were

asked to write computer programs to comply with given performance specifications.

Professors graded computer programs produced by individual students; gradable items included outputs (results), programing style, and documentation.

Companies that recognize the power of loyalty among customers or clients often use NPSs to monitor the level at which customers or clients maintain their loyalty. The notion of loyalty is not only intuitively appealing to companies and educational institutions; a growing body of empirical evidence suggests that those who neglect loyalty suffer negative consequences such as loss of market share or client retention, which ultimately leads to loss of revenue (Reichheld, 2001). Given the relationship between loyalty and increased levels of client satisfaction, institutions of higher education wisely invest time and resources into programs aimed at measuring students' satisfaction or, in this case, loyalty (Ittner & Larcker, 1998). In the case of DeVry University, NPSs reflect the level of students' satisfaction in recently completed courses. The NPSs were provided for all CIS115 course sections offered in the March 2014 session. This data included delineation for blended, online, and C-L course sections. Students completed the NPS survey during the final two weeks of an 8-week long session. Completion of all end-of-course evaluations by students is optional. NPSs were included in this study because they provide valuable information about students' level of course satisfaction; NPS questions posed to DeVry University students focus on students' willingness to recommend courses to friends or family (W. Philips, personal communication, April 4, 2005). NPS is reported numerically on a scale from 0 to 10, with 10 signifying strongest promoter and 0 signifying weakest detractor (Owen & Brooks, 2008).

Interviews

Following completion of the March 2014 pilot, DeVry University staff interviewed professors who taught the five sections of C-L courses. The highlights of the guided interviews were captured in a text format (Appendix E). The responses to open-ended interview questions highlighted respondents' perceptions of the C-L modality. Questions focused on professors' perceptions regarding the benefits and drawbacks of the C-L modality. Further, questions focused on professors' perceptions of the compensation and systems support for the C-L modality.

Data Analysis

In the March 2014 session, CIS115 courses were offered in three different modalities: blended, online, and C-L. Following the pilot offering of courses in the C-L modality, data related to students' academic performance, course satisfaction levels, and interview data from professors were collected. Numerical data were analyzed using IBM SPSS predictive analytics software (v. 21).

Research Question one was designed to provide the client (DeVry University) with a sense of the potential impact of the C-L modality on blended course offerings. The data analysis in this case was focused on determining a simple percentage change in the number of blended courses that would be offered without implementation of the C-L modality versus the number of blended courses that were offered due to implementation of the C-L modality. The hypothesis related to this question is that there is an increase in the number of blended courses that was offered due to implementation of the C-L

modality. The success standard for this outcome was a ten percent increase in the number of blended courses that was offered due to implementation of the C-L modality.

The data subset that was used to answer Research Questions two through five has been normalized to ensure that it exhibits characteristics consistent with normal distribution of data samples. A Shapiro-Wilks test was used to compare the shape of the sample distribution to the shape of a normal distribution curve. The normality of data sample distribution is defined as a distribution that does not have statistically significant deviation from the standard normal distribution curve. The Shapiro-Wilks test is the most common normality test used in cases where small and medium, over 30 but fewer than 2000 samples, data sets are present (Abbott, 2011). Given that all data sets were tested and shown to be normally distributed, a parametric two-tailed independent *t*-test, was used to test hypotheses for Research Questions 2 through 5. According to Abbott (2011), parametric tests require that data samples are normally distributed, which was shown to be the case with all data sets used to evaluate Research Questions 2 through 5. In testing hypotheses related to Research Questions 2 through 5, *p*-values were examined to determine if a statistically significant difference exists between data sets from the treatment and comparison groups. The *p*-value correlates with the probability of a Type I error occurring. A type I error exists when a null hypothesis is rejected when it is true (Abbott, 2011). Therefore, when *p*-value is high, greater than 0.05, the null hypothesis is accepted. Likewise when the *p*-value is low, less or equal to 0.05, the null hypothesis is rejected (Howell, 2011).

Research Questions 3 to 5 were designed to assess student academic performance. In evaluating these research questions, data triangulation was used to strengthen the validity of quantitative findings. The technique of triangulation stems from navigational and land surveying techniques used to determine a convergence of results from multiple data sources (Denzin, 1970). Data triangulation involves gathering data through several sampling strategies (Bogdan & Biklen, 2007; Denzin, 1970). “Once a proposition has been confirmed by two or more independent measurement processes, the uncertainty of its interpretation is greatly reduced” (Webb, Campbell, Schwartz, & Sechrest, 1966, p. 3). In the case of this study, the data triangulation approach was used to determine students’ course outcomes. Three data points were used to inform the results of students’ course outcomes: final course score, final exam score, and lab score. Figure 4 illustrates data triangulation for this study. The scale of each of these data sets was from 0 to 100. A score of a 100 indicated the best and the maximum score.

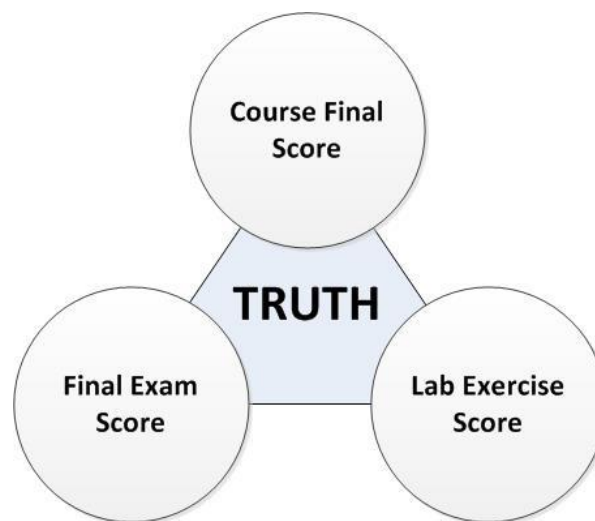


Figure 4. Data triangulation.

Because each of these data sets presented meaningful information, an equal weight was assigned to each of the data sets. An equally weighted average of the three triangulated results represented the result for student's achievement levels in the CIS115 course.

Research Question 6 was designed to assess professor's perceptions about C-L modality. Interview transcripts with professors who taught C-L courses were compiled following the March 2014 pilot. The interview questions were designed to be open-ended and to probe professors' perceptions of the benefits and drawbacks of the C-L modality. The procedure based on identifying significant statements leading to the development of themes was used to shed light on professors' experiences teaching C-L courses. In particular, efforts centered on evaluating whether criteria (Table 7) associated with Outcome 4, "Professors endorse the C-L modality," were achieved. The procedure to carry out the quantitative analysis based on identifying significant statements leading to development of themes was consistent with the procedure described by Creswell (2007). First, horizontalization was performed by highlighting significant statements captured in the interview transcripts. Horizontalization ensures that interview data are treated in a way that avoids implied favoritism, without higher weight assigned to any themes emerging from the interviews (Moustakas, 1994). Next, from significant statements, clusters of meaning or themes were developed (Creswell, 2007; Moustakas, 1994). These themes helped to focus the qualitative analysis by providing meaningful sections that were used to determine whether standards for Outcome 4 were satisfied.

In this study, a reviewer was used to strengthen the validity of qualitative findings and to limit a possible bias that might have been introduced by the researcher (an employee of the client). The independent reviewer followed the same qualitative data analysis procedure as did the researcher when analyzing interview transcripts (Denzin, 1970; Morse et al., 2002; Webb et al., 1966). This procedure involved identification of significant statements from interview transcripts leading to development of themes. Once the analyses were independently reviewed by the reviewer, a meeting was scheduled to discuss any differences and to reach consensus.

CHAPTER 3 ANALYSIS AND PRESENTATION OF DATA

Introduction

This study was conducted to evaluate the outcomes of a pilot initiative that offered several sections of a course (CIS115 - Logic and Design with Lab) in a new C-L modality. The outcomes of offering sections of a course in the C-L modality include increasing blended course offerings while maintaining student satisfaction levels and student academic performance as well as cultivating faculty endorsement of the new modality. Currently, there is virtually no understanding of how the C-L modality impacts DeVry University as an organization, its students, and its professors. The data collected following the March 2014 pilot offering of CIS115 C-L courses were analyzed using qualitative and quantitative approaches. This chapter analyzes and discusses the four program outcomes identified in this study and answers the question of whether the hypotheses aligned with the research questions were accepted or rejected. Research questions informed whether outcome standards were satisfied. Finally, depending on whether the standards were satisfied or not, this chapter determines whether program outcomes have been met.

Outcome 1: Higher Number of Blended Courses

Standard: The number of actual blended course offerings needs to be higher as compared with the number of blended courses expected to have been offered during the March 2014 session.

Research Question 1: What difference, if any, exists between the numbers of blended CIS115 courses expected to have been offered in the March 2014 session versus the number of blended CIS115 courses that were actually offered in the March 2014 session?

H₀₁: There is a statistically significant difference in the numbers of blended CIS115 courses offered in the March 2014 session versus the number of blended and C-L CIS115 courses also offered in the March 2014 session.

Prior to launching the C-L pilot, which consisted of offering courses in the C-L modality in the March 2014 session, DeVry University expected to offer seven sections of CIS 115 in blended modality. This number did not include blended sections that might face cancellation due to failure to meet the minimum student enrollment threshold. However, the C-L modality pilot increased the number of blended course sections of CIS115 from 7 to 11, representing an increase of 36.4%. In addition, this increase in available blended course sections of CIS115 increased the overall number of students enrolled in CIS115 – courses, preventing the cancellation of blended courses due to insufficient student enrollment. Therefore, Hypothesis H₀₁ is accepted; there is a statistically significant difference in the number of blended course sections of CIS115

offered in the March 2014 session versus the combined number of blended and C-L CIS115 courses offered in the March 2014 session. Since Hypothesis H_{01} is accepted, the standard for Outcome 1 is satisfied due to the increase in blended and C-L CIS115 courses offerings; therefore, the standard for Outcome 2 was satisfied, and Outcome 1 was achieved.

Outcome 2: Same or Higher Net-Promoter-Score in C-L Courses

Standard: The average Net-Promoter-Score in C-L courses needs to remain the same or be higher as compared with an average for blended or online courses offered during the March 2014 session.

Research Question 2: What difference, if any, exists between the Net-Promoter-Score (NPS) of students who complete:

- a. C-L course (online portion), versus students who complete the same course in an online modality?
- b. C-L course (blended portion), versus students who complete the same course in a blended modality?

H_{02} : There is no statistically significant difference in NPS between students who complete a C-L course (online portion) versus students who complete the same course in an online modality.

H₀₃: There is no statistically significant difference in NPS between students who complete a C-L course (blended portion) versus students who complete the same course in a blended modality.

DeVry University collects NPSs from students, voluntarily, at the end of all courses; NPSs collected from CIS115 students were used to measure student course satisfaction levels for Research Question 2. The scores of the treatment group, consisting of students enrolled in C-L courses, were compared to the scores of the two comparison groups (students enrolled in blended sections of CIS115 and students enrolled in online sections of CIS115). A Shapiro-Wilks test was used to compare the shape of the CIS115 NPS distribution to the shape of a normal distribution curve (Table 11).

Table 11

Results of Shapiro-Wilks Normality Test for NPS Scores

Group	<i>n</i>	<i>p</i>
Treatment: C-L (Blended Portion) Sample	67	.08
Comparison: Blended Sample	47	.12
Treatment: C-L (Online Portion) Sample	42	.14
Comparison: Online Sample	80	.29

In all cases, the normality test indicates that NPS distribution is not statistically different from a normal distribution ($p > 0.05$). Thus, all NPSs are normally distributed.

Therefore, a parametric two-tailed independent *t*-test was used to perform analyses on NPSs between treatment and comparison groups (Table 12).

Table 12

Results of Two-Tailed Independent t-Test: NPS Scores

Group	<i>n</i>	Mean	Standard Deviation	<i>p</i>
Treatment: C-L (Blended Portion) Sample	67	7.8	2.6	.23
Comparison: Blended Sample	47	8.1	3.1	
Treatment: C-L (Online Portion) Sample	42	8.7	3.2	.43
Comparison: Online Sample	80	9.0	3.3	

The mean NPS of C-L students (blended portion) was 7.8 and the mean NPS of students in blended sections of the same course was 8.1. The two-tailed independent *t*-test indicates that, although the mean NPS was higher in the blended course population, the difference is not statistically significant ($p = .23$). Therefore, the null hypothesis H_{02} is accepted; there is no statistically significant difference between the NPS of students who completed a C-L course (blended portion) versus students who completed the same course in an online modality.

The mean NPS of students enrolled as online students (online portion) in C-L sections of CIS115 was 8.7 and the mean NPS of students in enrolled in online sections of the same course was 9.0. The two-tailed independent *t*-test indicates that, although the

mean score of online students was higher, the difference is not statistically significant ($p = .43$). Therefore, the null hypothesis H_{03} is accepted; there is no statistically significant difference between the NPSs of students who completed a C-L course (online portion) versus students who complete the same course in the online modality. Since both hypotheses H_{02} and H_{03} were accepted, the standard for Outcome 2 is satisfied, and Outcome 2 was achieved.

Outcome 3: Same or Higher Student Course Outcome Achievements in C-L Courses

Standard: The average student course outcome achievement levels in C-L courses need to remain the same or be higher as compared with an average for blended or online courses offered during the March 2014 session.

Research Question 3: What difference, if any, exists between the course final scores of students who complete:

- a. C-L course (online portion), versus students who complete the same course in an online modality?
- b. C-L course (blended portion), versus students who complete the same course in a blended modality?

H_{04} : There is no statistically significant difference in course final scores between students who complete a C-L course (online portion), versus students who complete the same course in an online modality.

H₀₅: There is no statistically significant difference in course final scores between students who complete a C-L course (blended portion), versus students who complete the same course in a blended modality.

Research Question 4: What difference, if any, exists between the final exam scores of students who complete:

- a. C-L course (online portion), versus students who complete the same course in an online modality?
- b. C-L course (blended portion), versus students who complete the same course in a blended modality?

H₀₆: There is no statistically significant difference in final exam scores between students who complete a C-L course (online portion), versus students who complete the same course in an online modality.

H₀₇: There is no statistically significant difference in final exam scores between students who complete a C-L course (blended portion), versus students who complete the same course in a blended modality.

Research Question 5: What difference, if any, exists between the lab exercise scores of students who complete:

- a. C-L course (online portion), versus students who complete the same course in an online modality?
- b. C-L course (blended portion), versus students who complete the same course in a blended modality?

H₀₈: There is no statistically significant difference in lab exercise scores between students who complete a C-L course (online portion), versus students who complete the same course in an online modality

H₀₉: There is no statistically significant difference in lab exercise scores between students who complete a C-L course (blended portion), versus students who complete the same course in a blended modality.

To answer Research Question 3, students' course final scores for CIS115 were used to measure the level of overall student academic achievement. The course final scores of the treatment group, consisting of students enrolled in C-L sections of CIS115, were compared with the course final scores of the two comparison groups (students enrolled in blended sections of CIS115 and students enrolled in online sections of CIS115). A Shapiro-Wilks test was used to compare the shape of the normalized CIS115 course final scores distribution to the shape of a normal distribution curve (Table 13).

Table 13

Results of Shapiro-Wilks Normality Test for Course Final Scores

Group	<i>n</i>	<i>p</i>
Treatment: C-L (Blended Portion) Sample	67	.13
Comparison: Blended Sample	47	.19
Treatment: C-L (Online Portion) Sample	42	.11
Comparison: Online Sample	80	.24

In all cases, the normality test indicates that the distribution of course final scores is not statistically different from a normal distribution ($p > 0.05$). Thus, all course final scores are normally distributed. Therefore, a parametric two-tailed independent *t*-test was used to perform analyses on course final scores between treatment and comparison groups (Table 14).

Table 14

Results of Two-Tailed Independent t-Test: Course Final Scores

Group	<i>n</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>p</i>
Treatment: C-L (Blended Portion) Sample	67	82.6	18.8	.67
Comparison: Blended Sample	47	81.2	15.1	
Treatment: C-L (Online Portion) Sample	42	76.6	20.6	.82
Comparison: Online Sample	80	77.6	23.7	

The mean of course final scores for the C-L course (blended portion) was 82.6 and the mean of course final scores for the blended course population was 81.2. The two-tailed independent t -test indicates that, although the blended course population mean was higher, the difference was not statistically significant ($p = .67$). Therefore, the null hypothesis H_{04} is accepted; there is no statistically significant difference between the course final scores of students who completed a C-L course (blended portion) versus students who completed the same course in an online modality.

The mean of course final scores for the C-L course (online portion) was 76.6 and the mean of course final scores for the online course population was 77.6. The two-tailed independent t -test indicates that, although the online course population mean was higher, the difference is not statistically significant ($p = .82$). Therefore, the null hypothesis H_{03} is accepted; there is no statistically significant difference between the course final scores of students who completed a C-L course (online portion) versus students who completed the same course in an online modality.

The final exam scores of CIS115 were used to measure student academic achievement level for Research Question 4. The treatment group, students enrolled in a C-L section of CIS115, was compared with two comparison groups (students enrolled in blended sections of the course and students enrolled in online sections of the course). A Shapiro-Wilks test was used to compare the shape of the normalized CIS115 final exam scores distribution to the shape of a normal distribution curve (Table 15).

Table 15

Shapiro-Wilks Normality Test for Final Exam Scores

Group	<i>n</i>	<i>p</i>
Treatment: C-L (Blended Portion) Sample	67	.19
Comparison: Blended Sample	47	.22
Treatment: C-L (Online Portion) Sample	42	.14
Comparison: Online Sample	80	.15

In all cases, the normality test indicates that the final exam scores distribution is not statistically different from a normal distribution. Thus, all final exam scores are normally distributed. Therefore, a parametric two-tailed independent *t*-test was performed (Table 16).

Table 16

Two-Tailed Independent t-Test: Final Exam Scores

Group	<i>n</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>p</i>
Treatment: C-L (Blended Portion) Sample	67	79.5	21.2	.62
Comparison: Blended Sample	47	77.6	17.8	
Treatment: C-L (Online Portion) Sample	42	70.5	22.1	.92
Comparison: Online Sample	80	70.0	27.4	

The mean final exam scores for students enrolled in C-L sections of CIS115 (blended portion) was 79.5 and the mean final exam scores for students enrolled in blended sections of CIS115 was 77.6. The two-tailed independent *t*-test indicates that, although the blended course population mean was higher, the difference is not statistically significant ($p = .62$). Therefore, the null hypothesis H_{06} is accepted; there is no statistically significant difference between the final exam scores of students who completed a C-L section of CIS115 (blended portion) versus students who completed the same course in an online modality.

The mean of final exam scores for C-L sections of the course (online portion) was 70.5 and the mean of final exam scores for the online course sections was 70.0. The two-tailed independent *t*-test indicates that, although the online course population mean was higher, the difference was not statistically significant ($p = .92$). Therefore, the null hypothesis H_{07} is accepted; there is no statistically significant difference between the final exam scores of students who completed a C-L section of CIS115 (online portion) versus students who completed the same course in an online modality.

To answer Research Question 5, the CIS115 lab exercise scores were used as an additional measure of student academic achievement. The lab exercise scores of the treatment group, students enrolled in a C-L section of the course, were compared with the lab exercise scores of the two comparison groups (students enrolled in blended sections of CIS115 and students enrolled in online sections of CIS115). A Shapiro-Wilks test was generated to compare the shape of the normalized CIS115 lab scores distribution to the shape of a normal distribution curve (Table 17).

Table 17

Shapiro-Wilks Normality Test for Lab Exercise Scores

Group	<i>n</i>	<i>p</i>
Treatment: C-L (Blended Portion) Sample	67	.23
Comparison: Blended Sample	47	.32
Treatment: C-L (Online Portion) Sample	42	.13
Comparison: Online Sample	80	.34

In all cases, the normality test indicates that the lab exercise scores distribution is not statistically different from a normal distribution. Thus, all course final scores are normally distributed. Therefore, a parametric two-tailed independent *t*-test was performed (Table 18).

Table 18

Two-Tailed Independent t-Test: Lab Exercise Scores

Group	<i>n</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>p</i>
Treatment: C-L (Blended Portion) Sample	67	86.4	22.0	.64
Comparison: Blended Sample	47	84.6	18.4	
Treatment: C-L (Online Portion) Sample	42	83.2	24.7	.98
Comparison: Online Sample	80	83.0	27.4	

The mean scores of lab exercises for students enrolled in C-L sections of CIS115 (blended portion) was 86.4 and the mean scores of lab exercises for students enrolled in blended sections of the same course was 84.6. The two-tailed independent *t*-test indicates that, although the mean lab exercise scores of students enrolled in blended sections of the course was higher than the scores of students in the C-L sections (blended portion), the difference is not statistically significant ($p = .64$). Therefore, the null hypothesis H_{08} is accepted; there is no statistically significant difference between the lab scores of students who completed a C-L course (blended portion) versus students who completed the same course in an online modality.

The mean score of lab exercises for students enrolled in C-L sections of CIS115 (online portion) was 83.2 and the mean score of lab exercises for the online course population was 83.0. The two-tailed independent *t*-test indicates that, although the online course population mean was higher, the difference was not statistically significant ($p = .98$). Therefore, the null hypothesis H_{09} is accepted; there is no statistically significant difference between the lab exercise scores of students who completed a C-L course (online portion) versus students who completed the same course in an online modality.

In order to assess whether Outcome 3 was achieved, its standard needed to be evaluated based on the supporting Research Questions 3 through 5. Since all null hypotheses H_{04} through H_{09} were accepted, triangulated Research Questions 3 through 5 satisfy the Outcome 3 standard; therefore, Outcome 3 was achieved.

Outcome 4: Professors Endorse Cross-Listed Modality

Standard: Professors identified benefit of the C-L modality consistent with its outcomes.

Research Question 6: What are professors' perceptions of the C-L modality?

Hypothesis: H₁₀ Professors endorse the C-L modality.

Echoing the ideas of John Dewey (1936), professors are more likely to implement a new course delivery method with fidelity if they first endorse the new method.

Professors who participated in the March 2014 pilot of the new C-L modality were interviewed concerning their experiences, and the researcher compiled transcripts of the interviews for analysis. The procedure leading to the development of themes based on identified significant statements was used to determine the essence of professors' experience teaching C-L courses. In particular, efforts were placed on evaluating whether criteria (Table 6) associated with Outcome 4 were satisfied. The procedure to carry out the quantitative analysis based on identifying significant statements leading to development of themes was consistent with the procedure described by Creswell (2007). First, horizontalization was performed by highlighting significant statements captured in the interview transcripts. Next, from these significant statements, themes were developed (Creswell, 2007). The researcher is an employee of the client; in order to limit any possible bias caused by the researcher's employment status, an outside reviewer independently reviewed the analysis conducted by the researcher (Morse et al., 2002). The reviewer is not an employee of DeVry University and has experience conducting

qualitative analysis. Once the outside reviewer completed his analysis, the researcher and the reviewer met in person to discuss any differences and to arrive at consensus. In this case, no differences emerged as a result of comparing analysis and findings generated by the researcher and the reviewer.

After the researcher analyzed the interview transcripts, the following themes emerged:

- Benefits of C-L modality,
- Drawbacks of C-L modality,
- Utility of iConnect Live session,
- Compensation for teaching C-L courses, and
- Systems needed to support C-L modality.

Benefits of Cross-Listed Modality

The researcher identified faculty statements regarding benefits of the C-L modality (Table 19). All professors who were interviewed identified some kind of benefit associated with the C-L modality. One professor reported that the “cross-listed course delivery helps to decrease class cancellations due to low enrollment.” Another professor noted that adoption of the C-L modality led to “no cancelations of courses with low enrollment.” Raising average course section enrollments leads to higher professor utilization since professors assigned to teaching C-L courses serve a greater number of students. Faculty highlighted this benefit, with one professor observing that “the student to instructor ratio is much higher when cross-listed course is offered.” Another instructor

indicated that “teaching small class sizes is not effective; having more students even though some of them are online and in the same course is a much more effective way to teach.” The references to “small class sizes” by professors relate to pedagogical advantages realized when enough students are enrolled in a course to sustain an effective exchange of ideas and feedback among the students and the professor. In the case of DeVry University, the optimal class size most conducive to learning is about 20 students (D. Maddox, personal communication, July 2, 2015). Further, professors noticed that having a larger class size allows for more effective student-to-student interaction, via threaded discussions, than in courses with low student enrollment. Some professors thought that C-L modality “forces blended course professors to be more engaged via the course management system, as it is necessary for serving the online students.” By being more engaged, professors provide a higher level of service to their students. For example, a professor observed that “if only blended course students were enrolled, such an engagement is not practiced.” Thus, a perception of increased engagement by professors in C-L courses is attributed to C-L courses having both blended and online students enrolled in the LMS.

Table 19

Significant Statements Related to Benefits of C-L Modality

Directly Quoted Statements from Professors

It was as if the cross-listed course students had an opportunity to listen to a lecture twice from two different professors with two different perspectives; all in all students found it helpful.

Higher enrollments in class provided a better opportunity for students to collaborate with one another.

Overall cross-listed course offering is a great idea; it will help preserve the blended classes.

Teaching small class sizes is not effective, having more students even though some of them are online and in the same course is a much more effective way to teach.

Cross-listed course delivery stops blended courses from being canceled due to low enrollment.

Cross-listed course delivery helps to decrease class cancellations due to low enrollment.

It forces blended course professors to be more engaged via the course management system as it is necessary for serving the online students. If only blended course students were enrolled, such an engagement is not practiced.

No cancellation of courses with low enrollment.

Drawbacks of C-L Modality

In addition to the benefits associated with adoption of the C-L course modality, professors noted some drawbacks (Table 20). One professor observed that “the main drawback of the cross-listed delivery method was my (professor’s) inability to integrate the online and blended course students tighter in one class.” Professors searched for a way, virtually, of bringing their online students into their blended course meetings so that all students could benefit, at some level, from participation in the campus-based lectures.

The need for class integration of blended and online students enrolled in C-L courses is supported by a statement from one of the professors: “I wish there was a technology that I could use that will broadcast my blended course lecture to all cross-listed students, including online students.”

Table 20

Significant Statements Related to Drawbacks of C-L Modality

Directly Quoted Statements from Professors
One of the drawbacks of the current design of Cross-Listed courses is the inability of a faculty member to record their lectures and make it available for both blended and online course students afterwards.
Because the shell used in Cross-Listed delivery is an online shell it is not well suited for blended delivery.
The main drawback of the cross-listed delivery method was my inability to integrate the online and blended course students tighter in one class.

Professor Resistance

Some professors warned that the introduction of a new modality will be met with some degree of resistance from DeVry University professors. This resistance may stem from the fact that the new modality will require professors to deliver their assigned courses differently. As one professor stated, “There was a sense of uneasiness amongst them (other professors at a campus) when I (professor) introduced the cross-listed concept at the local campus.” The differences associated with the C-L modality that promoted this uneasiness include higher enrollments in courses. Two professors justified

the feeling of uneasiness by stating that “Cross-listed classes do have higher enrollments making it more challenging to teach” and that “professor teaching [a] cross-listed course needs to manage two different groups of students, online and blended.”

Student Expectations

In addition to the need for a thoughtful introduction of the C-L modality to DeVry University professors, a need to manage student expectations was identified by the following statement: “There was an initial confusion amongst blended course students who thought that when they show up in class there will be 30 students meeting them there. A new training for students enrolled in C-L courses needs to be developed.” Professors identified the need to introduce the C-L modality to students enrolled in C-L courses by explaining to students why the LMS lists many students, but only a subset of them is present during scheduled on-campus class meetings. Some students, as reported by professors, were surprised to see only a subset of their classmates attend campus lectures.

Utility of iConnect Live Session

An Adobe webcasting portal, iConnect Live, serves as one of the tools in the course learning management system (LMS), was mentioned by all professors participating in the pilot (Table 21). A Web-based meeting space, iConnect Live allows students to synchronously attend professor-delivered events that focus on the course content for a given week. Students also have an opportunity to view a recording of a weekly iConnect Live session following its conclusion. Most professors agreed that

“...students enjoyed having access to iConnect Live session.” The iConnect Live sessions benefit C-L course students, especially those enrolled in the blended portion as those students may not been exposed to iConnect Live prior to enrollment in a C-L course. One professor stated that, “...blended course students not only receive lectures from the professor at the campus but also have access to iConnect Live lectures.” The iConnect Live sessions are available in online courses only; blended courses do not offer these sessions. For students enrolled in a blended portion of a C-L course, an iConnect Live session can be considered an additional lecture for a given week. The extension of iConnect Live access to students in the blended portion of the C-L course did not always benefit students or professors. One professor stated that “The iConnect Live sessions were not very helpful for my (professor’s) blended course students, since I (professor) used a different programming language to teach the course with (for blended course students).” Still, this was a unique situation in which a professor used a programming language not recommended for use with the CIS115 course. This professor adjusted his course to teach students the required programming concepts with a different programming language. For that reason, his blended course students did not find iConnect Live sessions to be beneficial.

Table 21

Significant Statements Related to Utility of iConnect Live Session

Directly Quoted Statements from Professors
Blended course students not only to receive lectures from the professor at the campus but also have access to iConnect live lectures.
Students enjoyed having access to iConnect live session.
Cross-listed course students found that the iConnect live session to be of benefit.
Cross-Listed course student have iConnect live session as an extra added benefit.
The iConnect live sessions were not very helpful for my blended course students, since I used a different programming language to teach the course with (for blended course students). The online student did, however, find the iConnect Live sessions to be helpful.

Compensation for Teaching C-L Courses

DeVry University wants to be recognized as an employer of choice (“Employer Relations,” 2015). As an employer of choice, DeVry University needs to offer competitive salaries in order to attract and keep faculty. For this reason, the researcher recognized the importance of professors’ expectations and recommendations related to the compensation scheme for teaching courses via the new C-L modality. Most professors indicated a need for some additional compensation for teaching C-L courses. For example, one professor indicated that “it seems reasonable to allocate 1.5 credit hours for a cross-listed course.” Additional compensation is “justified due to the fact that a professor teaching [a] cross-listed course needs to manage two different groups of students, online and blended.” Professors recognized, correctly, that there is additional work associated with teaching C-L courses compared to courses offered via online or

blended modality (Table 22). This extra work included activities such as management of two groups of students (blended and online), keeping two different grade books, and answering students' questions in threaded discussions. In support of this view, one professor indicated that "when teaching a cross-listed course, after the lectures are completed, professors still need to tend to threaded discussions for the purpose of answering many questions from online students. Such dynamics in the course justify additional credit hours for the professor."

Table 22

Significant Statements Related to Compensation for Teaching C-L Courses

Directly Quoted Statements from Professors

Had it not been for this unusual heavy load, I consider receiving regular credit hours for teaching cross-listed course to be equitable.

Perhaps allocating one extra credit hour to professors of Cross-Listed course may be justified due to the fact that a professor teaching Cross-Listed course needs to manage two different groups of students, online and blended.

It seems reasonable to allocate 1.5 credit hours for a Cross-Listed course.

From my perspective I am teaching one class whether it is blended, online or Cross-Listed regular credit hours are to be allocated.

I suggest allocating 1.5 CH for teaching Cross-Listed course

Systems Needed to Support C-L Modality

The term "systems" in this context refers to tools that the DeVry University registrar uses to record students' grades and to schedule courses. In addition, this term

refers to the capabilities of the LMS that DeVry University uses to deliver course content. Professors identified some unnecessary differences in how procedures for submitting final course grades and attendance tracking are configured by DeVry University systems (Table 23). These differences included procedures for reporting final course grades to the university registrar and tracking of students' attendance by professors. For example, a professor noted that "attendance had to be recorded separately for blended course students while online students' attendance is tracked automatically." Professors went on to note that standardizing such procedures would enhance C-L courses by making them more manageable for professors: "This difference added to the workload as the two groups had to be managed differently."

Table 23

Significant Statements Related to System Needs to Support C-L Modality

Directly Quoted Statements from Professors

There should be one way of entering both grades and attendance records for online and blended course students participating in Cross-Listed course.

My bigger concern is from the DeVry administration perspective if a Cross-Listed course is offered how does a campus and online revenue get to be divided?

Having the option of entering grades for both online and blended course students in the same way would be of benefit.

While I can think about improvements that would increase convenience with which I needed to record grades and track student attendance; I did not find any of this to be an impediment to my delivery of cross-listed session.

Summary

This chapter presented the analysis of the data and findings related to established program outcomes. Program outcomes were determined to have been achieved or not achieved based on whether outcome standards were satisfied. Satisfaction of outcome standards was informed by acceptance or rejection of hypotheses associated with research questions. All established program outcomes were achieved. Table 24 shows that all hypotheses were accepted.

Table 24

Research Findings

Research Question (RQ)	Status of Hypotheses	Outcome Standard	Standard Satisfied (Yes/No)	Program Outcome	Outcome Achieved (Yes/No)
RQ 1	H_{01} Accepted	Outcome Standard 1	Yes	Outcome 1	Yes
RQ 2	H_{02} Accepted H_{03} Accepted	Outcome Standard 2	Yes	Outcome 2	Yes
RQ 3	H_{04} Accepted H_{05} Accepted	Outcome Standard 3	Yes	Outcome 3	Yes
RQ 4	H_{06} Accepted H_{07} Accepted				
RQ 5	H_{08} Accepted H_{09} Accepted				
RQ 6	H_{10} Accepted	Outcome Standard 4	Yes	Outcome 4	Yes

The next chapter, Chapter 4, presents implications of the evaluation on the organization, recommendations for further research, and explanation of how the Doctor of Education coursework prepared me for completion of this dissertation in practice.

CHAPTER 4 IMPLICATIONS AND RECOMMENDATIONS

Implications for Organization

This study has demonstrated that courses offered via a C-L modality can be implemented, at least on a small scale, at DeVry University. This modality can help resolve the problem of an insufficient number of blended course offerings that has been a challenge for DeVry University over the last few years. The data gathered and analyzed in this study suggest that, by combining students registered in a blended section of a course with students registered in an online section of the same course into a C-L course, the number of blended course sections can be increased by adding C-L courses. As a result, an increase in blended course offerings is expected have a positive impact on DeVry University students who need to enroll in blended courses as opposed to online courses.

While recognizing the benefits that C-L courses offer to students, current systems available at DeVry University do not support courses offered via the new C-L modality. Systems, in this case, refer to tools used by the DeVry University registrar to schedule courses, record grades, and track students' attendance. In order to implement the March 2014 pilot courses via the C-L modality, the courses needed to be manually configured within the registration system by registrar staff. While sustainable on a small scale, this manual approach to registration is not feasible when applied to a large number of courses that might need to be offered via C-L modality. A new system, processes, and procedures would need to be developed to support a wide implementation of the C-L

modality. The registration system would have to be upgraded in order to seamlessly integrate processes and procedures associated with all course modalities: C-L, blended and online.

When the C-L modality is implemented on a wide scale, this new modality is expected to reduce the number of online course sections as online students enroll in C-L courses taught by campus professors. DeVry University needs to be prepared for this reduction in online course sections. One way to prepare for such a reduction in online course offerings is to forecast the need for adjunct professors who would normally be assigned to teaching online courses. Another way to prepare is to ensure that full-time professors assigned to teach online courses are properly credentialed to teach a wide variety of course subjects. Having full-time online professors credentialed to teach a wide variety of course subjects provides much-needed flexibility for DeVry University and its professors (Silva, Lourtie, & Aires, 2013). This flexibility comes from the fact that when courses in one subject area are not available, full-time online professors can be assigned to teach courses in other subject areas.

Limitations of the Study

It is important to recognize study limitations, which are common to all research strategies and statistical procedures (Creswell, 2012). This is especially true in this study as the priority was placed on maintaining focus on client (DeVry University) needs. This study had several limitations.

- The sample of students and professors was drawn solely from DeVry University; therefore, the results from this study may not be generalizable to other colleges and universities.
- The results from the evaluation of the CIS115 C-L modality pilot should not be generalized to students and professors in other courses.
- Some variables were outside the researcher's control. These variables include variations in professors' teaching effectiveness, students' motivation, and students' prior academic background.
- The participants in this study were few in number and may not represent the DeVry University general student or professor population. This small convenience sample could have reduced opportunities for generalizing the results to the entire student and professor population of DeVry University (Fitzpatrick et al., 2004).

Recommendations for Future Research

Recommendations for future research that emerge from this dissertation in practice focus primarily on students' experiences in the C-L modality and the incorporation of course elements related to technology.

The first recommendation concerns the gathering and analysis of qualitative data related to students' perception of the new C-L modality. This qualitative data would add depth and nuance to the understanding of students' satisfaction levels and their perception

of the C-L modality (Stufflebeam, 2001). The qualitative data could be obtained by interviewing or surveying students who register for future C-L courses.

The second recommendation for future research concerns the study of C-L courses that incorporate specialized lab equipment. DeVry University offers courses which may require the use of specialized hardware to complete required lab exercises. The CIS115 course studied in the March 2014 pilot did have a lab exercise component; however, the lab exercises did not require students to use specialized lab equipment other than a personal computer. When specialized lab equipment is required, students who enroll in blended courses take advantage of the lab facilities available to them at campuses; students who enroll in the same courses in the online modality purchase specialized lab equipment in order to complete their lab exercises at home. The introduction of specialized lab equipment can potentially impact courses offered via C-L modality, impacts that cannot be predicted by the findings of this study. For this reason it is recommended that another study of C-L modality be conducted using a course that requires students to use specialized lab equipment.

How the Curriculum Prepared Me for the Dissertation in Practice

The entire Doctor of Education (EdD) program can be divided into three one-year-long sections, with each of the sections concluding with a meaningful milestone. The program was designed to provide me with the necessary coursework to ensure my readiness not only to complete a scholarly work but also to provide me with the opportunity to specialize in a variety of areas such as curriculum and instruction or

instructional technology. The blend of required and concentration courses provided me with a well-rounded education culminating with a dissertation in practice (DiP).

The coursework within the program can be considered analogous to a jigsaw puzzle. Each piece within the jigsaw puzzle represents a course within the program. Each puzzle piece has its unique size and shape, but when put together the pieces create a meaningful curriculum. The size of each puzzle piece can be analogous to the contribution that particular course makes to the completion of the DiP. For some students, a given course may contribute significantly to their ability to complete the DiP, while other students may find the same course contributes less to their successful completion of the DiP. In my case, required courses related to assessment and evaluation as well as concentration courses related to instructional design had the most significant impact on preparing me for completion of my DiP. This illustrates one of the strengths of the EdD program; namely, the program is comprehensive enough to offer its students the breadth and depth of coursework preparing them for a variety of careers.

The EdD program can be considered a process that, each semester, provides students an opportunity to learn and practice skills required for scholarly work. The coursework within the program encourages students to apply course concepts to practical problems found at their places of employment. Because students have opportunities to apply theoretical concepts and solve relevant practical problems, each successive course became more relevant and applicable. I was able to apply theoretical concepts to solving practical problems in my place of employment in a meaningful way. Moreover, each course within the EdD program contributed to preparing me to complete my DiP.

Year One

The coursework within the first semester focused on examining and broadening students' understanding of what is important in the educational system as it relates to accountability of schools to the public at large. Further, different learning and motivational theories were examined to give students an appreciation of the various concepts that impact how students learn (Vygotsky, 1978). Lastly, coursework related to organizational management in general was included. Each course within the first year contributed to my ability to design and ultimately implement the pilot offering of C-L courses. Some courses, however, had a more direct impact on my ability to complete my DiP. The course EDA7101 Organizational Theory in Education provided me with an understanding of the four different organizational frames that needed to be properly applied in order to secure approval for the pilot course offering. For example, I utilized my understanding of the Bureaucratic/Structural frame when I assembled a team representing multitudes of departments within DeVry University (Bolman & Deal, 2001). Representatives from these partner groups were critical in compiling existing and new policies and procedures to deploy the pilot offering of C-L courses. By looking at DeVry University through the Structural frame lens, I was able to understand processes and procedures that needed to be invoked in order to deploy a new course pilot. The Cultural/Symbolic frame was helpful in managing professors' and students' expectations about the benefits and potential challenges of offering C-L courses (Clark & Estes, 2008; Bolman & Deal, 2001). The C-L course offerings had an associated heightened level of sensitivity because of previous experience with campus-based students viewing online

course offerings as being substandard. By understanding and properly deploying concepts related to the Cultural/Symbolic frame, I was able to meet students' expectations by providing expected services to blended course students, and, at the same time, providing an expected level of services to online students. This was accomplished by having professors scheduled with blended course students at campuses, while online students were enrolled in these same courses via the LMS. The courses EDF7494 Identifying Complex Problems of Practice and EDF7457 Data, Assessment and Accountability prepared me for data gathering and data analysis related to my pilot study. During these two courses, I learned how to design research tools, such as interview questions and survey questions. Further, I had a chance to experience how to successfully deploy these research tools when the C-L modality pilot was implemented.

In the data gathering phase leading toward completion of my DiP, I found the content from EDF7494 Identifying Complex Problems of Practice and, in particular, the research articles found in Lyne (2008) that were analyzed in this course, to be of tremendous help in designing my own research approach. The course EDF7457 Data, Assessment and Accountability helped me to recognize the importance of comparing pilot data against similar course indicators (Hinkle & Wiersma, 2003). These approaches have yielded a comprehensive approach to implementing the C-L modality pilot.

Lab of Practice I

One of the highlights of the EdD program was the two Lab of Practice (LoP) courses. When completing the first LoP course, I was encouraged to identify a problem

of practice that could be significant in scope to serve as the problem of practice for my future DiP. I was fortunate to have chosen a problem of practice that focused on the study of C-L modality and its impact on DeVry University students, professors, and the organization. The goal of the first LoP course was to gain permission from DeVry University leadership to prepare a pilot offering of a C-L course and to implement the pilot in early 2014. The main activities of the first LoP were gaining permission to offer the pilot of the C-L modality, identifying courses that would participate in the pilot, and communicating the systems needs to the DeVry University registrar and scheduling groups. Above all, the first LoP afforded me a unique opportunity to demonstrate my ability to lead a team and to set up a pilot program. At the same time, this experience shed light on opportunities for me to grow and expand my knowledge related to identifying problems of practice and to apply organizational theory to prepare to pilot offering of C-L courses.

Overall, I found completing the first LoP to be a beneficial experience for me. I not only had an opportunity to practice some of the concepts already learned during my first year of the program, but I also had an opportunity to develop a unique perspective of what else I needed to learn and experience in order to effectively develop, conduct, analyze, and present findings from my pilot study. I was fortunate to have been engaged in a project that addressed DeVry University's needs as well as my needs to gain field experience with designing research protocols and their implementation. I remember looking forward to my coursework in the subsequent year of the EdD program, and I

continued to look forward to having another opportunity to put my newly acquired understanding and skills to practice in the next LoP course.

Year Two

During the second year of the EdD program, the coursework focus was placed on analysis and evaluation techniques and theories presented in Fitzpatrick et al. (2011). Some of the required courses during the second year of the program were EDF7468 Evaluation of Complex Problems of Practice and EDF7478 Analysis of Complex Problems of Practice. The course EDF7478 course introduced concepts related to data analysis; this course was supported by the SPSS statistical software package and concepts from Hinkle and Wiersma (2003). This material was helpful in completing my DiP because some of the DiP deliverables required quantitative data to be entered into a statistical analysis software package for the purpose of completing a computer-aided analysis. In addition, EDF7478 introduced data analysis techniques and methods helpful in interpretation of results. However, I would have benefited from an expansion of the EDF7478 scope to include content related to presentation of evaluation findings. The other course, EDF7468, was helpful to me in completing my DiP because it introduced concepts related to thoughtful identification of data that needed to be collected in order to perform meaningful analysis. Also, this course introduced program evaluation approaches informed by Fitzpatrick (2011) that were useful in determining the required set of data needed to be collected in order for the stated program objectives to be evaluated. In the case of my DiP, an outcome-based evaluation was selected, and the

data to be collected for such evaluation were carefully identified. Selection of the data to be collected was determined based on the techniques and theoretical background gained from EDF7468. EDA7196 Leadership in a Learning Organization exposed me to the various leadership approaches and theories that are prevalent within the educational landscape but also applicable beyond educational organizations. By understanding leadership approaches such as servant leadership, informed by Hickman (2010), I was able to gain permission to implement the pilot of C-L modality. By understanding the tenets of the servant leadership approach, I was able to appeal to senior management of DeVry University for endorsement of the pilot offering of a C-L course because this modality has the potential to better serve DeVry University and its students and professors.

Lab of Practice II

By completing the goals of the second LoP, I have been able to collect both qualitative and quantitative data needed to complete the analysis required for my DiP, namely to determine if the program outcomes were achieved. Data collections were necessary steps in the program evaluation process, and they were completed in conjunction with the second LoP. Having collected data related to the C-L modality pilot, I was in a position to proceed with data analysis. The experience gained during the second LoP helped me to develop practical skills based on the theoretical concepts introduced in EDF7478 and EDF7468 coursework. I had an opportunity to apply the outcome-based evaluation approach and to thoughtfully identify data collection needs.

Further, I've used practical skills introduced in EDF7478 to enter collected data into a statistical software package and to prepare for its analysis.

Year Three

The third and final year of the EdD program had a profound impact on my ability to complete the DiP. The focus of the third year coursework shifted from new content introduction to completing the proposal for the DiP and completing the DiP itself. The course EDG7985 Proposing & Implementing Data-Driven Decisions focused my thinking on completing the DiP proposal and literature review. The two EDG7987 Dissertation in Practice courses offered me the opportunity to complete my DiP in a setting where I had frequent communication with my dissertation committee chair and other committee members. In addition, the class meetings associated with this course afforded me an opportunity to have my work reviewed by my classmates. Feedback from my classmates has made my DiP more comprehensive. For example, during one of the class meetings we were asked to review and provide feedback about each other's visuals regarding problems of practice and their solutions. These visuals illustrated the problem of practice and its solution. The feedback that I received from my classmates brought to focus the need to illustrate the difference between online and blended courses. I have subsequently adjusted my visuals to show the difference between online and blended courses. This has made the visuals embedded in the DiP more accurate and descriptive. I find that having required coursework within which the proposal and DiP can be completed has a distinct advantage over other doctoral programs that leave students on

their own without the support structure that courses such as EDG7985 and EDG7987 provide.

Concentration Courses

The EdD program affords students an opportunity to complete concentration courses. Concentration courses within the EdD program allow flexibility to suit the particular needs of students. The concentration courses that I completed focused on instructional technology and instructional design. I utilized the content from these courses when I was completing the DiP sections related to the history and the position of colleges and universities within the United States. The completed concentration courses informed by Kliebard (2002) provided me with a broader perspective on the higher education landscape within the United States and around the world. By better understanding instructional technology and instructional design, from both, national and international perspectives, I was in a better position to understand how DeVry University played its role in shaping the current landscape of higher education in the United States.

Conclusion

In conclusion, this study illustrates DeVry University's ability to implement courses via a new C-L modality. This implementation was achieved in the March 2014 pilot offering of CIS115 courses. Further, this study, through its mixed-method research design, suggests that implementing the C-L modality had a positive impact on addressing the problem of an insufficient number of blended course offerings. This constitutes a

significant impact on DeVry University and its ability to better serve its students who want, or need, to enroll in blended courses. In the process of completing this program, I had to strike a balance between the responsibilities and time requirements of this EdD program, of my role as husband and father, and my position as a full-time employee of DeVry University. There were times that this balance was very difficult to achieve; however, my determination to complete this life-changing endeavor and the support of my family and colleagues allowed me to persevere. I have personally and professionally benefited from completing both the required and concentration courses within the program. I consider these courses and the requirements to complete the DiP as puzzle pieces that, when put together and properly applied, create a professional who is well schooled and experienced.

APPENDIX A
DEVRY UNIVERSITY CAMPUS LOCATIONS

<p>ARIZONA</p> <ul style="list-style-type: none"> • Glendale Center • Mesa Center • Phoenix Campus <p>CALIFORNIA</p> <ul style="list-style-type: none"> • Anaheim Center • Bakersfield Center • Colton (Inland-Empire) Center • Folsom Campus • Fremont Campus • Fresno Campus • Long Beach Campus • Oakland Center • Palmdale Center • Pomona Campus • San Diego Campus • San Jose Center • Sherman Oaks Campus <p>COLORADO</p> <ul style="list-style-type: none"> • Colorado Springs Center • Westminster (Denver) Campus <p>FLORIDA</p> <ul style="list-style-type: none"> • Ft. Lauderdale Center • Jacksonville Campus • Miramar Center • Orlando Campus <p>GEORGIA</p> <ul style="list-style-type: none"> • Alpharetta Campus • Atlanta Cobb Galleria Center • Decatur Campus • Duluth Center • Stockbridge (Henry County) Center <p>ILLINOIS</p> <ul style="list-style-type: none"> • Addison Campus • Chicago Campus • Chicago Loop Campus • Chicago O'Hare Center • Downers Grove Center • Elgin Center • Gurnee Center • Naperville Center • Tinley Park Campus 	<p>INDIANA</p> <ul style="list-style-type: none"> • Merrillville Center <p>MISSOURI</p> <ul style="list-style-type: none"> • Kansas City Campus <p>NEVADA</p> <ul style="list-style-type: none"> • Henderson Campus <p>NEW JERSEY</p> <ul style="list-style-type: none"> • Cherry Hill Center • North Brunswick Campus • Paramus Center <p>NEW YORK</p> <ul style="list-style-type: none"> • Midtown Manhattan Campus • Rego Park (Queens) Center <p>NORTH CAROLINA</p> <ul style="list-style-type: none"> • Charlotte Campus • Raleigh Durham Campus <p>OHIO</p> <ul style="list-style-type: none"> • Cincinnati Campus • Columbus Campus • Dayton Center • Seven Hills Campus <p>OKLAHOMA</p> <ul style="list-style-type: none"> • Oklahoma City Campus <p>PENNSYLVANIA</p> <ul style="list-style-type: none"> • Ft. Washington Campus • King Of Prussia Center • Philadelphia Center • Pittsburgh Center <p>TENNESSEE</p> <ul style="list-style-type: none"> • Nashville Campus <p>TEXAS</p> <ul style="list-style-type: none"> • Austin Campus • Irving Center • Mesquite Center • San Antonio Campus <p>VIRGINIA</p> <ul style="list-style-type: none"> • Arlington Campus • Chesapeake Campus • Manassas Center
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APPENDIX B
INSTITUTIONAL REVIEW BOARD: UNIVERSITY OF CENTRAL FLORIDA



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

NOT HUMAN RESEARCH DETERMINATION

From : UCF Institutional Review Board #1
FWA00000351, IRB00001138
To : Karol C. Sapijaszko
Date : February 26, 2015

Dear Researcher:

On 02/26/2015 the IRB determined that the following proposed activity is not human research as defined by DHHS regulations at 45 CFR 46 or FDA regulations at 21 CFR 50/56:

Type of Review: Not Human Research Determination
Project Title: Evaluation of Cross-Listed course delivery method
Investigator: Karol C. Sapijaszko
IRB ID: SBE-15-11060
Funding Agency:
Grant Title:
Research ID: N/A

University of Central Florida IRB review and approval is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are to be made and there are questions about whether these activities are research involving human subjects, please contact the IRB office to discuss the proposed changes.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Patria Davis on 02/26/2015 12:08:03 PM EST

IRB Coordinator

APPENDIX C
INSTITUTIONAL REVIEW BOARD: DEVRY UNIVERSITY



3005 Highland Parkway
Downers Grove
Illinois 60515-5799
630-515-7700
800-733-3879
www.devry.edu

January 30, 2015

Carlo Sapijaszko
DeVry University
4000 Millenia Blvd
Orlando, FL 32139

Dear Carlo,

Your IRB request for the following study, Evaluation of Cross-Listed course delivery method, has been reviewed.

Your IRB request has been approved.

This IRB approval expires on January 29, 2016. If the study continues beyond the expiration date, you will need to submit a request for continuance from the IRB.

Best regards,

A handwritten signature in cursive script that reads "Tracey E. Colyer".

Tracey E. Colyer, Ph.D.
Assistant National Dean, Program Analysis

Cc: John Gibbons, Dean of Faculty

APPENDIX D
PERMISSION TO REPRODUCE DRAWINGS

Sample Letter Requesting Permission to Reproduce Copyrighted Material

Dear Daniel Traynor:

I am writing to ask your permission to (check all that apply)

- photocopy
- digitize
- incorporate into
- a dissertation/thesis
- a website publication

the following material:

Author: Daniel Traynor

Title: Depiction of the problem of practice illustrating cancelations of blended courses.


Title: Depiction of the cross-listed modality illustrating combining of blended and online courses

The material will be distributed/published as follows:

Purpose: educational

Format: electronic

Sincerely,
Karol Sapijaszko



PERMISSION GRANTED:

I have the authority to grant the permission requested herein and I hereby grant permission to use the above referenced material in the manner described.

Copyright Holder's Signature



Daniel Traynor
Author's Name

July 4, 2015
Date

APPENDIX E
TRANSCRIPTS OF INTERVIEWS WITH PROFESSORS

Interview Guiding Questions:

Question #1: Tell me about the compensation scheme that you received for participating in this program.

Probing questions:

- Do you think there is a need for a change to a compensation scheme?
- Do you think other professors may object to the current compensation scheme?
- If necessary, how would you suggest changing the compensation scheme?

Response from Professor A:

During the session at which the pilot was offered, I had an unusually heavy teaching load. I had one blended course; one online course and a third course was the cross-listed pilot course. Had it not been for this unusual heavy load, I consider receiving regular credit hours for teaching cross-listed course to be equitable.

While it is difficult to say for certain, other professors may in fact have a concern with not being compensated more than a regular course for teaching the cross-listed course as it is designed currently.

Perhaps allocating one extra credit hour to professors of the cross-listed course may be justified due to the fact that a professor teaching the cross-listed course needs to manage two different groups of students, online and blended. I found myself having to keep a grade book separately not to confuse the online and blended course students. This was necessary in a case of grading threaded discussion, for the threaded discussion requirements, were different for blended and online course students.

Response from Professor B:

The cross-listed course is not a single course, there needs to be some way of recognizing faculty teaching this course over and above what they would normally be recognized for past teaching blended or online course. It seems reasonable to allocate 1.5 credit hours for a cross-listed course.

Typically for blended course students a professor will hold a lecture once or twice a week and that suffices to answer students' questions. When teaching a cross-listed course, after the lectures are completed, professors still need to tend to threaded discussions for the purpose of answering many questions from online students. Such dynamics in the course justifies additional credit hours for the professor.

Response from Professor C:

From my perspective I am teaching one class whether it is blended, online or cross-listed regular credit hours are to be allocated. My bigger concern is from the DeVry administration perspective if a cross-listed course is offered how does a campus and online revenue get to be divided?

Response from Professor D:

Teaching a cross-listed course is not quite like teaching a single blended course, but it is not quite like teaching two courses either. The cross-listed classes do have higher enrollments making it more challenging to teach. I suggest allocating 1.5 Credit Hours for teaching the cross-listed course. I had to setup a few Adobe Connects with online students who were in the cross-listed course.

Questions #2: What do you think are the main benefits of this program?

Probing questions

- Do you think that other professors share the same views about the benefits of the program?
- What can be changed in the program to create additional benefits?

Response from Professor A:

One of the benefits of the cross-listed course is the opportunity for blended course students not only to receive lectures from the professor at the campus but to also have access to iConnect live. It was as if the cross-listed course students had an opportunity to listen to a lecture twice from two different professors with two different perspectives; all in all students found it helpful.

The other benefits of the cross-listed course are fewer cancellations of blended courses. Blended course students expect to have courses available for them to enroll in and complete onsite. They do not appreciate having to take online courses instead.

Higher enrollments in class provided a better opportunity for students to collaborate with one another. For example a question asked by a student had a greater chance of being answered by others because there were many others that can potentially answer it.

Overall the cross-listed course offering is a great idea; it will help preserve the blended classes. They are far more positives than negatives.

Response from Professor B:

Teaching small class sizes is not effective, having more students even though some of them are online and in the same course is a much more effective way to teach.

The cross-listed courses allow the university to have a better utilization of its existing faculty. Simply stated: faculty to student ratio is more favorable when cross-listed courses are offered.

The cross-listed course delivery saves money for DeVry.

Students enjoyed having access to iConnect live sessions.

The cross-listed course delivery stops blended courses from being canceled due to low enrollment.

Response from Professor C:

The student to instructor ratio is much higher when the cross-listed course is offered.

The cross-listed course delivery helps to decrease class cancellations due to low enrollment.

The cross-listed course offering services students by helping to ensure that the class makes it, i.e. is not canceled.

It forces blended course professors to be more engaged via the course management system as it is necessary for serving the online students. If only blended course students were enrolled such an engagement is not practiced.

From the DeVry perspective it is a cost-saving measure.

The cross-listed course students found that the iConnect live session to be of benefit. In some cases the lecture needs to be updated. But all in all it was value-added to the cross-listed course students.

Response from Professor D:

No cancelation of courses with low enrollment. July 2014 cancelled with 4 students, if the cross-listed course was in place it would not have been canceled as on blended course.

Larger class size provides better interaction for students.

The cross-listed course student have iConnect live session as an extra added benefit.

Overall, Positive experience. I hope DeVry moves forward with this concept.

Question #3: What do you think are the main drawbacks of this program?

Probing questions:

- What can be done to reduce the impact of these drawbacks?
- Do you think that other professors share the same views about the drawbacks of the program?
- Do you think that these drawbacks are severe enough to preclude the program from being adopted?

Response from Professor A:

One of the drawbacks of the current design of the cross-listed courses is the inability of a faculty member to record their lectures and make it available for both blended and online course students afterwards.

One of the barriers to implementing the cross-listed courses beyond the pilot phase may simply be related to the fact that it is a new delivery model and faculty may resist change. This is not to say that there is a problem with the cross-listed delivery method but it is to say that it is different method and change is difficult to implement. Allocating one extra credit hour to teaching the cross-listed course may help in getting it widely accepted.

Response from Professor B:

While they were no official concerns or barriers cited by faculty from other colleges there was a sense of uneasiness amongst them when the professor introduced the cross-listed concept at the local campus.

Prof. stresses the importance of having a cross-listed delivery planned well ahead of intended offering. Because the shell used in the cross-listed delivery is an online shell it is not well suited for blended delivery.

Response from Professor C:

There was an initial confusion amongst blended course students who think that when they show up in class there will be 30 students meeting them there. A better training for blended course students needs to be developed.

Some blended course students had the following question: why do I have to drive 30 minutes to the campus if I can attend the same class online. This really is a nonissue since that student can take that course online however many of them choose to take it onsite. No matter what you do somebody is going to complain if you give a \$100 somebody is going to complain that they have to pay taxes on it.

Response from Professor D:

The main drawback of the cross-listed delivery method was my inability to integrate the online and blended course student tighter in one class. I wish there was a technology that I could use that will broadcast my blended course lecture to all cross-listed students, including online students. I found that I had to spent an unreasonably long hours with online students helping them with concepts that were well covered in the class. The class that have not had a change to participate in. The iConnect live sessions were not very helpful for my blended course students, since I used a different programming language to teach the course with (for blended course students). The online student did, however, find the iConnect Live sessions to be helpful. This is in part because the iConnect Live sessions and the course shell were based on the same programming language.

Question #4: How did the DeVry's systems support the cross-Listed modality?

Probing questions:

- Was the support from systems (registrar, scheduling, attendance tracking) supportive of this program?
- What other objectives could the program have achieved?

Response from Professor A:

Having to enter grades for blended course students via DeVry portal and for online students by marking an X in the grade book seemed like an unnecessary difference between the treatment for online and blended course students. There should be one way of entering both grades and attendance records for online and blended course students participating in the cross-listed course.

Attendance had to be recorded separately for blended course students and online students attendance is tracked automatically. This difference added to the workload as the two groups had to be managed differently.

Response from Professor B:

For the most part the current system supports the cross-listed delivery method.

Having the option of entering grades for both online and blended course students in the same way would be of benefit.

Response from Professor C:

It makes no sense to have two different processes for submitting grades one for blended and the other one for online students. There should be one system serving both.

Response from Professor D:

While I can think about improvements that would increase convenience with which I needed to record grades and track student attendance; I did not find any of this to be an impediment to my delivery of the cross-listed course.

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