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Student Satisfaction with Canvas Use in Face-to-Face Courses at Colorado Mountain College

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Abstract

By examining the relationship between the use of LMS tools and student course satisfaction, institutions can purposefully target areas most in need of improvement. The inconsistency in the application and use of LMS tools has resulted in a fragmenting of the student experience and has had a potentially negative affect on student attitudes toward its use. In order to address these issues and to support CMC's mission, college leadership has created a minimum usage requirement for Canvas in all credit courses. This evaluation aims to provide insight for improving the use of Canvas tools and increasing student course satisfaction in F2F courses at CMC. Drawing on Tinto's (1975) model of persistence, the use of learning management systems and resultant satisfaction in the classroom is a contributing factor to a student's decision to persist in a course. Davis' (1993) technology acceptance model (TAM) also informed the research as it specifies the causal relationships between several factors, in particular, perceived usefulness, ease of use, and satisfaction.

The Context and Product components of the CIPP evaluation model were used to guide the determination of the overall quality and merit of the mandated Canvas usage program. Based on the findings from a quantitative survey, the researcher was able to make six specific recommendations to improve the program centered around increased LMS training and support for faculty and students, the demonstration of a measurable positive impact on student learning for new Canvas tool or functionality adoption, and regular and consistent feedback from faculty and students.

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ABSTRACT

For many institutions, the learning management system (LMS) is the keystone in a technology-based learning strategy. By examining the relationship between the use of LMS tools and student course satisfaction, institutions can purposefully target areas most in need of improvement. The inconsistency in the application and use of LMS tools has resulted in a fragmenting of the student experience and has had a potentially negative affect on student attitudes toward its use. In order to address these issues and to support CMC's mission, college leadership has created a minimum usage requirement for Canvas in all credit courses.

This evaluation aims to provide insight for improving the use of Canvas tools and increasing student course satisfaction in F2F courses at CMC. Drawing on Tinto's (1975) model of persistence, the use of learning management systems and resultant satisfaction in the classroom is a contributing factor to a student's decision to persist in a course. Davis' (1993) technology acceptance model (TAM) also informed the research as it specifies the causal relationships between several factors, in particular, perceived usefulness, ease of use, and satisfaction.

The Context and Product components of the CIPP evaluation model were used to guide the determination of the overall quality and merit of the mandated Canvas usage program. Based on the findings from a quantitative survey, the researcher was able to make six specific recommendations to improve the program centered around increased LMS training and support for faculty and students, the demonstration of a measurable positive impact on student learning

for new Canvas tool or functionality adoption, and regular and consistent feedback from faculty and students.

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Chapter I: Introduction

For many institutions, the learning management system (LMS) is the keystone in a technology-based learning strategy. Many institutions invest in a LMS as a resource to support on- and off-campus online education, which may include face-to-face instruction, blended or hybrid instruction, and distance education, or to simply offer more convenient, efficient access to traditional classroom resources (Malm & DeFranco, 2012; Walker, Linder, Murphrey, & Dooley, 2016). The proposed teaching and learning benefits of LMS include increased students access to information, increased interactivity between student and teacher, improved collaborative efforts, eliminating geographical barriers, and building self-confidence (Cheng, 2011; Lonn & Teasley, 2009; Wei, Peng, & Chou, 2014). In essence, the LMS becomes another interface between teacher and learner (Walker, et al., 2016). This makes the LMS an important asset for the institution. The adoption of a LMS also represents a significant financial investment, which requires substantial staffing resources, and potentially affects most, if not all, faculty and students at an institution. Thus, the implementation of a LMS for an institution is a significant and consequential process (Spelke, 2011). With this in mind, I am proposing a program evaluation of LMS use for face-to-face (F2F) courses at Colorado Mountain College (CMC).

Problem Statement

With the near-universal adoption of LMS by institutions of higher education, it is critical to determine how these systems are affecting the student learning experience

(Malm & DeFranco, 2012). In the context of learning environments, student satisfaction is linked to student success and retention (Ruffalo Noel-Levitz, 2018). Dissatisfied students may elect to drop out or withdraw from a course or program. Even though the implementation of LMS in higher education has increased to 99% of all higher education institutions, little is known about students' experiences and preferences with these systems. Satisfaction occurs when the perceived performance and/or outcome exceeds a student's expectations (Elliott & Shin, 2002). By examining the relationship between the use of LMS tools and student course satisfaction, institutions of higher education can purposefully target areas most in need of improvement (Ruffalo Noel-Levitz, 2018). With this clearer sense of student perceptions regarding the usefulness of the LMS, institutions are better equipped to promote the LMS tools, which can create a more satisfactory learning experience, and thus improve persistence (Arabie, 2016).

While existing research of student satisfaction and LMS use focuses primarily on online learning environments, little is known about the relationship between the use of LMS tools in F2F courses and student satisfaction. This is due in part because, at many institutions, faculty may choose not to use the LMS at all. For example, the utilization of the adopted LMS, Canvas, at Colorado Mountain College stands at approximately 46% of all classes. This inconsistency in the application and use of LMS tools has resulted in a fragmenting of the student experience and has had a potentially negative effect on student attitudes toward its use. In order to address these issues and to support CMC's mission, college leadership has created a minimum usage requirement for Canvas in all credit courses, to be implemented in the Fall 2018 semester, henceforth known as the Program.

Purpose

The purpose of this research was to examine the relationship between Canvas use and student satisfaction in F2F courses. A student's experience within a course, including the use of a LMS, influences their course satisfaction and impacts their decision to persist. As LMS tools support a wide range of teaching and learning activities, it is important educators know which instructional tools to use and how to use them appropriately in order to have a greater impact on student learning (Arabie, 2016; Baghdadi, 2011). Research suggests more user control over the LMS environment can positively impact student satisfaction. This can be achieved through designing and providing more customizable and student-centered tools within the LMS (Sorenson, 2016; Zanjani, Edwards, Nykvist, & Geva, 2017). By considering the responses of students who partake in technology-enabled classroom courses, CMC can better understand what contributes to student course satisfaction (Liaw, 2008). This practice can lead to more effective implementation of LMS tools, which meet student expectations for quality learning (Baghdadi, 2011).

Rationale

This evaluation aims to provide insight for improving the use of Canvas tools and increasing student course satisfaction in F2F courses at CMC. Drawing on Tinto's (1975) model of persistence (e.g., the impact of institutional structural systems on persistence), I will position the use of learning management systems and resultant satisfaction in the classroom as a contributing factor to a student's decision to persist in a course. Davis' (1993) technology acceptance model (TAM) also informed this research as it specifies the causal relationships between system design features, perceived usefulness, perceived ease of use, attitude toward using, and actual usage behavior. The actual usage behavior runs parallel to satisfaction. If the

technology is perceived to be easy to use and useful this creates a positive attitude toward its use, which results in a higher likelihood of usage and increased satisfaction. Research indicates LMS improve learning and suggests that students are concerned less with whether an LMS is used, but rather the ways in which faculty use them for course learning (e.g., are they easy to use and useful) (Lonn & Teasley, 2008).

How a student perceives their learning experiences influences both the decision to continue in a course and the degree of satisfaction with their overall technology-based learning experiences (Kenny, 2003). By following the best practices of technology integration and use, instructors can maximize the benefits (e.g., promote students to be actively engaged in learning, higher grades, increased student persistence) of a LMS (Raines & Clark, 2011). Additionally, a better understanding of satisfaction with regard to the use of LMS in F2F courses will allow institutions to use their resources more effectively and efficiently in improving the student learning experience (Rhode, Richter, Gowen, Miller, & Willis, 2017). Focusing resources on optimizing the general usability of a LMS is a critical factor for increasing acceptance and satisfaction, but perhaps, more importantly, because the failure to do so may have a significant negative effect on learning and teaching.

Research Questions

Q1. To what extent is there a relationship between Canvas LMS use and student satisfaction in F2F courses?

Q2. To what extent is there a relationship between student expectations for the use of Canvas LMS and student satisfaction in F2F courses?

Currently, there are significant gaps in information about students' expectations and perceptions of the use of technology in the classroom. The ability to better understand these factors regarding the use of Canvas in F2F courses will allow the College to use its resources more effectively and efficiently to address areas of improvement, which increase the usefulness, ease of use, and, ultimately, the satisfaction of students.

Evaluation Model

The context, input, process, and product (CIPP) evaluation model has a comprehensive format, which has great utility for educators and administrators on smaller, program-specific scales. The CIPP evaluation model emphasizes "learning-by-doing" to identify corrections for problematic project features, and thus, is uniquely suited for evaluating emergent projects in a dynamic social context and can guide the determination of a program's overall quality and merit (Alkin, 2004; Stufflebeam, 1971). The evaluator using the CIPP model involves representative stakeholders to assist in question definition, to shape evaluation plans, and review and disseminate reports (Stufflebeam, 2001). In the context of higher education, the goal of CIPP evaluations is to assist institutions to regularly assess and improve services and make effective and efficient use of resources, time, and technology in order to serve the targeted needs of stakeholders and to do so appropriately and equitably (Stufflebeam & Shinkfield, 2007). The CIPP evaluation model belongs to the improvement/accountability category of program evaluation and is one of the most widely applied models. In particular, the Context and Product components are the focus of the evaluation.

Intent of the Improvement

Understanding the student perspective of Canvas use in the classroom will shed much needed light on existing gaps in the Program and identify those areas where needs are actually

being met. Once these are understood, the appropriate resources can be marshaled and applied in an intentional and deliberate manner. The intent of the improvement is to provide students and faculty with the appropriate support for Canvas use in the classroom, which leads to increased student satisfaction, learning, and persistence.

Key Terms

For the purpose of this research, the following definitions are used:

LMS - a software application for the administration, documentation, tracking, reporting, and delivery of educational courses. The ability to collaborate and coordinate learning materials and activities is a central benefit of its use. A LMS simplifies things for both learners and teachers by making it easy to create, deliver, and consume course content and to track and report on courses. The ability to collaborate and coordinate learning materials and activities is a central benefit of its use.

Perceived Ease of Use - the degree to which a person believes that using a particular system would be free of effort.

Perceived Usefulness - the degree to which a person believes that using a particular system will enhance performance.

Student Satisfaction - a student's perception of their learning and experience in a course and their perceived value of a course.

Summary

The adoption of a LMS represents a significant institutional commitment to improve the learning experience. However, many institutions, including Colorado Mountain College, have focused on a faculty-centric view of LMS use, potentially leaving the needs of the primary

beneficiary (students) as an afterthought. Engaging students in identifying the LMS tools used in F2F courses, which increase the quality of learning, can lead to increased student satisfaction and, more importantly, student persistence.

Chapter II: Literature Review

Introduction

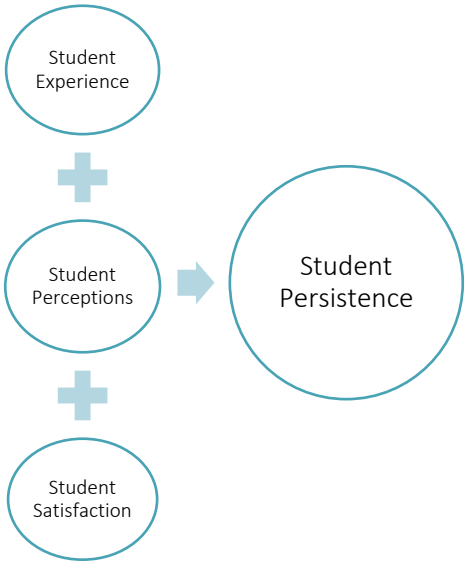
In considering the best way to frame the discussion of relevant literature to the research proposed in this prospectus, I have chosen to start with the theoretical framework and progress to a more narrow and applicable focus. I begin with Tinto's Student Departure Theory in order to broadly discuss the impact of student satisfaction on persistence. The Technology Acceptance Model then draws a more specific line between student satisfaction and the use of technology. I continue by discussing Learning Management Systems, their purpose, perception, and utilization as important considerations with regard to student satisfaction, learning, and persistence. I conclude with a discussion of the factors in LMS use that drive student satisfaction at the course level. This top-down approach is meant to assist stakeholders in better understanding the role LMS play, not only in course delivery but also within the institution itself - for faculty and students.

Theoretical Framework - Student Departure Theory

Tinto's (1975) model of student persistence illustrates factors influencing student dropout in higher education. As the model points out, a student's institutional experience influences their persistence (Tinto, 1975). Understanding the way in which students interact with systems of higher education may be traced back to Tinto's (1975) student departure theory.

He proposed the structural forms of academic institutions are connected to the risk of students' attrition. Tinto (1975) found the goals and level of commitment of the institution to students are at the foundation of whether or not individual students are able to achieve their goals and persist (Tinto, 1975). As seen in Figure 1, the Tinto model points out that the structural systems of the college can have an iterative effect on students' objectives, goals, and commitments, which can lead to attrition or persistence depending on the factors involved (Tinto, 1988). Researchers have found that student satisfaction is related to retention, quality, and student success (Ruffalo Noel-Levitz, 2018). A student's experience within a course, including the use of a learning management system (LMS), influences their course satisfaction and impacts their decision to persist. For this reason, it would serve institutions of higher education well to better understand the factors of technology use, which lead to student satisfaction.

Figure 1 Tinto's Model of Student Persistence (1975)



Satisfaction in technology-enabled courses is important to educators for a number of reasons, particularly as it relates to persistence and retention (Arabie, 2016; Liaw, 2008; Naveh, Tubin, & Pliskin, 2012). In order to create effective online learning environments and improve course satisfaction, it is critical for institutions to understand the perceptions and expectations of students (Liaw, 2008). Concerning attrition in higher education, Tinto (1975) stated student perceptions are the dominant factor of dropping out. Student perceptions of the use of technology in courses is an issue, which deserves greater attention from higher education administrators and educators as it relates to student persistence (Haydarov, Moxley, & Anderson, 2013; Sutton, 2014).

Customer satisfaction principles suggest when customers are not satisfied there is often a negative impact on organizations (Biscaia, Rosa, Moura e Sa, & Sarrico, 2015). Accordingly, the importance of customer satisfaction for the sustainability of organizations cannot be overstated (Biscaia et al., 2015). This is no less a concern in higher education as dissatisfied students may elect to drop out or withdraw from a course or program. In light of this, additional and substantive efforts should be made to try to improve student satisfaction and increase retention. Understanding the relationship between student perception of LMS tools' usefulness and student course satisfaction is an essential step, across learning environments, in order to enhance these efforts (Angelino, Williams, & Natvig, 2007).

By considering the responses of students who partake in technology-enabled courses, institutions of higher education can better understand what contributes to student course satisfaction (Liaw, 2008). This practice can lead to more effective implementation of LMS tools, which serve student expectations for quality learning (Baghdadi, 2011). Additionally, a greater

understanding of the influence of LMS tools helps instructors in higher education to design courses based on principles of effective technology-based teaching (Arabie, 2016). As LMS tools support a wide range of teaching and learning activities, it is important educators know which instructional tools to use and how to use them appropriately in order to have a greater impact on student learning and to increase course satisfaction (Arabie, 2016; Baghdadi, 2011). These structural components of an institution's learning environment can have a profound effect on student satisfaction and, therefore, persistence.

Conceptual Framework - Technology Acceptance Model

The use of technology by teachers to support the teaching and learning process in higher education has yielded many competing models with roots in information systems, psychology, and sociology (Morris, Davis, & Davis, 2003). Many of those models focus on the factors that support or hinder technology use in education (Cubeles & Riu, 2016). As seen in Figure 2, the technology acceptance model (TAM) specifies the causal relationships between system design features, perceived usefulness, perceived ease of use, attitude toward using, and actual usage behavior (Davis, 1993). According to the Technology Acceptance Model (TAM), the key predictors of individuals' acceptance and intention to use a new technology are their perceptions of its usefulness, and their perceptions of its ease of use (Davis, 1993). It should be noted, although ease of use is clearly important, the usefulness of the system is even more important - users may tolerate a difficult interface in order to access functionality that helps them do their work, while no amount of ease of use can compensate for a system, which does not allow things to get done (Davis, 1993). The next critical component in adopting new systems or new technologies is user satisfaction because it determines whether they are going to continue using

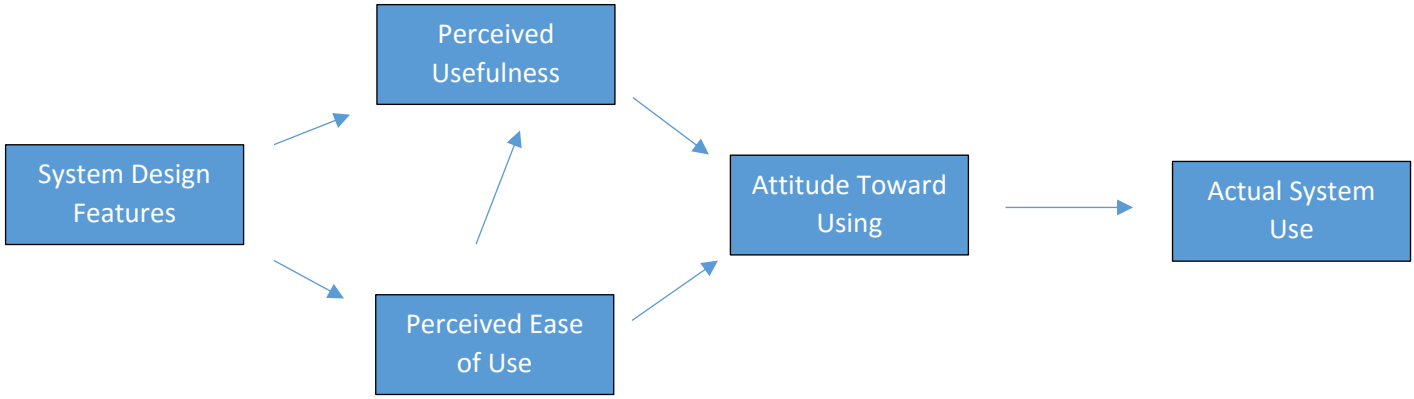
the system or not. Across the many empirical tests of TAM, perceived usefulness has consistently been a strong determinant of usage intentions (Abdel-Maksoud, 2018; Green, Inan, & Denton, 2012; Morris et al., 2003). A better understanding of the determinants of perceived usefulness would enable institutions of higher education to provide targeted responses, which would increase user acceptance and usage of systems (Venkatesh & Davis, 2000). A LMS, which is accepted due to its usefulness and ease of use, will invariably result in greater student satisfaction, which in turn will increase its perceived usefulness.

According to TAM, a LMS is adopted based on three primary factors: perceived usefulness, perceived ease of use, and user attitudes toward the technology (Davis, Bagozzi, & Warshaw, 1989). The relationships and interaction among and between these factors demonstrate the importance of addressing each to maximize LMS adoption. For example, in several studies perceived ease of use had a significant influence on attitude towards usage (Chang, Yan, & Tseng, 2012; Park, 2009) and perceived usefulness (Shroff, Deneen, & Ng, 2011). Perceived ease of use was also found to indirectly impact the intention to use through increased perceived usefulness (Lee, Hsieh, & Hsu, 2011; Sek, Lau, Teoh, & Law, 2010). Additionally, perceived usefulness and attitude towards usage were both found to be direct determinants of intention to use (Liu, Liao, & Peng, 2005; Ng, Shroff, & Lim, 2013).

Furthermore, research suggests more user control over the LMS environment can positively impact all three factors. This is achieved through designing and providing more customizable and student-centered tools within the LMS (Sorenson, 2016; Zanjani et al., 2017). Usable interfaces, which provide access to functions and features that are more reflective of a

student's thought process, can allow a student to interact with the system more naturally, thus providing an incentive for adoption (Sorenson, 2016).

Figure 2 Davis' Technology Acceptance Model (1993)



LMS Overview

According to a 2018 report by the Educause Center for Analysis and Research, 99% of higher education institutions have adopted a Learning Management System (LMS) for use. A LMS is a software application for the administration, documentation, tracking, reporting, and delivery of educational courses. LMS provide a means to share instructional materials, make class announcements, submit, and return course assignments, and communicate with each other online (Lonn & Teasley, 2009). The ability to collaborate and coordinate learning materials and activities is a central benefit of its use. A LMS simplifies things for learners, teachers, and administrators by making it easy to create, deliver, and consume course content and to track and report on courses.

For many institutions, the LMS is the keystone in a technology-based learning strategy, which may include blended or online learning, or simply more convenient, efficient access to traditional classroom resources (Malm & DeFranco, 2012). The adoption of a LMS represents a

significant financial investment, which requires substantial staffing resources, and potentially affects most, if not all, faculty and students at an institution. The implementation of a LMS for an institution is a significant and consequential process (Spelke, 2011).

Using technology in face-to-face (F2F) courses has shown the ability to increase student motivation, satisfaction, and promote higher levels of student learning than face-to-face or online learning alone (Malm & DeFranco, 2012; Naveh, Tubin, & Pliskin, 2010). Research indicates a LMS improves learning and suggests that students are concerned less with whether a LMS is used, but rather the ways in which faculty use them for course learning (Lonn & Teasley, 2008). Additionally, both instructors and students highly rate those LMS activities that allow for more efficient distribution of course materials and announcements. If a LMS is to support active teaching and learning as well as efficient communication, then instructors might benefit from receiving training that helps them understand how online interactive activities can be valuable and how easy they are to use (Lonn & Teasley, 2008). With the near-universal adoption of LMS platforms by institutions of higher education, it is essential to move beyond the question of *whether* faculty use the LMS to the more difficult and important questions of *how* these systems are affecting the student learning experience (Malm & DeFranco, 2012).

Purpose of LMS

One of the expected byproducts of the use of LMS technology in higher education was significant pedagogical changes and improvements in teaching and learning (Naveh et al., 2012). Advocates for LMS adoption in higher education expected great things from the technology, including the ability to develop student-learning abilities, a reduction in dropout rates, and improving the management of learning resources (Naveh et al., 2012). In practice, most LMS

are used for the distribution and management of course materials, but functionality that supports interaction and communication between students and instructors and among students is often under-utilized (Lonn & Teasley, 2009; Wei, Peng, & Chou, 2014). Neither has the goal of providing opportunities for institutional innovations in learning and education yet to be realized (Cheong, Park & Dutton, 2002).

Perception of LMS

Faculty

The ways in which faculty perceive and use various technologies is important because technology use is an individual choice in many higher education institutions. Understanding the process of technology adoption and, in particular, why specific tools were chosen to be used by faculty has considerable organizational implications for LMS utilization and effectiveness (Cubeles & Riu, 2016). In accepting a learning management system, an instructor first chooses to perform a specific task and then decides whether or not to use the corresponding technological tool to perform the instructional task involved (Schoonenboom, 2014). If the instructor believes the available tools in the LMS are sufficient to help accomplish learning objectives, then the LMS is more likely to be viewed positively and used more often (Schoonenboom, 2014). Pairing pedagogical practices with appropriate technology tools can lead to improved student learning and outcomes, and, thus, student satisfaction (Schoonenboom, 2014). Unfortunately, a consistent finding is that LMS are used most frequently for the distribution of learning materials, less frequently for communication between instructor and students, and even less frequently for online assessment or collaborative learning (Lonn & Teasley, 2009; Rhode et al., 2017; Zanjani, et al., 2017). Research indicates the ways instructors use a LMS depends largely on their

perception of the LMS, but organizational expectations and norms can also play a role (Nachmias & Ram, 2009).

In the case of LMS adoption at some institutions, innovation decisions are often forced or top-down driven (Walker, et al., 2016). Typically, a small group of individuals who possess the power and/or expertise makes the final decision on adoption, which is then required. Once this process has been set in place, an institution no longer allows a variety of LMSs to be used by instructors, but rather selects one that is officially sanctioned and supported. If an instructor does not use this institutional LMS, there can often be negative repercussions (Walker, et al., 2016). Understanding instructors' perceptions and satisfaction with attributes of a forced adoption may help decision-makers evaluate the effectiveness of their decision.

While much of the literature has focused on faculty perception of LMS in an online course context, there is a real need to understand the perceptions of faculty concerning the use of LMS use in the classroom (Greener & Wakefield, 2015). Research suggests faculty are more likely to use LMS purposefully provided:

- They have space to experiment with new ways of using LMS tools
- There is a clear strategy at the institutional level that promotes and supports LMS use
- There is adequate and appropriate technical support
- There is adequate and appropriate pedagogical support
- There is enough time allocated for teaching with the LMS
- They perceive they have appropriate skills in using the LMS

- They perceive their students as having the appropriate skills and/or demanding the use of the LMS

In order to increase adoption and the effective use of LMS tools, faculty perceptions need to be taken into account (Gonzalez, 2012).

Students

As technology becomes ever more pervasive in higher education, it is especially important to determine the influential factors related to student perceptions of LMS. The success of these systems relies on both its early adoption (satisfaction) and its continued use (Ghazal, Al-Samarraie, & Aldowah, 2018). In creating a course, which uses LMS tools, student needs and perceptions should be central, as failing to address student expectations can result in decreased involvement and motivation (Bradford, 2011). Unfortunately, there is often a disconnect between student expectations and faculty capabilities and motivation for using the LMS (Greener & Wakefield, 2014). More importantly, how a student perceives their learning experiences influences both the decision to continue in a course and the degree of satisfaction with their overall technology-based learning experiences (Kenny, 2003). In the context of LMS, perceived usefulness looks at a student's beliefs that using a LMS will improve their individual performance in a course (Abdel-Maksoud, 2018). As for perceived ease of use, when a student perceives a LMS as easy to use, the student is more likely to continue using that system (Venkatesh & Davis, 1998). Specifically, students question the degree of difficulty in using the LMS to complete their work assignments. Both types of perceptions will determine whether students accept and continue to use the LMS (Abdel-Maksoud, 2018). Students identify three major factors affecting ease of use (and therefore their perception of a course):

(1) monitoring their status in the course (e.g., completed assignments, grades),

(2) course-related information and materials (e.g., course announcements, submitting assignments)

(3) communication with the instructors and other students (e.g., messaging/inbox, discussion board)

In order to increase satisfaction, instructors must consider student perceptions when implementing LMS tools (Wei et al., 2015). Additionally, if a faculty chooses to use a LMS in the classroom, students want it to engage them in or deepen their learning (Skiba, 2018).

Utilization of LMS

The benefits of technology in the classroom have been reported in the literature for decades, however, the use of technology by higher education faculty is low and superficial (Cubeles & Riu, 2016). Research provides evidence of the limited use of technology in the higher education classroom, with lectures being a persistent feature of teaching despite the opportunities offered by new technologies including LMS (Cubeles & Riu, 2016; Wei et al., 2014). The focus has been on basic course management techniques with a lack of student-faculty engagement for learning. (Skiba, 2018). Low usage of installed LMS has been identified as a major factor underlying lackluster returns from organizational investments in information technology (Venkatesh & Davis, 2000). At many institutions, faculty may choose from a wide variety of tools provided by the LMS or they can choose not to use the technology at all. Generally speaking, institutions need to realize educational technologies, such as a LMS and its tools/features, can add to, detract from, or not affect teaching and learning. Tools, features, and

functionality that add to teaching and learning should be maximized, while tools, features, and functionality that detract from teaching and learning should be minimized (Walker, et al., 2016).

By following the best practices of technology integration and use, instructors can maximize the benefits of educational technology. Integrating technology into education can promote students to be actively engaged in learning, which leads to higher grades and increased student persistence (Raines & Clark, 2011). Although technology continues to transform instructional practices, many technologies have remained supplemental resources in the educational classroom, especially in higher education (Cubeles & Riu, 2016). Not surprisingly, significant differences in the use of technology in the classroom have been found between instructors from different disciplines, academic backgrounds, and those with prior experience teaching online (Diep, Zhu, Struyven, & Blieck, 2017). Results suggest that teachers with online experience use technology more intensively in the classroom, regardless of the tools or tasks (Cubeles & Riu, 2016).

Students tend to be satisfied with basic LMS tool use, such as submitting assignments, accessing course content, checking progress, and managing and receiving feedback on assignments. When more complex LMS tools are used, student satisfaction decreases, often due to the lack of engagement with instructors and other students, collaborating on projects, and participating in study groups (Skiba, 2018).

By understanding the utilization of LMS tools by faculty and students, institutional administrators can make better, data-informed decisions regarding procuring, training, and supporting additional technologies to help ensure that instructional needs are being met (Rhode, et al., 2017). Additionally, focusing resources on optimizing the general usability of a LMS is

critical for not only improving the educational impact but also because the failure to do so may have a significant negative effect on learning and teaching (Zaharias, 2009).

Factors Affecting Student Satisfaction

Higher education institutions have to be concerned with not only what society values in terms of the skills and abilities of their graduates, but also with how their students feel about their educational experience (Munteanu, Ceobanu, Bobalc, & Anton, 2010). Satisfaction occurs when the perceived performance and/or outcomes exceeds a student's expectations (Elliott & Shin, 2002). In the context of the learning environment, student satisfaction is linked to retention, quality, and student success (Ruffalo Noel-Levitz, 2018). By examining the relationship between student perception of the usefulness of LMS tools and student course satisfaction, institutions of higher education can purposefully target areas most in need of improvement (Ruffalo Noel-Levitz, 2018). With this clearer sense of student perceptions regarding the usefulness of the LMS, institutions are better equipped to promote the LMS tools, which can create a more satisfactory learning experience (Arabie, 2016). It is practical and sensible to consider student satisfaction as an indicator of LMS success and effective LMS use for several reasons (Naveh, et al., 2010). First, research has shown LMS use supports, rather than modifies, existing teaching and learning practices (Arbaugh, Godfrey, Johnson, Pollack, Niendorf, & Wresch, 2009). With this in mind, redefining LMS success away from achieving a pedagogic revolution toward improving student satisfaction is logical (Naveh, et al., 2010). Second, according to the American Marketing Association (2018), satisfaction is defined as the ability of a service or a product to address customer needs. While student needs may not be entirely understood, it is reasonable to assume that high student satisfaction with the use of the

LMS indicates it is meeting their needs (DeLone & McLean, 2003; Naveh, et al., 2010). Student satisfaction is an outcome measure of the education process and can be used to gauge the quality of teaching and learning in a course (Munteanu et al., 2010). Furthermore, a student's view of the quality of the course work and other curriculum-related factors is a driver of satisfaction (Munteanu et al., 2010).

Research indicates the use of instructional technology, most often via a LMS, in the classroom can encourage student engagement (Al-Samarraie, Teng, & Alalwan, 2017; Arabie, 2016; Horvat, Moxley, & Anderson, 2015; Islam & Azad, 2015). This engagement increases student motivation and perceptions, ultimately leading to increases in student learning and satisfaction (Arabie, 2016; Horvat, et al., 2015; Islam & Azad, 2015). It is important for institutions to recognize quality instruction and satisfying learning experiences are expected by students (DeBourgh, 1999). Furthermore, effective course management (e.g., timely entry of grades and announcements, the use of rubrics for assignments, etc.) creates an increased level of comfort for students with course content, which results in higher rates of both retention and satisfaction (Ozkan & Koseler, 2009). The converse is true as well, as using LMS tools incorrectly, or not at all, may lead to less usage for students. This can cause a vicious cycle where the perceived lack of usefulness or ease of use decreases satisfaction and this lowered satisfaction leads to less usage of the system (Horvat, et al., 2015).

A number of research studies have focused on how higher education online learners value various LMS tools (Borboa, Joseph, Spake, & Yazdanparast, 2017; Chawdry, Paullet, & Benjamin, 2011; Lonn & Teasley, 2009, Weaver, Spratt, & Nair, 2008; Zanjani, et al., 2017). However, little is known about the relationship between the use of LMS tools in F2F courses and

student satisfaction. A better understanding of student perceptions can provide valuable and actionable insight to improve course satisfaction, which can lead to increased student learning, persistence, and success (Horvat, et al. 2015; Liaw, 2008).

Digital Literacy, Self-Efficacy, and Support

Digital literacy is defined as the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills (American Library Association, 2019). Self-efficacy is the capacity to bring about a desired result (Pyschologydictionary.org, 2019).

Faculty

Even with the rapid adoption of a learning management system, many faculty do not feel prepared to teach using a LMS (Doherty, 2014; He, 2014). At many institutions of higher education students are often considered to be "digital Natives' while faculty are considered the "digital immigrants" (Conde, García-Peñalvo, Rodríguez-Conde, Alier, Casany, & Piguillem, 2014). This clearly presents a problem for faculty adoption, acceptance, and use of LMS. Faculty report a lack of confidence in large part due to a deficiency in their own experiences with technology, which exacerbates the problem further (Duprez, Van Hooft, Dwarswaard, Staa, Van Hecke, & Strating, 2016; He, 2014). Faculty development that includes improving levels of digital-literacy and self-efficacy builds faculty skills and motivation in utilizing a LMS effectively (Willis, 2015).

Regardless of the inherent time and place constraints in which faculty can learn content, faculty development programs give the support and training needed to be successful in using a

LMS (Chiasson, Terras, & Smart, 2015; Cook & Steinert, 2013; Sharif & Cho, 2015). While well-intentioned, many institutions do not provide the types and frequencies of training and support desired by faculty. Generally speaking, faculty perceptions about support in teaching using online modalities stress the need for more support (Herman, 2012).

Faculty members indicate this perception of support and training being inadequate because institutions do not provide multiple opportunities to attend training and receive instructional support on different days, times, and locations or using differing modalities (Rucker & Frass, 2017). College administrators and instructional support teams engaged in faculty development for LMS use must consider faculty members have busy and varied schedules, which may prevent them from attending training on short notice. In order to avoid scheduling conflicts, faculty members should be provided with training schedules well in advance, which allows them to plan their schedules around the training activities being offered (Rucker & Frass, 2017).

Another consideration for administrators in faculty development programming is meeting faculty where they are across the broad range of experience and previous LMS use. While all faculty must know what the LMS can do and the ways in which it can be used in the classroom, those more familiar with the technology have different needs and expectations. This might include more in-depth training that reinforces pedagogy, best practice, and the innovative use of LMS tools. Faculty who are early adopters of technology have different levels of skill, knowledge, and experience than those faculty who have been more reluctant to incorporate technology into their courses. With this reality in mind, faculty development (support and training) should be user-centered (Strawser, et. al, 2018).

A good example of an intentional and thoughtful program can be found at Bay Path College, which had great success with a one-week faculty development program that incorporated orientation, mentoring, and support for faculty using a LMS (Vaill & Testori, 2012). Faculty were given instruction on LMS tool use from an instructional designer as well as being partnered with a faculty mentor experienced in using the technology (Vaill & Testori, 2012). The results of the program were positive as faculty reported an increase in the use and comfort with the technology and the level of support from having instructional designer and mentor assistance throughout the week (Vaill & Testori, 2012).

Beyond specific development programs, having technical support options available for faculty to receive immediate assistance demonstrates the institutional dedication to ensuring technical issues are resolved quickly (Rucker & Frass, 2017). The goal is to provide a wide enough support net so that a diverse body of faculty have the types of training and support at the times and places needed. This does not occur without significant commitment as College administrators have to approve and provide the appropriate resources (e.g., instructional designers, support staff, etc.) to create the necessary infrastructure. Ensuring proper course design and pedagogy are incorporated into technology-enabled courses requires, at times, dedicated one-on-one assistance for faculty. However, faculty members must also be willing to invest their time and energy to learn how to use the LMS and its tools by attending and participating in workshops and other opportunities in order to remain effective in using the LMS in the classroom (Rucker & Frass, 2017).

Students

The promise of LMS use to enhance the learning process while making it easier to engage with a variety of content, collaborate and communicate with other students, and get feedback is not without its challenges to students based on their previous knowledge and experience (Ghazal, et al., 2018).

An individual's fearfulness in using technology to accomplish tasks is referred to as computer anxiety in the technology acceptance field (Saade & Kira, 2009). Those who have less anxiety are more likely to react positively to a system. Compounding the issue, the lack of computer experience may trigger a student's anxiety in real-time, which has the potential to influence the acceptance of a technology (Saade & Kira, 2009). Several studies have also argued computer anxiety can be associated with the ease of use (Al-Gahtani, 2014) and usefulness of the system (Chang, Hajiyev, & Su, 2017). The association between computer anxiety and negative perceptions (ease of use, usefulness) suggests students who have a higher comfort level in using the LMS are more likely to accomplish desired outcomes and have higher levels of satisfaction. In contrast, student perceptions of the difficulty in using a LMS are increased when the system makes them uncomfortable, thus reinforcing negative attitudes about the system (Chen & Tseng, 2012; Park, Son, & Kim, 2012).

Prior knowledge and experience can also influence a student's perceptions regarding their ability to use the LMS. The more a student has of both of these, the more likely is a positive outlook on accepting the LMS (Ghazal, et al., 2018). Consequently, a student with more technological experience is more likely to have a higher perception of the usefulness and ease of use of a system (Chang, Hajiyev, & Su, 2017; Lee, Hsieh, & Chen, 2013). Furthermore, prior

experience with technology serves as the basis for judging the usefulness and ease of use when using a new system (Park, Roman, Lee, & Chung, 2009).

Students with higher technology self-efficacy are more disposed to using LMS regularly (Hsia, et al., 2014). The level of technology self-efficacy also affects a user's perceived usefulness and ease of use of a system (Cheng, 2011). In addition, it can be expected a student with higher technology self-efficacy can more easily navigate difficult learning situations, which maintains the perceived usefulness of the system (Connerton, 2019). Conversely, individuals with less confidence in their ability to complete a task using technology may fail to achieve their learning goals due to the negative perceptions about a system (Al-Gahtani, 2014; Alsabawy, Cater-Steel, & Soar, 2016). Fortunately, negative perceptions caused by a lack of technology self-efficacy, can be minimized with institutional support and training. The availability of technical support plays a role in determining the behavioral intention of a student to accept and adopt LMS (Cheng, 2011; DeLone & McLean, 2003; Lee, 2010). In order for students to feel adequate levels of support for their use of technology systems, institutions must allocate additional resources including trained service coordinators and skillful technical service personnel (Lee, 2010).

The cognitive demands and learning skills required in college are greater than it is often assumed and is only compounded by the integration of LMS use in face-to-face courses (Bliuc, Ellis, Goodyear, & Piggott, 2010; Paechter & Maier, 2010). The multimodality environment at colleges has increased the complexity of learning, and students who lack the appropriate skills are less likely to achieve learning outcomes compared to their peers (Bliuc, Ellis, Goodyear, &

Piggott, 2010; Paechter & Maier, 2010). Keeping this in mind, it should not be assumed all students are able to use technology as a tool to improve learning (Ghazal, et al., 2018).

Training is an essential and critical component in encouraging the use and adoption of technology (Ghazal, et al., 2018). Training can take many forms including seminars, workshops, online tutorials, user guides, and courses (Ghazal, et al., 2018; Lee, 2010). The lack of an effective training program has the potential to negatively impact the student learning experience, and, ultimately, the success of the system (Asiri, Mahmud, Bakar, & Ayub, 2012).

College administrators need to constantly focus on providing effective support and training to students by identifying and committing to the institutional and technical resources required. When an institution provides the necessary training and technical support, students are more likely to enhance their technology self-efficacy and perceive the system as useful and easy to use (Ghazal, et al., 2018). These increased levels of training and support ultimately can lead to enhanced student satisfaction as well (Ghazal, et al., 2018).

Chapter III: Methodology and Methods

Student satisfaction in their courses is one factor in a student's decision to persist. As technology, primarily via LMS, is increasingly incorporated into the classroom learning environment, it is critical to understand how this impacts student course satisfaction. Two primary components of student satisfaction with the use of technology are usefulness and ease of use. If students perceive LMS tools to enhance or improve learning or grades (usefulness) and simple to employ or interact with (ease of use), then they are more likely to use them and to view their use positively (student satisfaction). CMC has recently implemented minimum requirements for Canvas use in all classroom courses (the Program).

The Program

Background

Work on the Program began in the Fall 2016 semester at the behest of the CMC President. After receiving a phone call from the parent of a student wondering why grades were not made available in Canvas to view, the president asked Academic Affairs to begin formulating a plan to address this concern. Several faculty surveys were sent out to inquire about tool usage and to gather suggestions for specific tool requirements. Unfortunately, this occurred during a transitional time in Academic Affairs, as those responsible were in the process of either retiring or leaving CMC. It seems when those individuals left, so did any records or data from survey results. None of the data was used in formal decision-making regarding the Program. In spite of these hurdles, a rough skeleton of the Program made it to the Faculty Senate

in February 2017, where it was formally adopted, to be implemented in the Fall 2017 semester. The Senate authored much of the language surrounding the Program (e.g., LMS training, Copyright, Enforcement, Responsibilities, etc.) at that time. As Academic Affairs positions were beginning to be filled in August 2017, it was apparent the infrastructure was not in place to ensure proper implementation of the Program, so the start date was postponed until the Fall 2018 semester.

Tool Use Mandated

Faculty are expected to post the course syllabus, create a "First Day" course home page, post Announcements of important course information and dates, publish the course by the course start date, post course grades in a timely fashion, and demonstrate the ability to use the Inbox and Assignment tools.

Fidelity of the Program

Since the implementation of the Program in the Fall 2018 semester, compliance reports indicating unpublished courses and faculty activity in the course are made available for supervisor review in weeks two and four of each semester. The appropriate Assistant Dean of Instruction is responsible for documenting that faculty meet the LMS Minimum Usage Standard for each credit course as specified. The number of unpublished courses decreased from 556 in week four of the Fall 2018 semester to only 270 in week four of the Spring 2019 semester. The counts include late start courses (begin in the eight week of the semester) and Concurrent Enrollment Programs Act (CEPA) classes that are offered for concurrently enrolled high school students and not currently required to use Canvas. The institution is actively working to create robust reporting structures in order to filter out the appropriate courses. At this time, it is not

known the extent to which these reports are used by supervisors in determining adherence to the Program.

Positionality

As the Director of Technology Enhanced Learning at CMC, I have direct access and oversight of all education technologies, including Canvas. The department is charged with supporting learning with technology in all credit courses (regardless of the modality) based on current research of best practices and data-driven decision-making. As CMC's mission and vision are student-centered, leveraging Canvas to enhance the student experience is imperative. My position is at the nexus of technology and academic affairs, so I serve on committees, working groups, and special projects with both administrators and faculty. In this regard, I am ideally situated to research, plan, and enact change with regard to the use of Canvas.

As a current user of Canvas in the University of Denver Higher Education Doctoral program, my own personal experience and or thoughts regarding usefulness and ease of use might differ dramatically from undergraduate students.

Research Questions

In order to gain insight into student's perception about and to better address gaps in the application or use of Canvas tools by instructors, the following research questions were considered:

Q1. To what extent is there a relationship between Canvas use and student satisfaction in F2F courses?

Q2. To what extent is there a relationship between student expectations for the use of Canvas and student satisfaction in F2F courses?

CIPP Program Evaluation Model

The LMS Minimum Usage program was implemented by administrators without substantive input from primary stakeholders or students. The lack of involvement by these groups in assessing needs and shaping the objectives and outcomes of the program is problematic in two ways. First, the program as currently instituted lacks meaningful context. Without understanding the needs of students concerning LMS use, the program is based on assumptions about what will satisfy students. This may, in fact, be the case, but there currently is no mechanism to validate those assumptions, which leads to the second issue. In terms of measuring program success, there does not exist any metric other than faculty compliance with the minimum requirements. This certainly will yield whether the Canvas tools were used in the course, but it does not tell us anything meaningful about the efficacy of their use with regard to student learning and student satisfaction. The context, input, process, and product (CIPP) evaluation model has a comprehensive format, which has great utility for educators and administrators on smaller, program-specific scales. In light of the situation, the CIPP Model is a perfectly suited program evaluation model to choose for its designed ability to serve the needs for both formative and summative evaluations. CIPP evaluations are formative when they proactively collect and report information to improve programs. They are summative when they look back on completed program activities or performance, aggregate value meanings of relevant information, and focus on accountability (Stufflebeam, 2003). Evaluators may use CIPP evaluations both to guide development and improvement of programs – the formative role – and to supply information for accountability – the summative role (Stufflebeam, 2001, 2003).

The CIPP evaluation model is uniquely matched for evaluating emergent projects in a dynamic social context and can guide the determination of a program's overall quality and merit

(Alkin, 2004; Stufflebeam, 1971). In the context of higher education, the goal of CIPP evaluations is to assist institutions to regularly assess and improve services and make effective and efficient use of resources, time, and technology in order to serve the targeted needs of stakeholders and to do so appropriately and equitably (Stufflebeam & Shinkfield, 2007).

All four components of CIPP (Appendix B) can play important roles in the assessment of a program (Stufflebeam, 2003). Context evaluation examines whether existing goals are in line with stakeholder needs and assess if the proposed objectives are responsive to those needs. Input evaluation assists in prescribing a program and after consideration of relevant approaches, formulating a responsive plan. Process evaluation allows for assessing the extent to which the program is being carried out effectively and appropriately in addressing identified stakeholder needs. The final component, Product evaluation, identifies and assesses both intended and unintended project outcomes. For the purpose of this prospectus, the Context and Product components, explained in detail below, will be the primary focus of this program evaluation.

The CIPP evaluation model emphasizes "learning-by-doing" to identify corrections for problematic project features. It is thus uniquely suited for evaluating emergent projects in a dynamic social context (Alkin, 2004). As Stufflebeam has pointed out, the most fundamental tenet of the model is "not to *prove*, but to *improve*" (Stufflebeam & Shinkfield, 2007, p. 331). The formative application of the model can facilitate decision making and quality assurance, and its summative use produce a complete assessment of program merit and worth (Alkin, 2004).

The evaluator using the CIPP model involves representative stakeholders to assist in question definition, to shape evaluation plans, and review and disseminate reports (Stufflebeam, 2001). This panel is the primary group the evaluator works with and is crucial for the success of the

evaluation (Alkin, 2004). The evaluator regularly communicates the formative information produced by the evaluation so stakeholders can make decisions about the program.

The CIPP evaluation model belongs to the improvement/accountability category of program evaluation and is one of the most widely applied models. CIPP is designed to systematically direct both evaluators and stakeholders in posing appropriate questions and conducting assessments at the beginning of a project (context and input evaluation), while it is in progress (input and process evaluation), and at its end (product evaluation) (Lippe & Carter, 2018).

Context Evaluation

Context evaluation is often referred to as needs assessment. It addresses the question of what needs to be done and assists in identifying problems, assets, and opportunities within a defined community and environmental context (Stufflebeam & Shinkfield, 2007). According to Stufflebeam and Shinkfield (2007), the primary objective of context evaluation is:

- to define the context
- identify the target population and assess its needs
- identify opportunities for addressing the needs
- diagnose problems underlying the needs
- identify resources that could be called upon to help meet the needs
- judge if project goals are appropriately responsive to the assessed needs
- provide a basis for setting improvement-oriented goals

Methods for context evaluation can include system analyses, surveys, document reviews, secondary data analyses, and interviews (Stufflebeam, 2003). A substantive amount of the

information can be obtained from primary stakeholders, including program administrators, the community, and students and faculty within the program. Summarized context evaluation data are shared with stakeholders for review and clarification (Lippe & Carter, 2018).

Product Evaluation

Product evaluation identifies and assesses project outcomes. The purpose of product evaluation is to measure, interpret, and judge a project's outcomes by assessing their merit, worth, significance, and probity. Its main purpose is to ascertain the extent to which the needs of stakeholders were met (Stufflebeam, 2003).

Stufflebeam and Shinkfield (2007) suggest that a variety of techniques, which help validate and verify findings, should be used to assess a comprehensive set of outcomes. The range of techniques used in product evaluations includes logs of outcomes, interviews of stakeholders, case studies, focus groups, document/records retrieval and analysis, achievement tests, rating scales, trend analysis of longitudinal data, and comparison of project costs and outcomes.

Product evaluations identify and assess short-term, long-term, intended, and unintended outcomes (Stufflebeam, 2003). In student-centered educational contexts, they assist evaluation users in keeping their focus on meeting the needs of students; assess and record their level of success in reaching and meeting student's targeted needs; identify intended and unintended consequences; and make informed decisions to continue, stop, or improve the effort (Stufflebeam, 2003). Obtaining feedback about achievements is important both during an activity cycle and at its conclusion. Product evaluations are used to decide whether a given program, project, service, or other enterprise is worth continuing, repeating, and/or extending to other settings. Product evaluation should provide direction for altering, adjusting, or replacing

the program so the institution will more cost-effectively serve the needs of all intended beneficiaries (Stufflebeam, 2003).

Research Design

To determine the relationship between student ratings of course satisfaction and student perceptions of LMS use in a F2F course, a quantitative, non-experimental approach was used. The study used the entire population of F2F credit bearing course survey responses.

Stakeholders

CIPP emphasizes the involvement of representative stakeholders throughout the process, to assist in question definition, to shape evaluation plans, and review and disseminate reports (Stufflebeam, 2001). In particular, the stakeholders help focus the evaluation, make sure their most important questions are addressed and provides appropriate information to aid decision making and to produce a record of accountability (Alkin, 2004). The School of Academic Support has the primary responsibility to provide both guidance and service to all college faculty. Within this school, the Department of Technology Enhanced Learning is charged with providing college-wide training for all staff and students, and includes the administration of several learning platforms. For the purpose of this research, Deb Loper, the Dean of Academic Support, and I, the Director of Technology Enhanced Learning (TEL) are the primary stakeholders of the completed evaluation, as it has the potential to inform improvements in teaching practice. Martin Kollman, the Instruction and Learning Administrator, is directly responsible for developing and delivering faculty training on Canvas and assisted in validating and administering the research instrument (quantitative survey). Lucas TenHarmsel, Training and Learning Coordinator, administers the staff and student learning portal and will work with Martin to create and implement an appropriate training curriculum based on the data collected

from the survey. Both of these individuals should be considered the primary beneficiaries of the evaluation. The focus of the evaluation is on determining the initiatives and training needed to increase the effectiveness and ease of use of Canvas, which will lead to higher levels of student satisfaction.

Potential Participants

For the purpose of this evaluation, all currently enrolled students in Fall 2018 credit-bearing courses were potential participants. This population included both traditional, full-time students (average age 24) and non-traditional, part-time students (average age 38), and is made up of approximately 60% females and 40% males. Nearly 60% of students are White, 18% are Hispanic, and 3% are US Minorities, with approximately 19% not reporting race/ethnicity (Colorado Mountain College, 2018). The majority of students (62%) live in CMC's service district (counties served by and taxed to support CMC), while 2% are within the Service Area (counties served by, but not taxed to support CMC), 7% live In State, and 6% come from Out of State (Colorado Mountain College, 2018). The remaining 23% of students are noncredit students, who do not have to report their residence in order to participate in courses. Students participating in the research were not considered part of a vulnerable population nor do they have substantive language differences. While noncredit courses do have the option to use Canvas (at the instructor's discretion), the minimum usage requirement only applies to credit-bearing classes. Therefore, those students enrolled exclusively in noncredit courses, including those taking developmental, ESL, or remedial courses were excluded from the evaluation.

The sample population data derived from the instrument did not include demographic characteristics such as part-time/full-time status, race/ethnicity, or gender. These omissions, in particular the last two, were made in part because this was the first time students were surveyed

about technology use at CMC and it was decided to keep the instrument as short as possible. More importantly, the intent of this research was to encourage higher respondent completion rates and it was felt these types of questions might be a hindrance to that end. Additionally, in order to be enrolled in a F2F course, it was also assumed students were either in district or within the Service Area of CMC and would access the course at one of twelve available campuses.

Instrument

The instrument used to collect data was an existing anonymous quantitative online survey comprised of 20 questions (Appendix C) developed by the Department of Technology Enhanced Learning at CMC. The first two questions were used to qualify if a respondent met the subject criteria (credit student taking at least one F2F course). The next six questions (3-8) asked for demographic data including the following characteristics: campus(es) attended, certificate/degree program enrolled in, credits taken, age, previous LMS experience. Questions 9 and 10 dealt with respondent perceptions and expectations of LMS tool usefulness and how effectively these tools were used in their F2F courses. Questions 11-13 focused on Canvas tool usefulness measures, while questions 14-18 were specific to LMS tool ease of use and included a conditional question (17) to better understand why the ease of use measure (Track My Progress) was low on the previous question (16). The final two questions (19 and 20) asked about the respondent's overall satisfaction with usefulness and ease of use of Canvas tools used in F2F courses.

Data Collection

This survey was deployed during the fall 2018 semester. The link to the survey was available to participants (as noted above) for a two-week period beginning in the eighth week of the semester and was posted to an announcement in Canvas and CMC's internal portal, Basecamp. The data collected focuses on the relationship between student satisfaction and the

use of Canvas in their face-to-face courses at CMC. Additionally, the relationship between student expectations regarding the use of specific learning activities within Canvas, and their level of satisfaction was explored.

The survey measures for LMS use and student course satisfaction were Likert scale survey items. Responses to these survey measures were averaged to determine values for the independent and dependent variables. The independent variable is LMS use in F2F course. To determine the LMS use variable, responses to the survey Likert scale items were averaged. In responding to the survey, students rated LMS use with a standard five variation Likert scale minus the neutral response: 1 - Strongly Disagree, 2 - Disagree, 3 - Agree, 4 - Strongly Agree.

The dependent variable in the study is student course satisfaction. This variable was calculated as an average based on the survey measures of Usefulness and EOU. On the survey, each of these was rated on a four-point Likert scale. The usefulness measure, "The Canvas tools used added value to my learning experience," and ease of use measures, "The Canvas tools used were easy to use" were rated as 1 - Strongly Disagree, 2 - Disagree, 3 - Agree, 4 - Strongly Agree. Further, to determine if a students' school or student classification influences the relationship between Canvas use and student course satisfaction, these subgroups were examined. The categories for CMC Schools are Business, Humanities & Social Sciences, Communication, Arts, & Media, Nursing, Health Sciences, & Public Safety, Science, Technology, Engineering, & Math (STEM), and Tourism, Hospitality, & Recreation. The categories for student classification are Freshman, Sophomore, Junior, and Senior.

Survey Considerations

All survey materials were ADA compliant and no additional accommodations were needed for respondents to participate.

Confounding Variables

Potential confounding variables include:

- Age
- Student Classification (Freshman, Sophomore, Junior, Senior)
- Student type (Commuter, Residential)
- Program/Discipline
- Faculty aptitude in using Canvas
- Technology self-efficacy
- Digital-literacy (prior Online course experience)

Validity

To support the validity of the quantitative data, I used the content validity approach. Content validity involves gaining feedback from reviewers with some expertise and subject matter knowledge as to how appropriate survey items seem (Litwin, 1995). In order to attain this type of validity, I asked the following CMC staff to review each item and rate each survey item and the survey as a whole for appropriateness and relevance to LMS use and student satisfaction: LMS Administrator, Director of Assessment, two full-time faculty, Institutional Research Analyst, and two Assistant Deans of Instruction. In addition, I piloted the survey in one course currently being taught by each of the two full-time faculty reviewers listed above. As pilot testing helps identify errors (typographical mistakes, unclear or ambiguous instructions, etc.) in form and presentation of the survey, the feedback from these pilots was used to make the survey easier to read and understand (Litwin, 1995).

Data Analysis

For this study, multiple numerical analyses were used. First, descriptive statistics were used to describe the data. The descriptive statistics include the number of survey responses per semester, the number of survey responses from each degree or program, and the number of survey responses from each student classification. Data was analyzed using quantitative techniques and included a variety of tests and analysis, including linear regression, t-tests, Chi-squared, and correlation. These focused on the relationship between student satisfaction and the use of Canvas in F2F courses and controlled for student characteristics and programs for which respondents were currently enrolled. Additionally, the correlation between student satisfaction and expectations for Canvas use in F2F courses was explored. The primary goal of the CIPP evaluation model is to improve program outcomes. This requires engaging stakeholders throughout the evaluation. Once all data from the survey was collected and analyzed, the group of primary stakeholders and beneficiaries met, as necessary, to develop and make recommendations for improvements to the use of Canvas in F2F courses.

A correlation analysis was performed to look at all of the responses for usefulness and ease of use for Canvas use. By averaging the survey Likert scale items, the researcher was able to compute independent and dependent variables that can be examined using correlational analysis. Correlations were calculated to examine the relationships between students' perceived usefulness and ease of use of Canvas tools and students course satisfaction for F2F courses. These correlations illustrated the strength and direction of these relationships (Cohen, Cohen, West, & Aiken, 2013). The correlations were then compared to determine a relative ranking. By ranking the correlations, the researcher was able to determine which component of the TAM model (usefulness, ease of use) had the strongest correlation with student course satisfaction.

Statistical significance will be determined using the accepted standard alpha level of 0.5 (Lavrakas, 2008). This analysis was repeated within each school and student classification category to see if the results differed for these subgroups. Research questions were viewed based on whether or not significant relationships were found.

Limitations

One of the major limitations of this study was the exclusion of technology self-efficacy (TSE) and technical support questions. While these are both important factors of successful technology acceptance and adoption, they were outside the scope of the research for practical reasons. The first reason had to do with the additional number of questions these topics would have added to the survey. Since this was the first time students were asked about their experience with the use of LMS tools in their F2F course, the survey instrument was purposefully limited to twenty questions to ensure it could be taken quickly. In order to adequately engage students meaningfully regarding their perceptions of technology self-efficacy and technical support the number of questions would have been considerably higher and added more complexity for respondents. Secondly, the research was focused on components of the TAM and their relationship to satisfaction. While TSE and technical support contribute to both the perception of usefulness and ease of use, they are secondary measures of acceptance, adoption, and satisfaction. Therefore, it was thought best to keep the initial survey used for evaluation of the Program within a narrower band of inquiry. Other potential limitations to this study included the number of survey responses, anonymous data collection (which does not allow for follow up), self-reported satisfaction that may be due to other factors, and not including faculty as a stakeholder.

Strategy/Professional Development

The results of the evaluation have served the following purposes: 1) to guide and support the staff of TEL in making data-driven decisions regarding the training needs of faculty and students, 2) to add to the limited literature surrounding the relationship of learning management system use in F2F courses and student satisfaction, and 3) to gain invaluable higher education program evaluation experience to apply to my professional work in Academic Affairs.

Within TEL, the Canvas and Learning administrators have responsibility for creation, curation, and oversight of teaching and learning training resources. The minimum use standards for Canvas, introduced by College leadership, while beneficial, were not grounded in any particular pedagogical or learning context or practice, but rather a reaction to the underutilization of a costly technology to the institution. Based on this evaluation, the TEL staff now have a greater understanding of the needs of students, with the potential to optimize the use of Canvas in order to increase student satisfaction.

The evaluation has also further illuminated the role student satisfaction plays in improving persistence. As the Director of TEL, I will share this data with the School Deans and Vice President of Academic Affairs, as well as to college leadership more broadly, in order to secure additional funding for instructional designers and other technical specialists to carry out recommendations to improve current practice. On a college-wide level, advisors, counselors, and other student affairs professionals may use the data to identify gaps in technology literacy for students and faculty, to better articulate the impact of technology use or not in the F2F classes, and to provide students with a clear understanding of expectations as they enter the classroom.

While this evaluation was not generalizable in the greater context of higher education, it has contributed another reference data point to the discussion and the research of the relationships between technology use, student satisfaction, and persistence. Current research has focused primarily on these three factors within the context of online learning or web-enabled distance learning via LMS. However, little data regarding those factors and the impact on F2F classroom practice is available. The intent is to use this initial research as a jumping off point to better understand and reframe the conversation with respect to all modalities of learning (online, F2F, and hybrid) and to identify the best use of LMS in these situations, in order to augment the student experience. Presenting or publishing any findings based on this evaluation is at the discretion of Deb Loper, the Dean of Academic Support. In discussing this evaluation and the data collected, other colleagues with similar focuses on student persistence may be able to add additional context or understanding to this issue and/or collaborate on future research.

The experience and practical skills I acquired through this research process have been an invaluable tool and aid in my current work in Academic Affairs as Director of TEL at CMC. My job requires the oversight and evaluation of multiple staff and technology-focused projects, which affect faculty, students, and staff. To this point, the use of data in decision-making has been limited and research specific to technology use in learning environments has been even less. The research process undertaken in this program evaluation has the potential to serve as a template for many other initiatives tasked to my department. On a broader level, the skills acquired have proven useful to other work done in Academic Affairs as part of a reorganization. Additionally, our accrediting body, HLC, has directed CMC to strengthen our assessment at the course, program, and institutional levels. Understanding how to conduct an evaluation that can

help answer questions regarding efficacy, learning outcomes and ways to improve has given me opportunities for continued professional growth and development.

Chapter IV: Findings

Purpose

The purpose of this research was to examine the relationship between Canvas use and student satisfaction in F2F courses at CMC. A student's experience within a course, including the use of a LMS, influences their course satisfaction and impacts their decision to persist. As LMS tools support a wide range of teaching and learning activities, it is important educators know which instructional tools to use and how to use them appropriately in order to have a greater impact on student learning (Arabie, 2016; Baghdadi, 2011). Furthermore, student input regarding the overall LMS environment can positively impact satisfaction. This can be achieved through designing and providing more student-centered tools within the LMS (Sorenson, 2016; Zanjani, Edwards, Nykvist, & Geva, 2017). By considering the responses of students who partake in technology-enabled F2F courses, CMC can better understand what contributes to student course satisfaction (Liaw, 2008). This practice can lead to more effective implementation of LMS tools, which meet student expectations for quality learning (Baghdadi, 2011).

Statistical Tests Used

Correlation, t-tests and Chi-squared are statistical tests performed to test whether or not the relationship between two variables is significant. Regression analysis (Linear, M-estimation) is a group of statistical processes for estimating the relationship among variables (in particular between dependent and independent variables). These tests generate values, such as R-Squared,

P-Value, and Effect Size. R-squared is a measure of how accurately the output variable can be predicted by the input variables in the regression. R-squared falls between 0 and 1; results closer to 1 indicate a more accurate prediction. A P-Value represents the probability that the observed results would be seen if no correlation between the variables exists. A lower P-Value means more correlated data. How large the correlation between two variables is measured by the Effect Size. The Effect Size is measured in different ways depending on the type of statistical test performed. Examples are Cohen's d, Pearson's r, and Cramer's v. The larger the effect size value, the more correlated the variables are to each other.

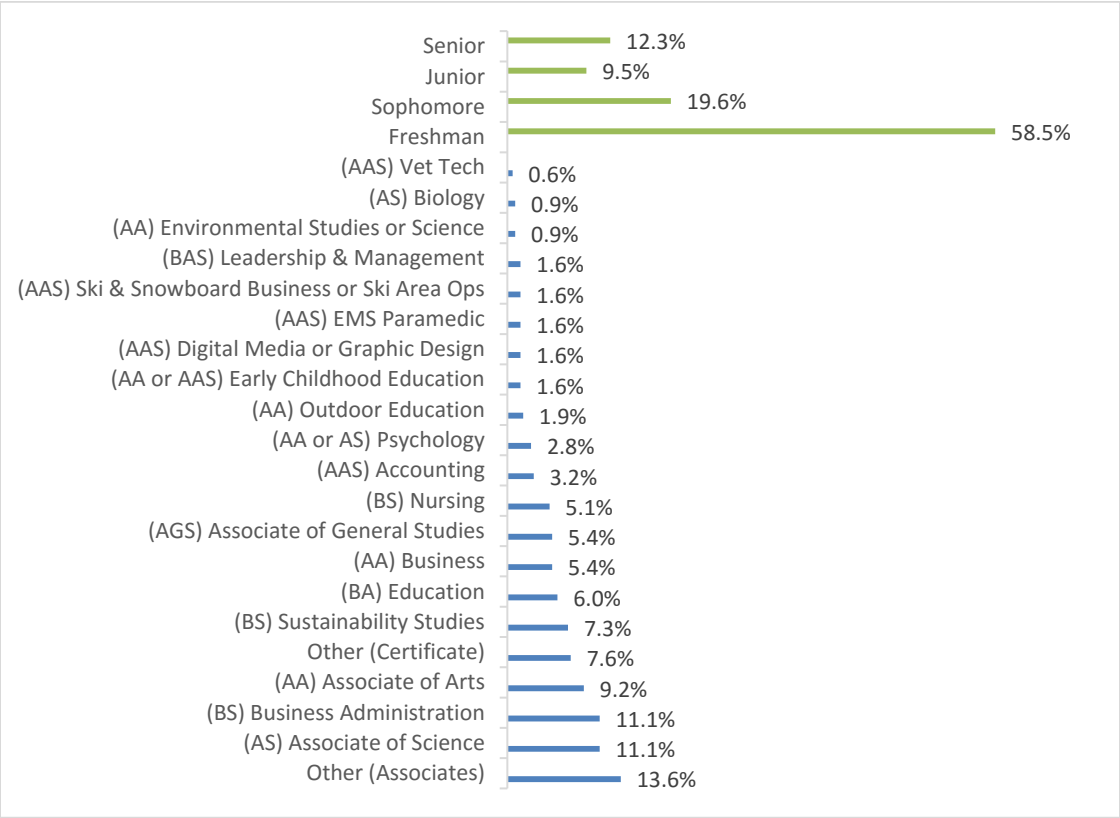
Descriptive Statistics

Sample Population

During a two-week period of the Fall 2018 semester, 438 online survey responses were collected. This represents approximately seven (7) % of total credit students enrolled (n=6376) at the institution during that semester. After excluding those respondents who were not enrolled in a face to face credit course, out of 325 responses 78.2% of respondents identified as a commuter, with 21.8% identifying as a residential student. Nearly half of respondents indicated belonging to either the school of Business (21.2%) or Humanities and Social Sciences (26.9%), while another 27.9% were in a certificate or non-school affiliated (general AA, AAS) program. Out of 316 responses, the majority of respondents (58.5%) had taken under 30 credits (Freshman), 19.6% had taken between 31-60 credits (Sophomore), 9.5% between 61-90 credits (Junior), and 12.3% had taken 90+ credits (Senior). The majority of respondents (71.5%) were under 30 years old, 22.8% were 31-50 years old, and 5.7% were over 50 years in age. Additionally, 243 (76.9%) of respondents had prior experience with a learning management

system. Survey responses per student classification and certificate/degree program are presented in Figure 3.

Figure 3 Classification and Degree Program



As Usefulness and Ease of Use (EOU) are critical elements of TAM and directly affect student satisfaction, measures for both the Usefulness (Q11-Q13) and EOU (Q15-16, Q18) of Canvas tools were calculated. All of these questions used a 4-point Likert scale: 1 - Strongly Disagree, 2 - Disagree, 3 - Agree, 4 - Strongly Agree.

Questions #11 and #12, inquired about the respondent's experience with Canvas tools and how they either enhanced learning or improved grades, respectively. Question #13 was intended to capture the overall perception of Canvas tool usefulness in F2F courses by respondents.

Questions #15 and #16, inquired about the respondent's experience with Canvas tools and how they either improved communication or allowed progress to be tracked, respectively. Question #18 was intended to capture the overall perception of Canvas tool ease of use in F2F courses by respondents.

The Usefulness measures of Enhanced My Learning and Improved My Grades (Questions #11 and #12) were used to create an overall Usefulness variable. The Ease of Use measures Communicate with Others and Track My Progress (Questions #15 and 16) were used to create an overall Ease of Use (EOU) variable. Measures of central tendency can be seen for all of these variables in Table 1.

Table 1 Measures of Central Tendency for Usefulness and Ease of Use Variables

Variable	**Mean**	**Median**	**Mode**	**Standard Deviation**
Usefulness				
Enhanced My Learning	3.13	3	3	0.823
Improved My Grades	3.19	3	3	0.836
Overall Usefulness	3.5	4	4	0.734
Ease of Use				
Improved Communication	3.13	3	3	0.823
Track My Progress	3.62	4	4	0.693
Overall Ease of Use	3.51	4	4	0.679

As can be seen in the data above, all of the Usefulness and EOU variables demonstrate measures of central tendency within the Agree to Strongly Agree range. While slightly higher, the scores for the overall Usefulness and EOU variables lend validity to the other two specific variables used to create them.

Satisfaction measures for Usefulness and EOU were captured in Questions 19 and 20, respectively, and rated on the same 4-point scale as the Usefulness and EOU variables. These were used to assist in validating whether or not Usefulness and EOU are in fact highly suggestive of Satisfaction.

Table 2 Measures of Central Tendency Aggregated and Satisfaction Variables

Variable	**Sample Size**	**Median**	**Mean**	**Mode**	**Standard Deviation**
Aggregated					
Ease of Use	287	4	3.66	4	0.650
Usefulness	299	4	3.45	4	0.710
Satisfaction					
Satisfaction - Usefulness	284	3	3.37	4	0.728
Satisfaction - EOU	284	3.5	3.41	4	0.685

Mean scores for all variables in Table 2 demonstrate ratings between Agree and Strongly Agree, but, generally speaking, mean and median scores for Satisfaction were slightly lower than for the Ease of Use and Usefulness aggregated variables.

CIPP – Context

Within the CIPP model, Context evaluation is a form of needs assessment. Context evaluation strives to better understand program beneficiaries and the needs to be addressed by the program. As the target population of the program was students, it was necessary to gather research to assess student needs and to identify opportunities for addressing those needs within the current program.

The mandated use of specified tools in the Canvas LMS was made presumptively by upper administration at the college and was subsequently adopted by the faculty senate. Student input in the process was not elicited in determining the particular tools chosen. While CMC has much data available about current students, none of it was used in the context of determining the ideal Canvas tool usage standards to adopt, student expectations for their use, or what impact on the student experience they might have. The data obtained through the survey is instrumental in creating a starting point, which better frames the conversation about the goals of the program and, more importantly, how to improve it.

At a deeper level, this evaluation should assist in diagnosing underlying problems in addressing needs and to identify untapped resources that can be called upon to meet those needs. As no specific program goals were identified, other than compliance with the standard, the context evaluation will help in providing a basis for setting improvement-oriented goals for the LMS Minimum Usage program.

Several questions were intended to give a better understanding of current student characteristics, including demographics, LMS experience, and expectations for the use of LMS tools in F2F courses. Many of these characteristics are informative and can be used in combinations to build a profile of particular subsets of students (e.g., sophomore school of Business students aged 30-50) for tailoring of specific course offerings, however, the purpose of this analysis is to view and assess student needs broadly within the LMS Minimum Usage program.

Relationship of Demographics to Usefulness and Ease of Use

Variations in respondent demographics (student type, LMS experience, certificate/degree program, student classification, and campus location) seem to have little effect on perceptions of

the usefulness or ease of use for Canvas tools in F2F courses. This suggests these particular aspects of the CMC student context (with the exception of certificate/degree program and Usefulness variable, which had a significant relationship) should not be viewed as critical contributors in setting improvement goals within the LMS Minimum Usage program. However, when respondents were classified by School, there was a significant relationship with both the Usefulness and EOU (Figures 4 and 5, respectively). This may indicate the nature of School-specific Canvas usage is a contributing factor in the respondent experience with Canvas tools used in their courses. Schools have the latitude to use Canvas well beyond the Minimum Usage program, and, in fact, some do encourage greater use because it is expected by students enrolled in those programs.

Based on a paired samples T-test, there is no statistically significant relationship between a respondent's student type (M = 3.4, SD = 0.7) or prior LMS experience (M = 3.5, SD = 0.7) and the Usefulness variable $t(298) = 4.29$, $p = .135$ and $t(298) = 12.5$, $p = .542$, respectively. There is also no statistically significant relationship between a respondent's student type (M = 3.69, SD = 0.7) or prior LMS experience (M = 3.7, SD = 0.7) and the Ease of Use variable $t(286) = 1.36$, $p = .533$ and $t(286) = 1.22$, $p = .292$, respectively. Correlation analysis of responses indicates no statistically significant relationship between campus location(s) $r(n = 299) = .08$, $p = .159$ and the Usefulness variable or between campus location(s) $r(287) = .05$, $p = 0.361$ and the EOU variable. There is also no statistically significant relationship between a respondent's certificate/degree program $r(287) = .02$, $p = .785$ or student classification $r(287) = -.06$, $p = .300$, and the EOU variable or student classification and the Usefulness variable $r(299) = -.01$, $p = .825$. However, there is a subtly positive correlation between a respondent's School classification $r(240) = .22$, $p < .001$ and the Usefulness variable and a respondent's School

classification and the EOU variable $r(229) = .16$, $p < .015$.

Figure 4 Relationship between School and Usefulness Variable

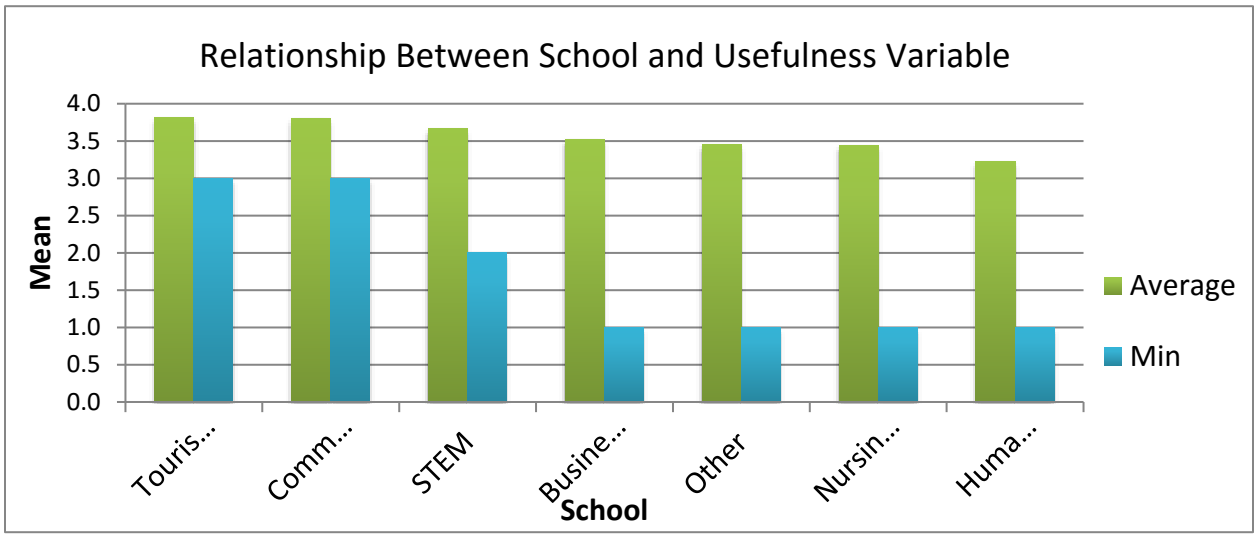
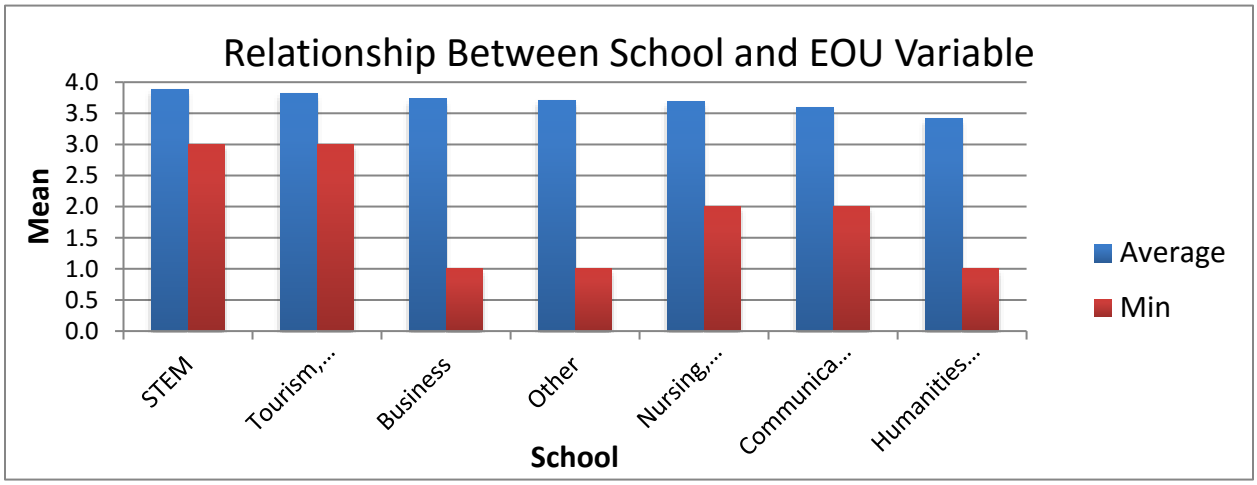


Figure 5 Relationship between School and EOU Variable

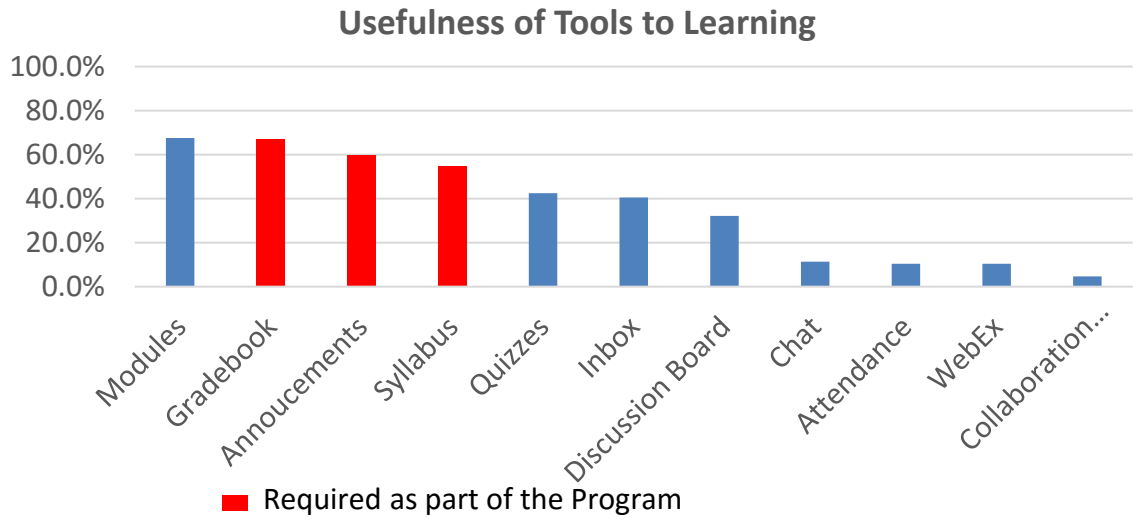


Usefulness to Learning of Required Tools

The data suggests the program is generally meeting the expected use of the tools students find useful to their learning, with the exception of three tools perceived as only moderately useful. Certainly, having this type of information prior to the start of the program would have been preferable and better informed decision making.

Question 9 provides meaningful context regarding the specific LMS tools respondents find useful to learning and, therefore, the tools they would expect to be used. Looking at Figure 6, there are three clear categories of usefulness indicated (high, moderate, low). Four of the eleven tools can be considered having high usefulness, with over 50% of respondents selecting them: Modules (67.6%), Gradebook (67.2%), Announcements (58.5%), and Syllabus (54.8%). Those with moderate usefulness are Quizzes (42.5%), Inbox (40.5%), and Discussion Board (32.1%). Chat (11.4%), Attendance (10.4%), WebEx (10.4%), and Collaboration (4.7%) were deemed as having low usefulness compared to other tools. It is not known if the differences in these three categories are due to the respondent's relative experience with these tools or the lack thereof. Of the four high usefulness tools chosen, three (Gradebook, Announcements, and Syllabus) are required to be used in some way as part of the current LMS Minimum Usage program.

Figure 6 Usefulness of Tools to Learning

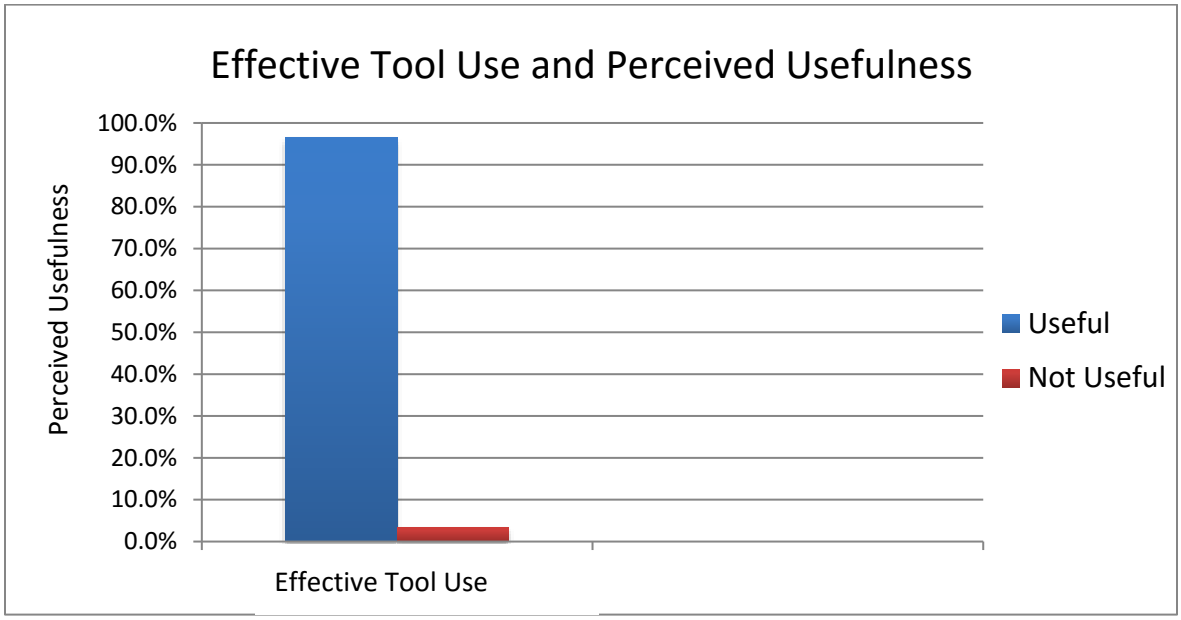


Effective Tool Use and Perceived Usefulness

For a majority of respondents, the data suggests if a faculty uses a Canvas tool effectively, then respondents tend to find them more useful. Additionally, the overall data suggests student expectations for the use of Canvas tools (including those which are part of the LMS Minimum Usage program) are being at least partially met.

Question 9 in the survey gauges respondent perceptions of effective Canvas tool use, based on the tools self-indicated in Question 8 as being useful to learning, and whether or not the current program meets expectations for tool usage. Of those surveyed 96% of respondents (n = 299) indicated either All or Most faculty effectively used the tools students believe to be important to their learning. Almost one-fifth (19.4%) of respondents indicated the tools were not used effectively by either *Some* or *None* of the faculty in their F2F courses. The results of the Chi-squared test indicate there is a strong relationship between perceived effective tool use indicated by respondents in Question 10 and respondents overall rating of the usefulness (Q13) of the Canvas tool used $X^2(12, n = 299) = 121, p < .001)$. In other words, it is not enough to use the tools students deem useful, they must be used well by faculty, otherwise, they have no value to students. There is also a strong statistical relationship between perceived effective tool use from Question 10 and respondents overall rating of the ease of use of the Canvas tools used. Having nearly 20% of respondents indicate the ineffective use of Canvas tools in their F2F courses does represent a considerable gap between expectation and actual experience. The relationship between effective tool use and perceived usefulness can be seen in Figure 5.

Figure 7 Effective Tool Use and Perceived Usefulness



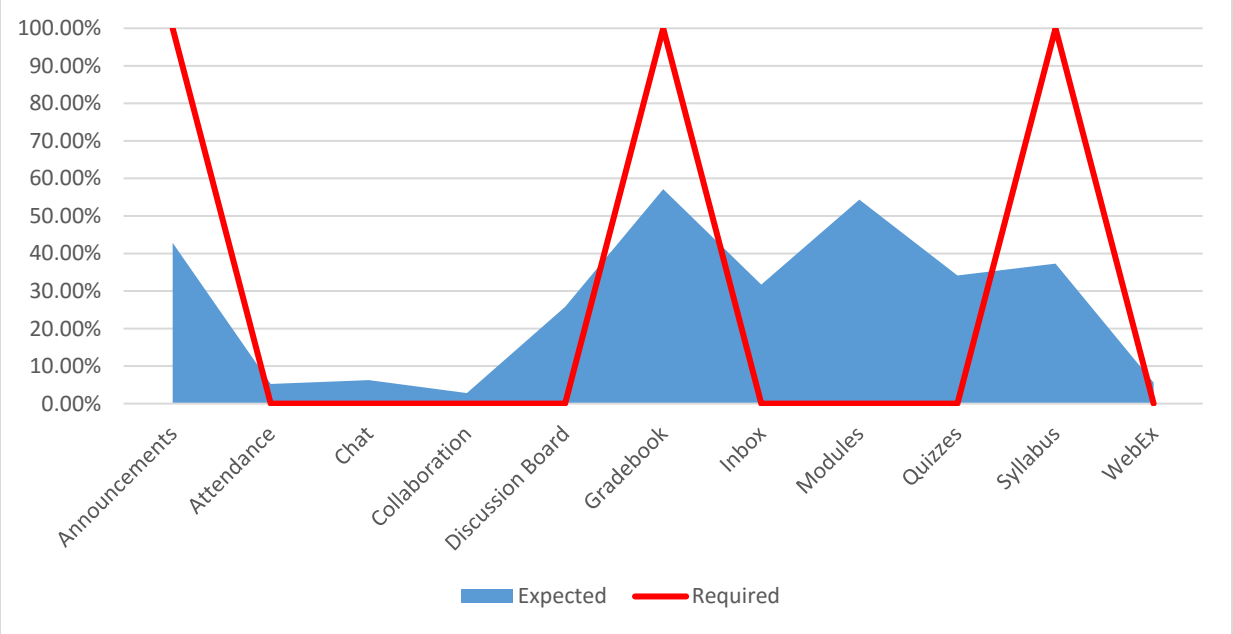
Expected Versus Required Tool Use

The data suggests a noticeable gap in the respondent's expectations of tool usage versus the actual requirements of the program. If tool usage aligned with expectations to a greater degree, it is logical to suggest students would have increased motivation to use Canvas.

Questions 9 and 14 provide meaningful context regarding the specific LMS tools respondents find useful and easy to use and were used as a proxy for the tools they might expect to be used in a course. If this data was known before the implementation of the program, the choices made for minimum usage might have varied from those actually adopted. Looking at Figure 8, there are two clear categories of ease of use indicated (high and low). Seven of the eleven tools can be considered having high expectations of use, with at least 30% of respondents selecting them: Gradebook (57.1%), Modules (54.4%), Announcements (42.9%), Syllabus (37.3%), Quizzes (34.2%), and Inbox (31.7%). Discussion Board (25.8%), Attendance (19.5%), Chat (15.7%), WebEx (10.5%), and Collaboration (7.7%) were deemed as having low expected

use as compared to other tools. It is not known if the differences in these three categories are due to the respondent's relative experience with these tools or the lack thereof. Of the seven high ease of use tools chosen, three (Gradebook, Announcements, and Syllabus) are required to be used in some way as part of the current LMS Minimum Usage program.

Figure 8 Expected versus Required Tool Use



CIPP - Product

Product evaluations identify and assess short-term, long-term, intended, and unintended outcomes (Stufflebeam, 2003). The CMC LMS Minimum Usage program presupposed what the needs of students were in face to face courses and did not elicit their input. In gaining feedback regarding student expectations, how well the chosen tools met them, and the resultant measure of student satisfaction, the department of TEL is better equipped to determine whether the program is worth continuing. Additionally, this evaluation provides direction for altering or adjusting the program, to more cost-effectively serve the needs of all intended beneficiaries.

In determining the outcomes of the LMS Minimum Usage program at CMC and adjustments that need to be made for it to be more effective, student satisfaction is the focus of the Product evaluation analysis. As student satisfaction results from the usefulness and ease of use of the Canvas tools being used, these two variables will be viewed in relation to other variables, but also with regards to the extent of their individual and collective effect on satisfaction.

Tool Usefulness and Satisfaction

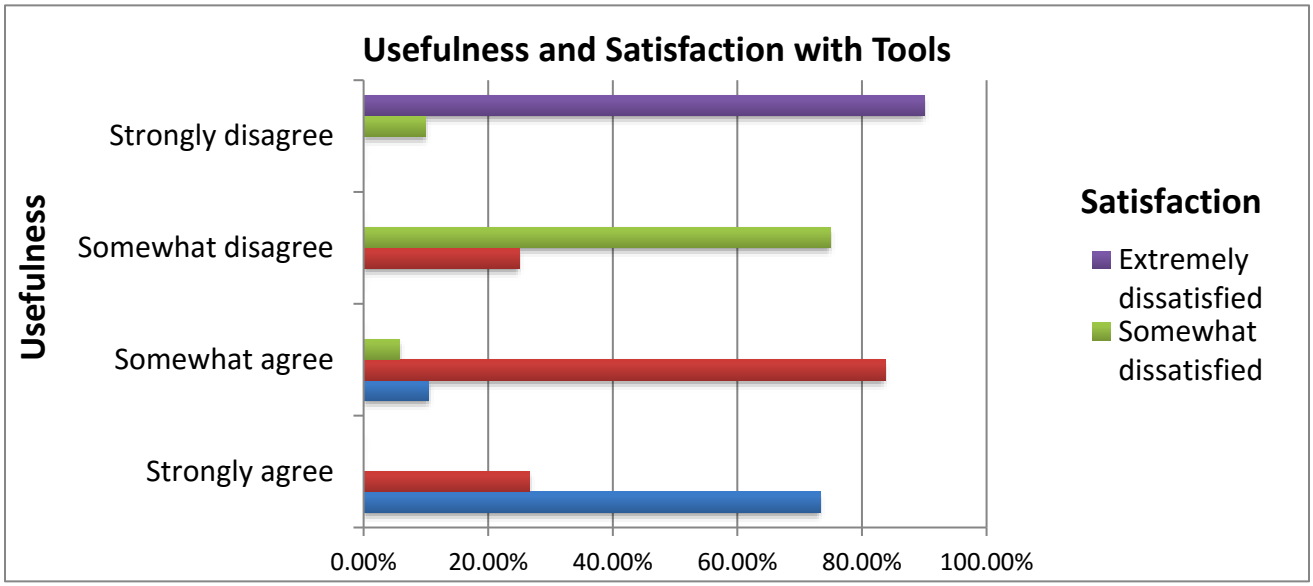
As seen in Figure 9, respondents who indicated the Canvas tools used in their F2F courses to be useful were more likely to also indicate their satisfaction with those tools. This is suggestive of perceived outcomes for the usefulness of these tools exceeding the respondent's expectations. When this is the case, respondents who believe their performance benefits from the use of Canvas tools should be expected to use them more often and derive higher levels of satisfaction as a result.

The Usefulness measures from Question 11 (Enhanced Learning) and Question 12 (Improved Grades) were used to create a Usefulness variable. Question 13, was intended to capture the overall perception of Canvas tool usefulness in F2F courses by respondents and to be used as validation for the Usefulness variable.

Using Chi-squared testing, there is a strong statistically significant correlation among respondents between (Q19) Student Satisfaction - Usefulness and (Q11) Enhanced Learning, $X^2(9, n = 284) = 281$, $p < .001$, and (Q12) Improved Grades, $X^2(9, n = 284) = 216$, $p < .001$. Even more significantly, using Linear Regression, the proportion of student satisfaction with the usefulness of Canvas tools (Q19) that is explained by the overall rating for Usefulness (Q13) is approximately 65% ($R^2 = 0.647$). Correlation Analysis yields similarly strong positive results,

$r(282) = 0.81$, $p < .001$. Correlation Analysis, $r(282) = 0.71$, $p < .001$, and Chi-squared testing, $X^2(9, n = 284) = 330$, $p < .001$, also demonstrate a significant relationship among respondents between (Q20) Student Satisfaction - EOU and (Q13) overall Usefulness.

Figure 9 Relationship between Usefulness and Satisfaction with Tools



Tool Ease of Use and Satisfaction

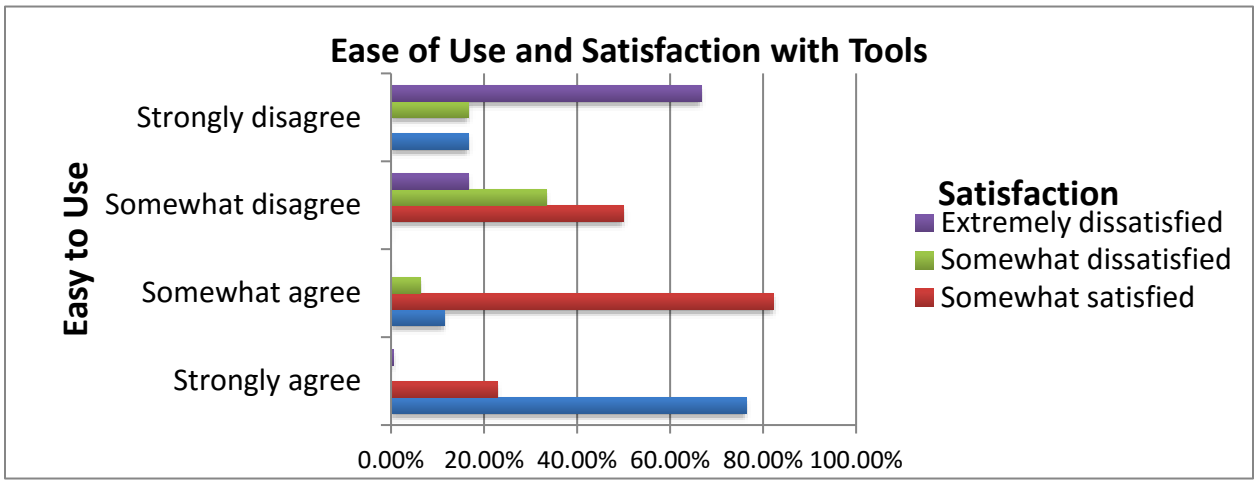
As seen in Figure 10, respondents who indicated the Canvas tools used in their F2F courses to be easy to use were more likely to also indicate their satisfaction with those tools. This suggests the perceived outcomes for the EOU of these tools exceeded the respondent's expectations. Respondents who believe Canvas tools to be user-friendly and/or intuitive should be expected to use them more often and derive higher levels of satisfaction as a result. However, it appears to some degree a minor gap in satisfaction exists for a significant group of respondents in relation to the EOU measurement of Track Progress.

The EOU measures from Question 15 (Improved Communication) and Question 16 (Track Progress) were used to create an EOU variable. Question 18, was intended to capture the

overall perception of Canvas tool ease of use in F2F courses by respondents and to be used as validation for the Ease of Use variable.

Results of the Pearson Correlation indicated there is a strong positive correlation between (Q20) Student Satisfaction – EOU and (Q15) Communicate with Others $r(282) = 0.57$, $p < .001$, (Q16) Track Progress $r(282) = 0.62$, $p < .001$, and (Q18) overall EOU $r(282) = 0.70$, $p < .001$. There is also a strongly positive correlation between (Q20) Student Satisfaction – EOU and (Q18) overall EOU $r(282) = 0.70$, $p < .001$. The vast majority of respondents (n=202), *Strongly Agreed* the Canvas tools used in their F2F course(s) allowed them to track their progress. However, *Somewhat Agree* was chosen by 31% (n = 62) of respondents, which indicates a possible area for improvement.

Figure 10 Relationship between EOU and Satisfaction with Tools



The Relationship Between Ease of Use and Usefulness

When viewed in relation to each other, EOU had a greater influence on Usefulness than the reverse. The interplay of both variables is important, but the data suggests respondents consider the EOU of Canvas tools a slightly more significant determinant of their Usefulness than Usefulness is for EOU. Logically, an easier to use tool, which also allows one to

accomplish tasks effectively would be considered more useful than one that is harder to use, even if it yields the same result. Generally, the natural inclination of technology users is to gravitate to more intuitive, user-friendly tools, provided they perform to expectations.

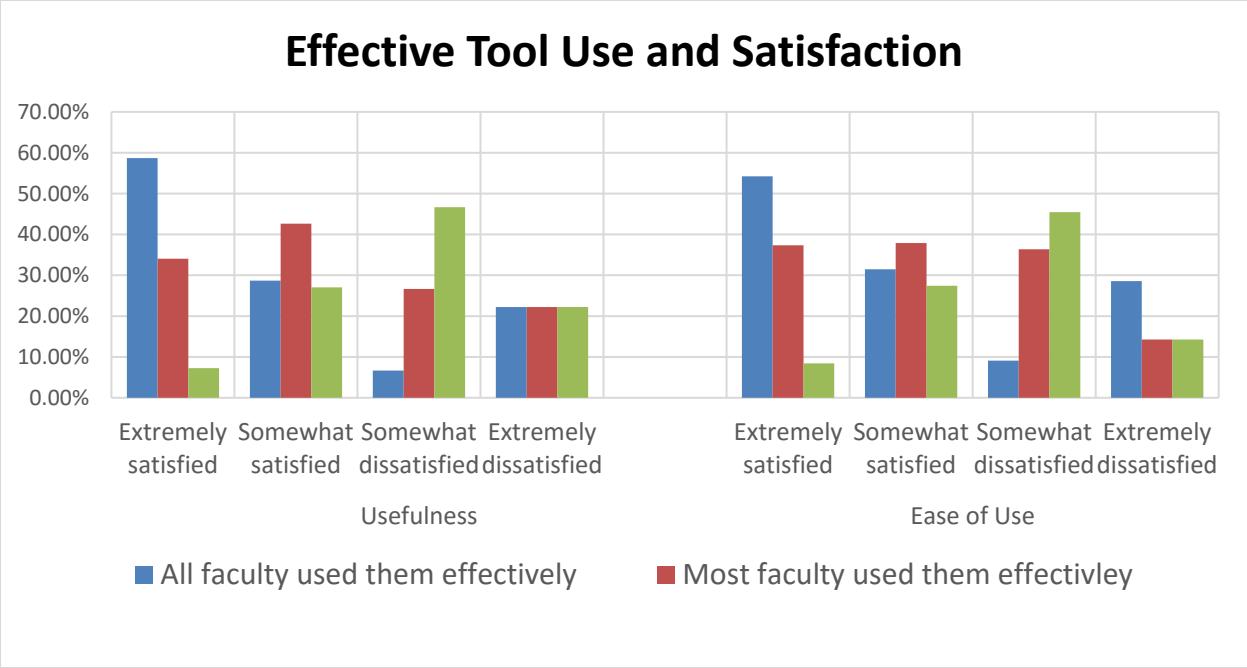
Questions 13 and 18 were overall measures of Usefulness and EOU, respectively. Using correlation analysis, there is a strongly positive relationship and positive influence between (Q18) Overall EOU and (Q13) Overall Usefulness $r(282) = 0.71$, $p < .001$. Chi-squared testing also reveals a strong statistically significant relationship $X^2(9, 286) = 227$, $p < .001$. An M-estimation regression was calculated to predict Overall EOU based on Overall Usefulness, $b = .75$, $p < .001$ between (Q18) Overall Usefulness and (Q13) Overall EOU. The results indicate when the Overall Usefulness score increases by one, the Overall EOU score increases by 0.689. An M-estimation regression was also calculated to predict Overall Usefulness based on Overall EOU, $b = .91$, $p < .001$ between (Q18) Overall Usefulness and (Q13) Overall EOU. The results indicate when the Overall EOU score increases by one, the Overall Usefulness score increases by one as well.

Effective Tool Use and Satisfaction

When faculty utilized tools, which were both expected to be used and demonstrated aptitude in using them, respondent satisfaction was higher (Figure 11). This suggests student expectations for not only the tools used, but also for effective tool use by faculty is a critical satisfaction component for respondents. Furthermore, in the absence or ineffective use of tools use, it is reasonable to assume students can have a more difficult time accomplishing assigned tasks and/or lose motivation to use Canvas, as it is not viewed as being useful (e.g., helping to improve grades or enhance learning).

Using a Chi-squared Test, there is a strong statistically significant relationship between the effective use of tools (Q10) and both the extent of respondent satisfaction with (Q19) the usefulness of Canvas tools $X^2(12, n = 284) = 132, p < .001$ and (Q20) the ease of use of LMS tools $X^2(12, n = 284) = 129, p < .001$.

Figure 11 Effective Tool Use and Satisfaction



Summary

An online survey was used to collect data from credit students taking F2F courses in order to gauge their satisfaction with the use of Canvas tools in their classes. After running several statistical tests, positive correlations and relationships were found between many variables, including School and Usefulness/EOU, expectations for Canvas tool use and actual use, effective tool use and Usefulness, EOU, and satisfaction, and the impact of EOU on Usefulness. The implications of the findings presented here are discussed in Chapter 5.

Chapter V: Implications and Recommendations

From the outset of the LMS Minimum Usage program, two considerable factors were assumed by those administrators responsible for defining the program: 1) which Canvas tools were to be used (for unspecified reasons) and 2) why those particular tools were important to use. There was also the assumption the prescribed tools would meet a hypothetical, but unknown, baseline of student needs when deployed. Surprisingly, student input was not included in determining the specific Canvas tools to be used and although the Program was approved by Faculty Senate before implementation, faculty input into specific aspects was, at best marginal. In short, the Program was designed without stakeholder input, focused intention, or a plan for implementation, feedback, or control. Realizing the potential disconnect between the purpose of the program and those it intended to benefit, I decided to examine the following research questions.

Q1. To what extent is there a relationship between Canvas LMS use and student satisfaction in F2F courses?

Q2. To what extent is there a relationship between student expectations for the use of Canvas LMS and student satisfaction in F2F courses?

Discussion - Context

All of the CIPP Context research findings presented in Chapter 4, with the exception of Finding 1, affirm the extant literature regarding technology acceptance with respect to the use of

LMS tools. Considering the amount of literature that states otherwise, it was surprising to see there was, generally, no statistical relationship between student demographic characteristics and either Usefulness or EOU in the CMC survey sample. In particular, students without prior LMS experience would be expected to struggle more than those having experience with the tools used (Ghazal, et al., 2018). A difficulty in using the tools would typically lead to negative perceptions of ease of use and usefulness, lowering their acceptance and, ultimately, satisfaction with them (Ghazal, et al., 2018; Alsabawy, Cater-Steel, & Soar, 2016). The majority of the data collected did not align with prior research in this regard. This may be in large part due to the limited sample size, which only accounted for seven (7) % of the total available credit student population. Perhaps, a majority of respondents to the survey without prior LMS experience may have been biased, simply due to higher TSE, towards a more positive perception of the usefulness and EOU of Canvas tools. Those with lower TSE and/or little experience may not have been willing to engage in the survey because they found no usefulness or satisfaction in prior Canvas use or did not feel qualified to participate. More robust datasets are needed in order to complete or at least bring more clarity, to the picture. However, the available data does reveal a few potential points of further inquiry for this apparent contradiction at CMC. The respondent certificate/degree program and prior LMS experience did have a significant statistical relationship with the Usefulness variable. Furthermore, when respondents were classified by the School to which their certificate/degree program belongs, a strong relationship between prior LMS experience and both the EOU variable and Usefulness variable occurred.

Student expectations for Canvas tool use were not known before the implementation of the program, so the potential for those choices to be unsatisfactory in meeting student needs was a strong possibility. Fortunately, this does not appear to be the case, but this lack of context

could have proven to severely limit student adoption within this program. While students do not know which tools might best serve their learning (pedagogically speaking), this is still an important factor in their satisfaction. Additionally, it is to be expected until students are exposed to other effectively used Canvas tools, the rather limited list of tools included in the current program are sufficient to meet most of their needs at satisfactory levels.

Discussion – Product

The CIPP Product findings in Chapter 4 were in line with existing research and did not pose any contradictions to the accepted factors affecting technology acceptance. This is evident when viewing the survey data regarding expectations. Exceeding expectations is always preferable to the alternative and this was the case for those respondents who found Canvas tools to be useful and easy to use. These higher levels of satisfaction are due, in part, because of the perceived performance benefits of using the tools, which reinforces the use of the tools (DeLone & McLean, 2003; Naveh, et al., 2010). Simply put, as students perceive benefits from and become more comfortable with LMS tools, they are more likely to accomplish desired outcomes. This is a critical point to understand as the success of a LMS relies on its early adoption (via satisfaction) and its sustained use (Ghazal, Al-Samarraie, & Aldowah, 2018). Another critical factor in achieving higher levels of satisfaction is the faculty's ability to use the expected Canvas tools effectively. When this is not the case, students recognize the tools may, in fact, encumber learning rather than enhance it (Burling, 2018). Product Finding 4 explicitly addresses this issue and reinforces the importance of faculty competency in using LMS tools. By most accounts, faculty use of Canvas tools, even beyond those prescribed in the Program, was satisfactory in relation to student expectations.

Limitations of This Evaluation

This program evaluation focused solely on student perceptions and experiences of Canvas tool use in F2F courses and the potential impact on their satisfaction. Purposefully, it did not include faculty input as there already exists much research about faculty adoption and use of LMS and there is an abundance of material regarding best practices in the use of LMS tools. This is not to suggest the faculty voice should not be considered in the future, but the primary focus was to see if the current version of the program was sufficient at addressing student needs and concerns. Neither did the evaluation explore digital literacy or self-efficacy for either students or faculty. Thus, the data collected to not specifically account for these additional factors. Considering the potential impact these factors might have with regard to satisfaction, and, by extension, retention, this is an area where additional research is needed. The evaluation was also limited in scope with regard to the CIPP model, focusing on only two components, Context and Product, at the exclusion of Input and Process. This was meant in no way to downplay the importance of those factors, as both would add considerable depth and understanding, and, perhaps, a better fit between expressed stakeholder needs and program design and implementation. However, the lack of documentation and coherent plan surrounding the Program made these too difficult to consider as viable options for the purpose of this evaluation. It is difficult to evaluate that which does not (unfortunately) exist.

Context Implications

General

A relatively small sample size may have skewed the results in favor of those who find Canvas to be useful and easy to use – more data is needed to ascertain if student demographic

characteristics do in fact have a significant relationship or correlation to student adoption and satisfaction with the system. However, certain certificate/degree programs and/or Schools in the aggregate did have a strong relationship with the EOU and Usefulness variables. It is possible the basic nature of the Program had a normalizing effect on student demographic characteristics that otherwise would have been expected to impact EOU and Usefulness measures at some level. In the opposite sense, programs with more robust use of Canvas tools, and a greater degree of expectations for how faculty are to use those tools may influence student perceptions in a positive direction. This would be in line with and reinforce the notion of TAM, wherein greater use of a system and a corresponding positive attitude about its use makes the system more useful and more likely to be accepted.

Continued Feedback/Evaluation of Canvas Usage

Student

In creating a course, which uses LMS tools, student needs and perceptions should be central, as failing to address student expectations can result in decreased involvement and motivation (Bradford, 2011). More importantly, how a student perceives their learning experiences influences both the decision to continue in a course and the degree of satisfaction with their overall technology-based learning experiences (Kenny, 2003).

It is reasonable to assume that high student satisfaction with the use of the LMS indicates it is meeting their needs (DeLone & McLean, 2003; Naveh, et al., 2010). Student satisfaction is an outcome measure of the education process and can be used to gauge the quality of teaching and learning in a course (Munteanu et al., 2010). A more recent study took an approach of measuring and analyzing time spent on a task by students as a way to evaluate the use of the

LMS. With this approach, even if a faculty designed a course with rich features, they were not reported unless students used the feature (Whitmer, Nuñez, & Fortera, 2016).

Faculty

Understanding the process of technology adoption and, in particular, why specific tools were chosen to be used by faculty has considerable organizational implications for LMS utilization and effectiveness (Cubeles & Riu, 2016). One of the main influences of faculty adoption of LMS tools is the degree to which they believe the tool will assist in accomplishing or aiding the desired learning outcomes. In this regard, faculty that do not understand the potential benefits of particular tools, or don't know how to use a tool properly or to its fullest potential present a roadblock to its adoption. By soliciting feedback from faculty with respect to LMS tool use and expectations, additional information and resources can be targeted to specifically address any concerns with adoption or to demonstrate the benefits of adoption. If the instructor believes the available tools in the LMS are sufficient to help accomplish learning objectives, then the LMS is more likely to be viewed positively and used more often (Schoonenboom, 2014).

According to faculty, additional factors that predict satisfaction included ease of use, organizational support, training, attitude, interaction, and self-efficacy (Cheok & Wong, 2015). Overall, understanding faculty perspectives can greatly influence how effectively a LMS is used (Cheok & Wong, 2015).

Product Implications

Training and Support

Faculty

While faculty training and support were not explicitly measured in the survey (Question 9 did address this tangentially), research has shown the importance of these factors in faculty adoption and use of LMS.

Faculty adoption of Canvas has increased since its use was mandated, but many instructors are only utilizing the tools which are required by the program. This represents a gap between the tools being used and those which students find to be the most useful. Adjusting the list of tools to reflect these expectations is a necessary first step, but it has the potential to exacerbate issues if not done with intention. Faculty must receive training to understand not only which tools should be used, but how they should be used, and, more critically, why it is important to use them. The more familiarity a faculty has with LMS tools, the more likely they are to use those (Cubeles & Riu, 2016). As importantly, effective use of LMS tools creates an increased level of comfort for students with course content, which results in higher rates of both retention and satisfaction (Ozkan & Koseler, 2009). Faculty perception of a LMS is a primary driver of its use and if the benefit to student's learning experience is understood properly, this perception would certainly be enhanced (Nachmias & Ram, 2009).

One of the critical external variables that will determine whether a user will accept or not a technology innovation is the level of training and support provided and used by the end-user. Even with the widespread institutional adoption of LMS, many faculty do not feel prepared to teach using the technology (Almeida, Jameson, Riesen, & McDonnell, 2016; Doherty, 2014; He, 2014). In order to ensure faculty have the confidence and skill in using LMS tools, faculty development programs need to be of many types and frequencies (Herman, 2012). This can be as simple as providing multiple opportunities (different days/times) to attend training, receive

instructional support, and these opportunities be in differing forms (e.g., self-paced, instructor-facilitated, F2F, online, etc.) so as to meet individual needs (Herman, 2012).

The Program did include trainings in a variety of venues and formats. However, these training were neither mandatory nor geared to student or pedagogical topics. On the contrary, they were focused on the technical nature of using the prescribed tools – the nuts and bolts of how to build, arrange, and publish, with an eye on getting a large group of faculty up to the minimum standard as quickly as possible. Faculty support is critical to the success of online and web-enhanced education (Burling, 2018).

Student

Technology self-efficacy is associated with students' perception of LMS usefulness, which may contribute to their level of confidence in LMS (Ghazal, et al., 2018). While not explicitly measured in this study, Question 5 did attempt to ascertain the impact of previous LMS experience on student perceptions and expectations. The lack of correlation between these factors in this study stands in stark contrast to the extant literature.

It should also be understood the increased use of technology in the classroom is not necessarily more inclusive for diverse groups of students than traditional teaching methods. Unsupported technology use can result in learning difficulties or even alienation from the learning process by students (Al-Gahtani, 2014; Alsabawy, Cater-Steel, & Soar, 2016; Asiri, Mahmud, Bakar, & Ayub, 2012). Research demonstrates significant relationships between computer anxiety and students' perceived ease of use and usefulness of LMS. Furthermore, computer anxiety is directly linked to the perceptions about technology developed by individuals (Abdullah & Ward 2016; Chang, et al., 2017; Venkatesh & Davis, 1996). Adequate training and

support are critical components to the technology self-efficacy of students, which in turn leads to improved perceptions of usefulness, increased satisfaction, and greater system adoption.

System Design

Focusing resources on optimizing the general usability of a LMS is critical for not only improving the educational impact but also because the failure to do so may have a significant negative effect on learning and teaching (Zaharias, 2009). Inherent to a student's attitude towards the adoption of a LMS, is the degree of difficulty perceived in using the LMS to complete their work assignments (Abdel-Maksoud, 2018). In order to increase satisfaction, instructors must consider student perceptions when implementing LMS tools (Wei et al., 2015). More specifically, administrators and faculty need to determine not only the appropriate mix of tools to be used (e.g., increased usage of tools deemed useful, decreased emphasis on tools deemed less useful), but how the overall system is designed to ensure lower technology anxiety, increased perceptions of usefulness and EOU, and the necessary support structure is in place. In particular, these standards for system design are critical factors for higher-level courses, where the amount of work and interaction with the system often increases. Additionally, when considering the implementation of other tools or functionality, the decision should be more heavily weighted toward perceived usefulness than ease of use.

Recommendations

Faculty Development Program

CMC, via the Department of Technology Enhanced Learning, should employ a variety of training methodologies and modalities for faculty. At other institutions who have implemented successful development programs, faculty have indicated, in preferred order, the following ways

to learn how to use LMS tools: (1) participating in a LMS webinar, (2) participating in one or more LMS sessions at a campus-wide faculty development workshop, and (3) jumping right in and learning by trial and error. The least helpful training method identified was reading a LMS Instructor guide (Judge & Murray, 2017; Rucker & Frass, 2017). Additionally, training should be considered ongoing and may require multiple one-on-one sessions with adjuncts off-site or conducting late group training sessions for new hires prior to the start of a semester. In order to provide the necessary support to faculty, the department of TEL needs to undertake the following activities:

- Develop a tiered menu of Canvas and other modality training from which faculty can choose or be assigned the appropriate resources
- Create a training schedule and resources that include multiple days, times, and modalities
- Create a college-wide support system, which leverages personnel resources (Instructional Designer, Canvas Administrator, faculty champions) for one-on-one consultations and dialogical exchange between stakeholders
- Curate a list of partner training resources (webinars, white papers, course offerings, etc.) for additional development opportunities

Student Training Program

With the current mandate to use Canvas in all F2F courses and the continued growth of technology-enabled courses, it is incumbent upon CMC to provide and promote a technology training program to address technical difficulties students might encounter when matriculating to the institution, and, particularly, during the first semester of attendance. Given the institution serves a diverse and varied group of students, including a significant number of non-traditional and historically underserved students, a robust training program becomes even more critical.

The goal of this training program would be to increase student TSE, with the side benefit of promoting increased Canvas use and adoption. Through this broad program new students would learn how to access and navigate college technology resources, learn how to use Canvas tools, and become familiarized with technologies used in other modalities (e.g., interactive video system, video conferencing, etc.), as well as develop communication skills to participate effectively in multi-modality technology environments. For those degree programs or Schools, which leverage Canvas use (via hybrid, WebEx, or mixed modality course offerings) well beyond the requirements of the Program, tailored training should be developed to address these specific needs as well. An added benefit of a training program specific to student technology needs is to take the additional responsibility of informal technology training away from faculty, so they can focus on teaching and learning in their areas of expertise. Specific activities to be undertaken by the department of TEL include:

- Develop a technology training page in Basecamp (portal), which is accessible to students
- Develop training modules that cover not only the most commonly used tools (and those of the LMS Minimum Use program but give an overview of Canvas navigation and tools identified by survey respondents as being useful
- Incorporate feedback as a means to measure TSE before and after completing the modules and to refine and improve future training

System Design

Well-designed and user-friendly interface is considered as one of the most important factors in determining the students' perceived ease of use and usefulness when using the LMS. Requests for the implementation of additional tools to Canvas should include a description of how the tool will be used by the instructor and how the tool will enhance student learning and/or

improve grades (usefulness measures). Generally, Canvas tools or functionality proposed for adoption should demonstrate a positive and measurable impact for all courses at a specific level, within a degree program, or the college at large in order to justify its implementation. Specific recommendations to the department of TEL include:

- Create and deploy on Basecamp a tool request form, which can be filled out by students, faculty, and staff
- Create a Canvas tool/application rubric to include usefulness and EOU scores
- When choosing an app to meet the expressed need, the rubric should be used as the primary driver in determining the teaching/learning value to faculty and students
- Solicit a committed group of faculty to test and or pilot the new app and give feedback
- Prepare a report of the results for the School Deans in order for them to promote/require the use of the tool
- Create a training schedule and resources that include multiple days, times, and modalities

Program Revision

As stated previously, the Canvas tools chosen to be included in the Program were not based on any feedback from stakeholders. In particular, student perceptions or expectations were not identified. As baseline data for this study does exist now, it should be utilized in order to maximize the value of the Program to students. In this regard, the mandated use of specific Canvas tools should be revised to include the following tools which were rated highly with regard to student expectations for their usefulness to learning:

- Modules
- Quizzes

The usefulness to learning of the following tools below was rated poorly by respondents, so they should be suspended from incorporation into the Program until such time as the appropriate training resources and best practices can be applied to their use:

- Chat
- WebEx
- Collaboration (group sites)

Additionally, it is not known if the nature of a F2F course, the ineffective use of these tools, or a combination of these and other factors is the primary reason for this negative perception, so special consideration should be given to their future use based on more robust data collection and analysis.

Continued Feedback/Evaluation of the Program

Faculty

As faculty input was nonexistent in the original development of the program, their feedback with regard to training needs and/or technology struggles is a critical factor in the success of the Program moving forward. Adjunct faculty, who account for a significant portion of courses taught but often only teach one semester per year, should be considered during the development and deployment. Feedback from the survey will be used to identify any gaps in IT support services, so they can be addressed sufficiently. The department of TEL should undertake the following activities:

- Develop an instrument to help identify faculty TSE and training/support needs relative to the use of Canvas in general, and, more specifically, to its use in F2F classes
- Include questions to identify date, time, and modality preferences for scheduling training

- Deploy the survey twice a year in the fall and spring semesters to allow adjunct faculty to participate
- Create a training schedule (in conjunction with the broader faculty development schedule), which can be posted well in advanced on Basecamp

Student

The success of LMS in academic institutions may be initiated by instructors' acceptance, but its survival can be attributed to students' experience and satisfaction. In order for continuous improvement to be achieved in the LMS minimum usage requirement program, regular and consistent student input and feedback are necessary. In order to accomplish this, it is recommended the department of TEL engage in the following activities:

- Continued use and refinement of the student satisfaction survey, which is to be made available once a year (alternating between the fall and spring semesters)
- Development of a new survey focused on TSE and training/support needs to be deployed in the semesters opposite to the satisfaction survey

This feedback will serve two important purposes: 1) growing and enriching the understanding of the context of the program and 2) providing the means to evaluate the program and to make adjustments attuned to meeting student needs.

Future Research

When considering the potential for further study of the Program, there are several questions which come to mind:

- Would a faculty training program related to feature and tool usage in the LMS lead to a more positive impact on the quality of teaching and overall LMS satisfaction?

- Would requiring a standardized Canvas usage training program for both faculty and students enhance teaching and learning?
- Which features or tools better fit particular circumstances or teaching styles?
- What is the extent of the relationship between TSE and student satisfaction with Canvas use in F2F courses?

In order to address these types of questions and to gain a richer understanding of both student and faculty attitudes and perspectives on Canvas use, it is apparent additional data is needed. The current survey needs revisions to include demographic characteristics, which would help illuminate the sample population fit in regards to the broader student population at CMC. Additionally, surveys inquiring about technology self-efficacy and training/support gaps need to be developed and implemented. The questions for these surveys should include both quantitative and qualitative questions that will provide a more complete picture of stakeholder needs with which to focus resources and efforts within the Department of Technology Enhanced Learning.

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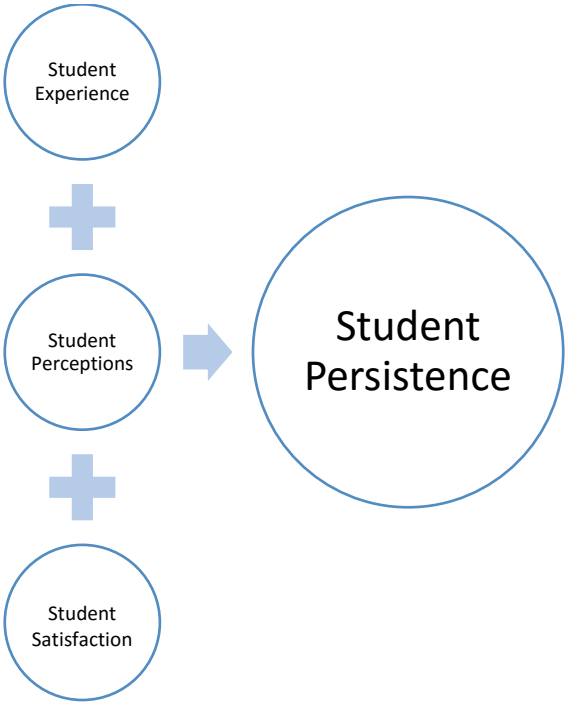
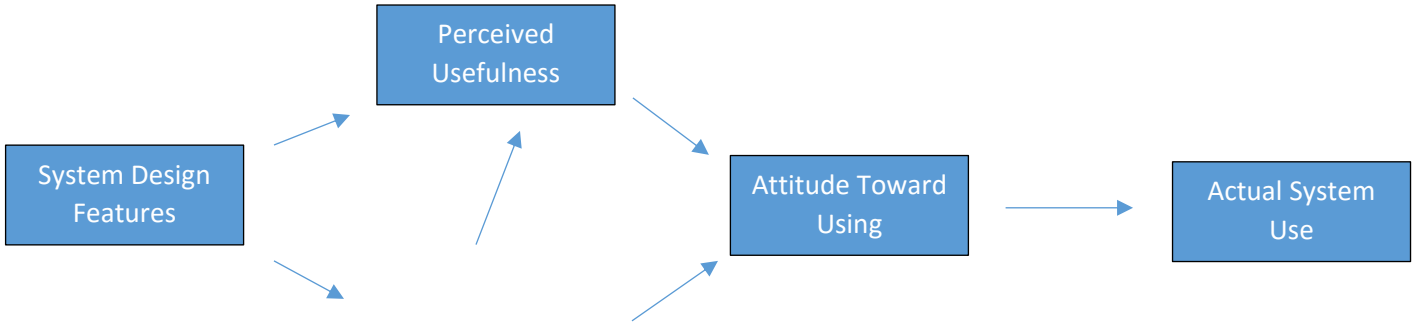
Appendix A

Theoretical and Conceptual Framework Model Graphic

Tinto's Model of Student Persistence (1975)



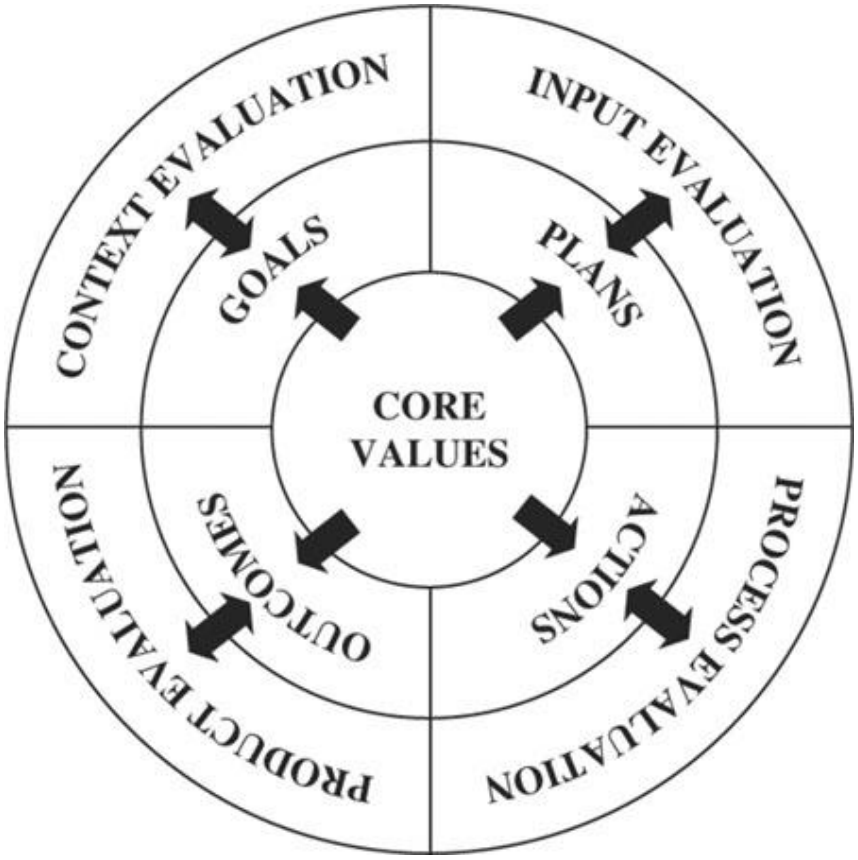
Davis' Technology Acceptance Model (1993)



Perceived Ease of Use

Appendix B

Context, Input, Process, Product (CIPP) Program Evaluation Model Graphic



Appendix C

Q1 Are you taking at least one course for credit this semester at Colorado Mountain College (CMC)?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Are you taking at least one course for credit this semester at Colorado Mountain College (CMC)? = No

Q2 Are you taking at least one face to face (classroom) course this semester at Colorado Mountain College (CMC)?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Are you taking at least one face to face (classroom) course this semester at Colorado Mountain Co... = No

Q3 Which campus(es) do you attend at Colorado Mountain College (CMC)? You may select more than one response.

- [ ] Aspen (1)
- [ ] Breckenridge (2)
- [ ] Carbondale (3)
- [ ] Chaffee County (4)
- [ ] Dillon (5)
- [ ] Glenwood Springs (6)
- [ ] Leadville (7)
- [ ] Rifle (8)
- [ ] Spring Valley (9)
- [ ] Steamboat Springs (10)
- [ ] Vail Valley (Edwards) (11)

Q4 Are you a commuter or residential (live on campus) student at Colorado Mountain College (CMC)?

- ○ Commuter (1)
- ○ Residential (2)

Page Break

Q5 Which certificate or degree program are you currently enrolled in at Colorado Mountain College (CMC)? Please choose one.

- ○ (BS) Business Administration (1)
- ○ (BA) Education (6)
- ○ (BAS) Leadership & Management (2)
- ○ (BS) Nursing (3)
- ○ (BS) Sustainability Studies (7)
- ○ (AAS) Accounting (17)
- ○ (AA) Associate of Arts (9)
- ○ (AGS) Associate of General Studies (10)
- ○ (AS) Associate of Science (11)
- ○ (AS) Biology (24)
- ○ (AA) Business (21)
- ○ (AAS) Digital Media or Graphic Design (13)
- ○ (AA or AAS) Early Childhood Education (12)
- ○ (AAS) EMS Paramedic (5)
- ○ (AA) Environmental Studies or Science (22)
- ○ (AA) Medical Assistant (4)
- ○ (AA or AS) Psychology (23)
- ○ (AA) Outdoor Education (15)

- ○ (AAS) Ski & Snowboard Business or Ski Area Ops (16)
- ○ (AAS) Vet Tech (8)
- ○ Other (Certificate) (19)
- ○ Other (Associates) (20)

Q6 How many credits have you taken at Colorado Mountain College (CMC)?

- ○ 1-30 (1)
- ○ 31-60 (2)
- ○ 61-90 (3)
- ○ 91-120 (4)
- ○ 121+ (5)

Q7 What is your age?

- ○ 16-20 (1)
- ○ 21-30 (2)
- ○ 31-40 (3)
- ○ 41-50 (4)
- ○ 51-60 (5)
- ○ 61-70 (6)
- ○ 71+ (7)

Q8 Have you used an online learning platform (e.g., Canvas, Blackboard, Moodle, etc.) in previous semesters at CMC or another educational institution?

- ○ Yes (1)
- ○ No (2)

Page Break

Q9 Which of the following Canvas tools do you consider the most useful to your learning? You may choose more than one.

- [ ] Announcements (1)
- [ ] Attendance (2)
- [ ] Chat (3)
- [ ] Collaboration (group sites) (4)
- [ ] Discussion Board (5)
- [ ] Gradebook (6)
- [ ] Inbox (messaging) (11)
- [ ] Modules (7)
- [ ] Quizzes (8)
- [ ] Syllabus (9)
- [ ] WebEx (10)

Q10 If the Canvas tools selected above were used in your face to face (classroom) course(s), were they used effectively by the faculty?

- ○ All faculty used them effectively (1)
- ○ Most faculty used them effectively (2)
- ○ Some faculty used them effectively (3)
- ○ No faculty used them effectively (4)
- ○ The tools were not used (5)

Q11 Canvas tools used in my face to face (classroom) course(s) this semester enhanced my learning.

- ○ Strongly agree (1)
- ○ Somewhat agree (2)
- ○ Somewhat disagree (3)
- ○ Strongly disagree (4)

Q12 Canvas tools used in my face to face (classroom) course(s) this semester helped improve my grades.

- ○ Strongly agree (1)
- ○ Somewhat agree (2)
- ○ Somewhat disagree (3)
- ○ Strongly disagree (4)

Q13 Overall, the Canvas tools used in my face to face (classroom) course(s) are useful.

- ○ Strongly agree (1)
- ○ Somewhat agree (2)
- ○ Somewhat disagree (3)
- ○ Strongly disagree (4)

Q14 Which of the following Canvas tools do you consider easy to use (intuitive, user-friendly)? You may choose more than one response.

- ☐ Announcement (1)
- ☐ Attendance (2)
- ☐ Chat (3)
- ☐ Collaboration (group sites) (4)
- ☐ Discussion Board (5)
- ☐ Gradebook (6)
- ☐ Inbox (messaging) (11)
- ☐ Modules (7)
- ☐ Quizzes (8)
- ☐ Syllabus (9)
- ☐ WebEx (10)

Q15 Canvas tools used in my face to face (classroom) course(s) this semester improved my ability to communicate with others.

- ○ Strongly agree (1)
- ○ Somewhat agree (2)
- ○ Somewhat disagree (3)
- ○ Strongly disagree (4)

Q16 Canvas tools used in my face to face (classroom) course(s) this semester allowed me to track my progress.

- ○ Strongly agree (1)
- ○ Somewhat agree (2)
- ○ Somewhat disagree (3)
- ○ Strongly disagree (4)

Skip To: Q18 If Canvas tools used in my face to face (classroom) course(s) this semester allowed me to track my p... = Strongly agree

Skip To: Q18 If Canvas tools used in my face to face (classroom) course(s) this semester allowed me to track my p... = Somewhat agree

Q17 The inability to use Canvas to track progress in my face to face (classroom) course(s) was the result of

- ○ faculty not utilizing the appropriate tool(s) (11)
- ○ faculty not utilizing the appropriate tool(s) effectively (12)
- ○ the tool(s) utilized not being easy to use (14)

Q18 Overall, the Canvas tools used in my face to face (classroom) course(s) are easy to use.

- ○ Strongly agree (1)
- ○ Somewhat agree (2)
- ○ Somewhat disagree (3)
- ○ Strongly disagree (4)

Page Break

Q19 To what extent are you satisfied with the usefulness of Canvas tools utilized in your face to face (classroom) course(s)?

- ○ Extremely satisfied (1)
- ○ Somewhat satisfied (2)
- ○ Somewhat dissatisfied (3)
- ○ Extremely dissatisfied (4)

Q20 To what extent are you satisfied with the ease of use (intuitive, user-friendly) of Canvas tools used in your face to face (classroom) course(s)?

- ○ Extremely satisfied (1)
- ○ Somewhat satisfied (2)
- ○ Somewhat dissatisfied (3)
- ○ Extremely dissatisfied (4)

Appendix D

Executive Summary

For many institutions, the learning management system (LMS) is the keystone in a technology-based learning strategy. Many institutions invest in a LMS as a resource to support on- and off-campus online education, which may include face-to-face instruction, blended or hybrid instruction, and distance education, or to simply offer more convenient, efficient access to traditional classroom resources. The adoption of a LMS also represents a significant financial investment, which requires substantial staffing resources, and potentially affects most, if not all, faculty and students at an institution.

In the context of learning environments, student satisfaction is linked to student success and retention. Dissatisfied students may elect to drop out or withdraw from a course or program. By examining the relationship between the use of LMS tools and student course satisfaction, institutions of higher education can purposefully target areas most in need of improvement. With this clearer sense of student perceptions regarding the usefulness of the LMS, institutions are better equipped to promote the LMS tools, which can create a more satisfactory learning experience, and thus improve persistence. The inconsistency in the application and use of LMS tools has resulted in a fragmenting of the student experience and has had a potentially negative affect on student attitudes toward its use. In order to address these issues and to support CMC's mission, college leadership has created a minimum usage requirement for Canvas in all credit courses. A student's experience within a course, including the use of a LMS, influences their course satisfaction and impacts their decision to persist. As LMS tools support a wide range of teaching and learning activities, it is important educators know which instructional tools to use and how to use them appropriately in order to have a greater impact on student learning. By

considering the responses of students who partake in technology-enabled classroom courses, CMC can better understand what contributes to student course satisfaction.

This evaluation aims to provide insight for improving the use of Canvas tools and increasing student course satisfaction in F2F courses at CMC. Drawing on Tinto's (1975) model of persistence (e.g., the impact of institutional structural systems on persistence), the use of learning management systems and resultant satisfaction in the classroom is a contributing factor to a student's decision to persist in a course. Davis' (1993) technology acceptance model (TAM) also informed this research as it specifies the causal relationships between system design features, perceived usefulness, perceived ease of use, attitude toward using, and actual usage behavior. If the technology is perceived to be easy to use and useful this creates a positive attitude toward its use, which results in a higher likelihood of usage and increased satisfaction. A better understanding of satisfaction with regard to the use of LMS in F2F courses, will allow CMC to use its resources more effectively and efficiently in improving the student learning experience.

The context, input, process, and product (CIPP) evaluation model has a comprehensive format, which has great utility for educators and administrators on smaller, program-specific scales. The CIPP evaluation model emphasizes "learning-by-doing" to identify corrections for problematic project features, and thus, is uniquely suited for evaluating emergent projects in a dynamic social context and can guide the determination of a program's overall quality and merit. For the purpose of this research only the Context and Product components of CIPP were used.

Research indicates the ways instructors use a LMS depends largely on their perception of the LMS. In order to increase adoption and the effective use of LMS tools, faculty perceptions

need to be taken into account. In order to increase satisfaction, instructors must consider student perceptions when implementing LMS tools.

Research provides evidence of the limited use of technology in the higher education classroom, with lectures being a persistent feature of teaching despite the opportunities offered by new technologies including LMS. Low usage of installed LMS has been identified as a major factor underlying lackluster returns from organizational investments in information technology. By understanding the utilization of LMS tools by faculty and students, institutional administrators can make better, data-informed decisions regarding procuring, training, and supporting additional technologies to help ensure that instructional needs are being met.

Even with the rapid adoption of a learning management system many faculty do not feel prepared to teach using a LMS. Generally speaking, faculty perceptions about support in teaching using online modalities stress the needs for more support. This does not occur without significant commitment as College administrators have to approve and provide the appropriate resources (e.g., instructional designers, support staff, etc.) to create the necessary infrastructure.

Prior knowledge and experience can also influence a student's perceptions regarding their ability to use the LMS. The more a student has of both of these, the more likely is a positive outlook on accepting the LMS. Keeping this in mind, it should not be assumed all students are able to use technology as a tool to improve learning. College administrators need to constantly focus on providing effective support and training to students by identifying and committing to the institutional and technical resources required.

In order to gain insight into student's perception about and to better address gaps in the application or use of Canvas tools by instructors, the following research questions were considered:

Q1. To what extent is there a relationship between Canvas use and student satisfaction in F2F courses?

Q2. To what extent is there a relationship between student expectations for the use of Canvas and student satisfaction in F2F courses?

To determine the relationship between student ratings of course satisfaction and student perceptions of LMS use in a F2F course, a quantitative, non-experimental approach was used. For the purpose of this evaluation, all currently enrolled students in Fall 2018 credit bearing courses were potential participants. This population includes both traditional, full-time students (average age 24) and nontraditional, part-time students (average age 38), and is made up of approximately 60% females and 40% males. The instrument used to collect data was an existing anonymous quantitative online survey comprised of 20 questions (Appendix C), which was developed by the department of Technology Enhanced Learning at CMC.

Findings

Context

Finding 1 - Variations in respondent demographics (student type, LMS experience, certificate/degree program, student classification, and campus location) seem to have little effect on perceptions of the usefulness or ease of use for Canvas tools in F2F courses. However, when respondents were classified by School, there was a significant relationship with both the EOU and Usefulness variables.

Finding 2 - The data suggests the program is generally meeting the expected use of the tools students find useful to their learning, with the exception of three tools perceived as only moderately useful.

Finding 3 - the data suggest if a faculty uses a Canvas tool effectively, then respondents tend to find them more useful. Additionally, the overall data suggests student expectations for the use of Canvas tools (including those which are part of the LMS Minimum Usage program) are being, at least, partially met.

Finding 4 - The data suggests a noticeable gap in respondent's expectations of tool usage versus the actual requirements of the program.

Product

Finding 1 - According to the data, respondents who indicated the Canvas tools used in their F2F courses to be useful were more likely to also indicate their satisfaction with those tools.

Finding 2 - According to the data, respondents who indicated the Canvas tools used in their F2F courses to be easy to use were more likely to also indicate their satisfaction with those tools.

Finding 3 - When viewed in relation to each other, EOU had a greater influence on Usefulness than the reverse. The interplay of both variables is important, but the data suggests respondents consider the EOU of Canvas tools a slightly more significant determinant of their Usefulness than Usefulness is for EOU.

Finding 4 - When faculty utilized tools, which were both expected to be used and demonstrated aptitude in using them, respondent satisfaction was higher.

Recommendations

Recommendation 1 - CMC, via the department of Technology Enhanced Learning, should employ a variety of training methodologies and modalities for faculty.

Recommendation 2 - CMC needs to provide and promote a technology training program to address technology difficulties students might encounter when matriculating to the institution, and, particularly, during the first semester of attendance. Given the institution serves a diverse and varied group of students, including a significant number of non-traditional and historically underserved students, a robust training program becomes even more critical.

Recommendation 3 – Canvas tools or functionality proposed for adoption should demonstrate a positive and measurable impact for all courses at a specific level, within a degree program, or the college at large in order to justify its implementation.

Recommendation 4 – The mandated use of specific Canvas tools should be revised to include the following tools which were rated highly with regard to student expectations for their usefulness to learning: Modules and Quizzes

Recommendation 5 – Faculty feedback with regard to training needs and/or technology struggles is a critical factor in the success of the Program moving forward and should be regularly solicited.

Recommendation 6 - In order for continuous improvement to be achieved in the LMS minimum usage requirement program, regular and consistent student input and feedback is necessary.

Appendix E

Student Demographic Variables, Usefulness Variables, Ease of Use Variables, and Satisfaction Variables: Correlations (N=329)																			
Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Campus(es)	-	.102	0.193*	.115	.122	.207	.051	.004	.015	.104	.004	.084	.121*	.092	.084	.082	.054	.196^	.114
2. Commuter/Residential	.102	-	.255	.166	.317^	.019	.094	.113	.083	.108	.140	.092	.097	.105	.048	.058	-.014	.098	.166*
3. Certificate/Degree	.193*	.255	-	.343^	.311^	.334*	.114	.088	.264	.246	.256	.282	.239	.236	.046	.337**	.016	1^	.369^
4. Credits Taken	.115	.166	.343^	-	.211^	.351^	.114	.088	.092	.172**	.091	.133	.099	.140	.126	-.013	-.061	.241^	1^
5. Age	.122	.317^	.311^	.211^	-	.249**	.163	.133	.104	.104	.131	.122	.178	.151	.005	.011	-.053	.184**	.226^
6. Prior Online Experience	.207	.019	.334*	.351^	.249**	-	.087	.033	.024	.086	.032	.118	.024	.138	.130*	.057	.065	.221*	.351^
7. Effective Tool Use	.051	.094	.114	.114	.163	.087	-	.403^	.343^	.317^	.318^	.409^	.425^	.394^	.389^	-.425^	-.393^	.161	.116
8. Enhanced My Learning	.004	.113	.088	.088	.133	.033	.403^	-	.548^	.631^	.440^	.483^	.471^	.574^	.573^	.567^	.611^	.170	.080
9. Improved My Grades	.015	.083	.264	.092	.104	.024	.343^	.548^	-	.526^	.416^	.365^	.390^	.504^	.588^	.799^	.566^	.152	.088
10. Overall Usefulness	.104	.108	.246	.172**	.104	.086	.317^	.631^	.526^	-	.440^	.491^	.515^	.567^	.622^	.820^	.664^	.260^	.167**
11. Communicate w/ Others	.004	.140	.256	.091	.131	.032	.318^	.440^	.416^	.440^	-	.453^	.385^	.415^	.573^	.567^	.611^	.160	.068
12. Track My Progress	.084	.092	.282	.133	.122	.118	.409^	.483^	.365^	.491^	.453^	-	.439^	.509^	.622^	.590^	.968^	.169	.122
13. Overall Ease of Use	.121*	.097	.239	.099	.178	.024	.425^	.471^	.390^	.515^	.385^	.439^	-	.536^	.697^	.613^	.536^	.134	.260^
14. Satisfaction - Usefulness	.092	.105	.236	.140	.151	.138	.394^	.574^	.504^	.567^	.415^	.509^	.536^	-	.695^	.746^	.618^	.150	.137
15. Satisfaction - Ease of Use	.084	.048	.046	.126	.005	.130*	.389^	.573^	.588^	.622^	.573^	.622^	.697^	.695^	-	.660^	.634^	.174**	-.008
16. Usefulness	.082	.058	.337**	-.013	.011	.057	-.425^	.567^	.799^	.820^	.567^	.590^	.613^	.746^	.660^	-	.606^	.250**	-.013
17. EOU	.054	-.014	.016	-.061	-.053	.065	-.393^	.611^	.566^	.664^	.611^	.968^	.536^	.618^	.634^	.606^	-	.161*	-.061
18. School Classification	.196^	.098	1^	.241^	.184**	.221*	.161	.170	.152	.260^	.160	.169	.134	.150	.174**	.250**	.161*	-	.260^
19. Student Classification	.114	.166*	.369^	1^	.226^	.351^	.116	.080	.088	.167**	.068	.122	.260^	.137	-.008	-.013	-.061	.260^	-
*p < .05. **p < .01. ^p < .001.																			