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An Evaluation of the Iowa State University Ecosystem

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AN EVALUATION OF THE IOWA STATE UNIVERSITY LEARNING ECOSYSTEM

by

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ABSTRACT

Purpose – This dissertation in practice is an evaluation study conducted at Iowa State University, entitled, Learning Ecosystem Assessment Review of Needs (LEARN). The evaluation posed these questions: (a) What educational technologies are currently used and what technologies will be needed in the future? (b) What are the attitudes and practices of faculty and students toward online and blended learning? (c) What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

Methodology/design – The study was a mixed-methods design employing interviews with deans and focus groups and surveys of faculty and students.

Findings – Iowa State University faculty and students use a wide array of academic technologies both in physical and virtual classrooms. The prevailing sentiment regarding the need for future academic technologies is not for new offerings and new features but for easier to use, more reliable technologies, and more timely support. Although Iowa State University has formally adopted online learning by offering numerous programs and courses, the university is in the early stages of adopting blended learning.

Implications – The results and implications of the study inform the university on next steps to ready the institution for leveraging technology and preparing for the transformation toward strategic adoption of online and blended learning. The author

outlines an organizational learning approach to manage change and promote adoption of blended learning.

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CHAPTER ONE: INTRODUCTION

Shifting social, political, and economic forces are creating disruptions in the higher education landscape (Staley & Trinkle, 2011). Enrollments expand (Institute of Education Sciences, 2011) while state appropriations shrink (State Higher Education Executive Officers, 2012). Rising expectations to increase access to education (The White House, 2014) are juxtaposed to calls for maintaining low tuition rates (Baum, Kurose, & McPherson, 2013). Like tectonic plates, these shifting and opposing forces can be disruptive, creating a new and different landscape, and catalyze new paradigms in education, such as online and blended learning. Year after year, in growing numbers, higher education students engage in online and blended learning. In Fall of 2013, nearly one-third, or 7.1 million, of all higher education students enrolled in at least one online course (Allen & Seaman, 2014). Less is known about the adoption rates of blended learning (Picciano, Dziuban, & Graham, 2013), but researchers in the field believe the practice to be mainstream (Bonk & Graham, 2012). The steady adoption of online learning by higher education is expected to continue with nearly two-thirds of the academic leaders polled confirming that online learning is a critical part of their long-term strategy (Allen & Seaman, 2014).

Iowa State University (ISU), like other state universities, stressed by shifting and opposing forces, is exploring how best to ready their institution to leverage educational technologies and online learning modalities. The university began their investigation in Fall 2013 through a Learning Ecosystem Assessment Review of Needs (LEARN) evaluation study (Iowa State University, Learning Ecosystem Assessment and Review of Needs, 2012), the subject of this dissertation in practice. A dissertation in practice for the professional

doctorate degree in education as described by the Carnegie Project on the Education Doctorate is a scholarly endeavor that impacts a problem of practice (Carnegie Project on the Education Doctorate, 2014). The role of the researcher and author of this dissertation was to design the evaluation methodology, develop the survey and focus group instruments, collect and analyze the data, and make recommendations based on findings from the study and supported by scholarly research. The scope of the LEARN evaluation was broad and inclusive of topics on the faculty and student use of various educational technologies, the adoption of online and blended learning, and the needs and satisfaction of the ISU faculty and students using the technology support services. For the purpose of this dissertation in practice, to narrow the scope, the literature review focuses only on the adoption of blended learning in higher education, although results and implications for all topics covered by the LEARN evaluation are reported herein.

This document includes: in Chapter One, the background information about the study and its context; in Chapter Two, a literature review focusing on the organizational challenge to transform higher education by scaling the adoption of blended learning; in Chapter Three, a description of the methodology of the study; in Chapter Four, the results from the evaluation surveys of faculty and students at ISU; and finally, in Chapter Five, a discussion and implications of the study.

Purpose of the Evaluation

The purpose of the study, entitled the Learning Ecosystem Assessment Review of Needs (LEARN), is threefold (ISU, Learning Ecosystem Assessment and Review of Needs, 2014). The first objective is to measure the current use and future needs of academic technologies required to support both the physical and virtual learning and teaching

environments. The secondary purpose is to inform the strategic plan for an expanding online learning presence. The third purpose of the study is to evaluate the use, performance, and future needs of the academic technologies support structures. This evaluation examines these research questions:

- What educational technologies are currently used and what technologies will be needed in the future?
- What are the attitudes and practices toward online and blended learning?
- What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

Background of the Study

The LEARN evaluation did not begin with the intention of collecting information to develop a university wide technology strategy. It started with a mid-level manager in a complex organization seeking to reliably determine the needs of a variety of stakeholder groups regarding the Learning Management System (LMS) that was up for a renewal of its contract in 2014. As the evaluation plan evolved, it became clear that the faculty and administration were interested in a broader conversation surrounding technology and education. When the new provost became aware of the intended needs assessment, he expressed his desire for the study to also capture data on where the university community wanted to go with online learning to inform the administration's strategic plans (Wickert, 2013). Rather than limit the study to the determination of the LMS contract renewal, a broader learning ecosystem evaluation was conducted in the Fall of 2013 of faculty, teaching assistants, and students through surveys, interviews, and focus groups to measure

attitudes, beliefs, and practices concerning educational technologies, the virtual (online and blended) and physical learning spaces, and support for the educational technology.

Statement of the Problem

The Iowa State University Context

Established in 1858, Iowa State University was one of the first land grant Universities in the United States established by the Morrill Act (Iowa State University, Sesquicentennial, 2014) and one of three public state universities in Iowa. Located in Ames, Iowa, in Fall 2013, the University enrolled just over 33,000 students in undergraduate, professional, and graduate programs (Iowa State University, The Office of the Registrar, 2014). With seven colleges, including Agricultural and Life Sciences, Business, Design, Engineering, Human Sciences, Liberal Arts and Sciences, and Veterinary Medicine, the University is experiencing an upward trend and steady growth in enrollment (see Figure 1), increasing 27 percent from Fall 2006 to Fall 2013.

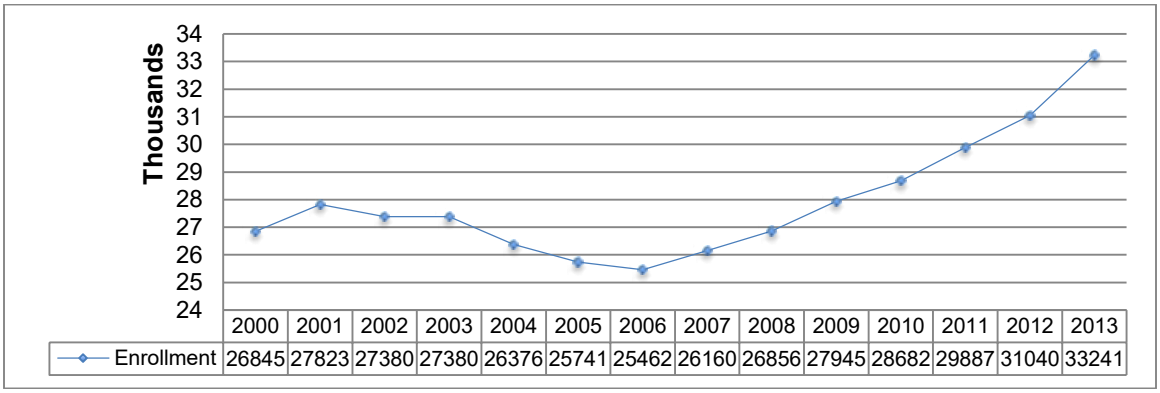
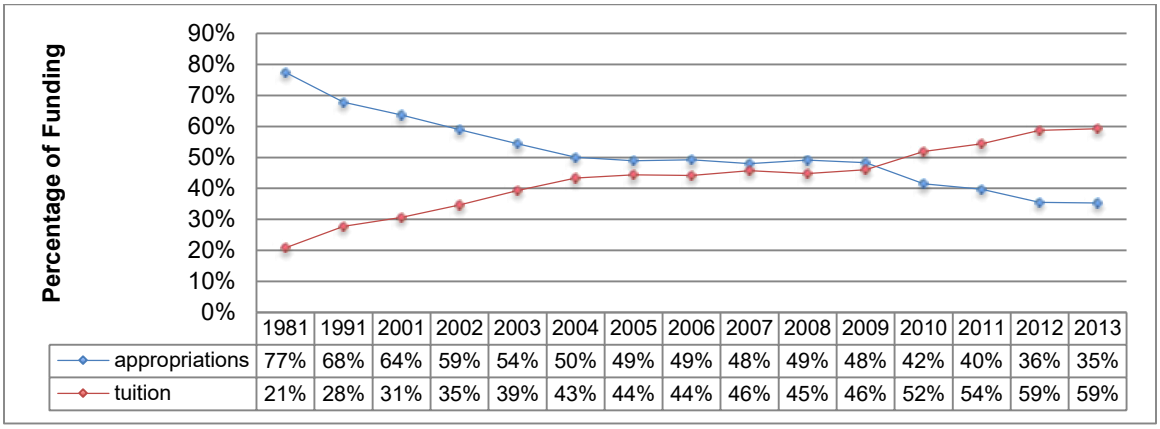


Figure 1: Trend in ISU total enrollment from 2000 - 2013
Source: Data aggregated from the Iowa State University web site News pages

Concurrent to increases in student enrollments, the Iowa State University system experienced a steady decrease as a percent of overall funding of general education by state appropriations and an increase in tuition as a percent of funding. For example, in 1981,

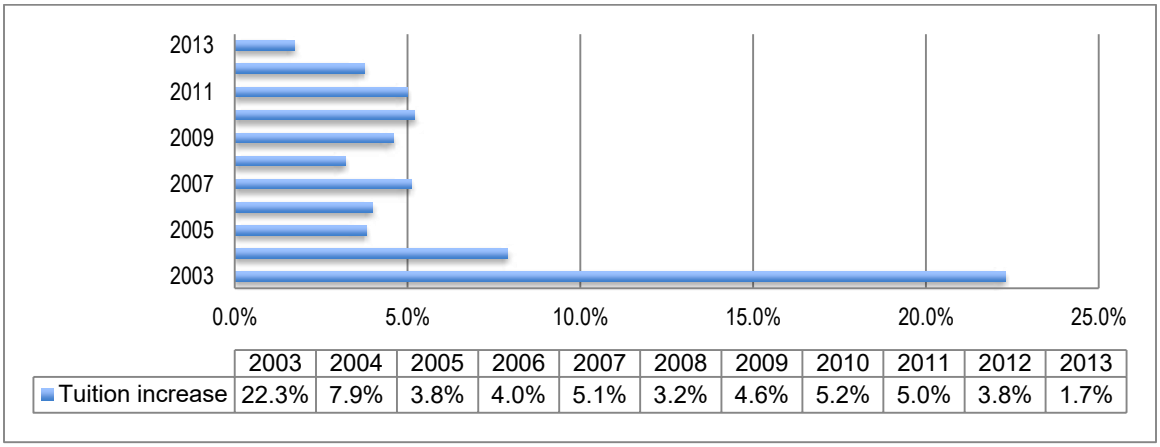
state appropriations provided 79 percent and tuition contributed 21 percent of the overall funding. In 2013, state appropriations provided 35 percent and tuition contributed 59 percent of the overall funding (see Figure 2).



	1981	1991	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
appropriations	77%	68%	64%	59%	54%	50%	49%	49%	48%	49%	48%	42%	40%	36%	35%
tuition	21%	28%	31%	35%	39%	43%	44%	44%	46%	45%	46%	52%	54%	59%	59%

Figure 2: Trend in general funding comparing percent provided by state appropriation and student tuition 1981 - 2013
Source: Iowa State Regents Annual Report 2013

As state appropriations decreased, shortfalls in funding were replaced through increases in tuition (see Figure 3.)



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tuition increase	22.3%	7.9%	3.8%	4.0%	5.1%	3.2%	4.6%	5.2%	5.0%	3.8%	1.7%

Figure 3: Trend in tuition increases from 2003 - 2013
Sources: The Chronicle of Higher Education 2010 and Inside Iowa State 2011, 2013

Not only were operating funds shrinking, but the state appropriations for capital improvements were quashed in 2013 when Iowa Governor Branstad vetoed the budget for expansion and replacement of physical facilities (Bonner, 2013). The Governor explained his decision this way, "technology and innovation should make it feasible to deliver high-quality education to students at a lower tuition and infrastructure cost, as delivery of educational services will require less physical presence on college campuses in the future" (Bonner, 2013, para. 14). The Governor revealed his attitude about the expected transformation in higher education by saying "…there are institutions like the University of Phoenix that are educating… hundreds of thousands of people without a lot of brick and mortar. I'm not saying that's the way all of education is going to be in the future, but I'm expecting a significant share of it will occur in (that) manner" (Obradavich, 2013, para. 8).

Subsequent to the veto by the Governor, the Iowa Board of Regents called for proposals and awarded a contract to Deloitte Consulting (beginning 2014) for an efficiency

and transformation review of all three universities which leaders of the Board of Regents hoped "will lead to more online classes and other efforts to limit tuition increases" (KCRG-TV.com, 2014, para.1). According to Board President Bruce Rastetter, the study is not just about reducing cost; it is about "transformational change" in how the universities operate (Iowa State University, Inside Iowa State, 2014, para. 6). Within the context of new leadership at ISU with a new president and provost (Iowa State University, Office of the President; Strewn, 2012) in the last 2 years, a tightening budget, and a governor's challenge of identifying revenue-generating and cost-saving measures by expanding online learning, LEARN is poised to provide key information to the university community.

The National Higher Education Context

Iowa State University is experiencing common challenges of many higher education institutions. Many state universities are tasked, (a) to educate an increasing number of students (Institute of Education Sciences, 2011) with fewer resources (Baum & Ma, 2012), (b) to increase access to education to many students who are underprepared for the rigors of college (Institute of Education Sciences, 2011), and (c) to meet the demands of students who expect greater use of technology in learning (Allen & Seaman, 2013; Dahlstrom, Eden, Walker, & Dziuban, 2013).

Increasing Enrollment

In the US, from 2000 to 2012, undergraduate enrollment in colleges and universities increased by 41 percent from 15 to 21 million students, the highest 12-year increase since the 1970s (IPEDS, 2012). Iowa State University enrollment during the same period grew

23.8 percent. U.S. enrollment of post-secondary students is expected to continue to hit record highs through 2021 (Snyder & Dillow, 2013).

Trends in Student Preparedness and Graduation Rates

In tandem with burgeoning enrollments, a large proportion of students enter colleges underprepared in basic skills such as English and Mathematics (ACT Inc., 2013). Of the national high school graduating class of 2012 who took the ACT, nearly 33 percent were not prepared academically for first-year courses in English Composition versus 23 percent for students in Iowa (ACT, Inc., 2012) and 54 percent were not prepared academically for first-year courses in College Algebra versus 49 percent for students in Iowa (ACT, Inc., 2012). "The issue is not that high school students are performing worse now than they did in the past; rather, it is that relatively less well- prepared high school graduates are attempting college in increasing numbers" (Baum & Ma, 2013, p. 23). Accordingly, the National Center for Education Statistics reports that of first-year undergraduate students in public 4-year institutions, 21 percent reported enrolling in at least one remedial or developmental course (Sparks & Malkus, 2013).

With significant proportions of underprepared students enrolled, it is estimated that nationally, higher education institutions devote $3.6 billion of their budgets to direct remedial education costs; for the state of Iowa, the estimated cost is $37 million (Alliance for Excellent Education, 2011). Academic preparation also predicts graduation rates (Attewell, Heil, & Reisel, 2011). Nationally, 66 percent of students beginning 4-year institutions graduate in 6 years (Radford, 2010) and at ISU that rate is 69 percent (Iowa State University, President's Council, 2011). While the six-year graduation rates are

trending up at Iowa State University, from 62 percent in 2001 to 69 percent in 2011 (Iowa State University, President's Council, 2011), unfortunately, many students who start college fail to earn a diploma.

Reductions in Funding and Increases in Costs

Higher education funding by states has a cyclical pattern, declining during periods of economic contraction while enrollments tend to rise during these periods (Baum, Kurose, & McPherson, 2013). As the economy expands, increases in funding follow. However, enrollment growth outpaces state appropriations that were "25 percent lower in inflation-adjusted dollars in 2009 – 2010 than their level a decade earlier" (Baum and Ma, 2011 as cited in Baum, Kurose, & McPherson, 2013). Nationally, during the period 2007 – 2012, educational appropriations per full time equivalent (FTE) student fell 23 percent (State Higher Education Executive Officers, 2012). In the same period, Iowa state higher education institutions fell almost 28 percent (State Higher Education Executive Officers, 2012).

Not only is funding shrinking, expenditures are rising and outpace the inflation rate by about 1 percent per year (Baum et al., 2013). The phenomenon of continual increases in expenditures without productivity gains is called the *Baumol Effect*, or more commonly known as the "cost disease," and described by William Bowen in his book, *Higher Education in the Digital Age* (Bowen, 2013). Bowen, President Emeritus of Princeton University (1972-1988) and President of the Andrew W. Mellon Foundation (2006 -2009), argues that higher education institutions must find ways to curb costs and stay true to their mission. "We must recognize that if higher education does not begin to slow the rate of increase in college

costs, our nation's higher education system will lose the public support on which it so heavily depends" (Bowen, 2013, p. 62). Bowen advocates that higher education must more fully explore the role of technology and online learning as a means to achieve cost productivity in higher education.

Adoption of Online Learning

One of the continuing trends in higher education is the development and expansion of online learning environments. Of all higher education students enrolled, about a third take at least one course online (Allen & Seaman, 2014). Higher education institutions drive growth, with nearly two-thirds of academic leaders polled reporting that online learning was a critical part of their long-term strategy while only 9.7 percent rated online learning as not critical to their long-term strategy (Allen & Seaman, 2014).

Adoption of Blended Learning

For over a decade, Allen and Seaman have measured online learning trends in a series of studies. However, "…there are few and perhaps no reliable estimates of the number of students enrolled in blended courses" (Picciano, Dziuban, & Graham, 2013). Yet prominent researchers in the field believe the practice to be mainstream (Bonk & Graham, 2012). Blended learning models are heralded as transformative (Garrison & Kanuka, 2004), debated as the new normal (Norberg, Dziuban, & Moskal, 2011), and considered "…likely to emerge as the predominant model of the future — and to become far more common than either one alone" (Watson, 2008, p.3).

Simply defined, blended or hybrid education is a combination of face-to-face and online modalities (Oliver & Trigwell, 2005). However, there is a lack of standard definition in

practice (Graham, 2013, Oliver & Trigwell, 2005). On the continuum of face-to-face learning and online learning, blended learning is anywhere in between, encompassing a wide range of practices and definitions. The Sloan Consortium defines a blended course as one that consists of online course activity in which online activity replaces at least 30 percent of the required face-to-face meetings (Sloan Consortium Commons, 2014). However, there are many competing definitions that are more thoroughly discussed in Chapter Two. Perhaps due to the lack of a consistent definition in the education community or the lack of institutions keeping track of courses using a blended approach, there is difficulty in measuring trends in use of blended learning (Graham, Woodfield, & Harrison, 2012). Since many institutions are not measuring enrollments in blended courses, the implication is that they are not strategically leveraging the model (Graham et al., 2012). The adoption of blended learning appears to be a grass-roots effort in higher education (Graham et al., 2012).

College and university leaders are increasingly seeking solutions to reduce costs, increase access, and meet student and faculty expectations by adopting academic technologies and online modalities. As a national priority, President Obama, in 2009, set a goal for the U.S. to again have the highest proportion of college graduates in the world (the last time this occurred was 1990) (The White House, Higher Education, 2014). To meet such a goal, higher education institutions will need to become more productive to continue to increase access, remediate, and retain students despite shrinking resources (Bowen, 2013). Part of the solution may lie with greater adoption of online and blended learning. "Serious restructuring seems inevitable if our institutions and systems are to adjust to the new realities" (Zumeta, 2013, p. 34).

Problem Statement

It is in this context that the Iowa governor and Board of Regents seek transformative change in how the Iowa State University operates. To ready the institution to leverage technology in the transformation, the LEARN evaluation set out to determine the academic technology and support needs of the faculty and students by answering these questions:

- What educational technologies are currently used and what technologies will be needed in the future?
- What are the attitudes and practices toward online and blended learning?
- What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

Professional Standards

This study complies with the Joint Committee (1994) *Program Evaluation Standards* of utility, feasibility, propriety, and accuracy (Joint Committee on Standards on Educational Evaluation, 2014); the American Educational Research Association (AERA, 2014) ethical standards; and the American Evaluation Association *Guiding Principles for Evaluators* (AEA, 2014).

Definition of Terms

For this dissertation, a brief list of definitions is provided.

Academic technologies: the hardware, software, audio/visual equipment, connectivity of digital systems, and cloud computing system used in teaching and learning for both physical and virtual learning environments.

ACT: The ACT® college readiness assessment is a curriculum- and standards-based educational and career planning tool that assesses students' academic readiness for college (ACT, Inc. 2014).

Baumol effect: the phenomenon of continual increases in expenditures without productivity gains (Bowen, 2013).

Blended learning**:** a combination of face-to-face and online modalities (Oliver & Trigwell, 2007). For alternative definitions, see Table 1.

Case study method: a strategy of inquiry in which the researcher explores in depth a program, event, activity, process, or one or more individuals (Stake, 1995 as cited in Creswell, 200, p. 12).

Categorical scale: a scale where variables are measured on the nominal or ordinal scale (Hinkle et al., 2003, p. 733).

Change agent: an individual who influences … innovation decisions in a direction desirable by a change agency (Rogers, 2003).

Chi-square distribution statistics: a family of distributions used as sampling distributions in both parametric and non-parametric test of significance (Hinkle et al., 200, p. 734).

CIPP evaluation framework: CIPP is an acronym representing the types of evaluations: context, input, process, and product (Stufflebeam, The 21st century CIPP model, 2004)

Cognitive theory: follows the interest in the internal processes of the brain and processing of information. Theory tends to focus on learners' prior knowledge and on learning styles (Moore, 2011, p. 305).

Contingency tables: the summarization of categorical data into a tabular format.

Constructionist theory: vew of learning that regards knowledge as resulting from an active process of subjectively building a system of meanings (Moore, 2011, p. 305).

Cost disease: the phenomenon of continual increases in expenditures without productivity gains (Bowen, 2013).

Descriptive statistics: a collection of methods for classifying and summarizing numerical data (Hinkle, Worthen, & Sanders, 2003, p. 13).

Didactic teaching: a teacher-centered approach generally associated with lecture-based instruction.

Diffusion of innovation: the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among members of the social system (Rogers, 2003, p. 11).

Early adopter: one of the 5 adopter categories in Rogers Diffusion of Innovation Theory (Rogers, 2003).

Evaluation: the identification, clarification, and application of defensible criteria to determine an evaluation object's value (worth or merit) in relation to those criteria ((Worthen, Sanders, & Fitzpatrick, 1997, p. 7).

Face-to-face courses: courses delivered in a physical classroom at a scheduled meeting time.

Formative assessment: in evaluation, the assessment of a program for the primary purpose of program improvement (Worthen et al., 2011).

Frequencies: a tabulation of data that indicates the number of times given scores or group of scores of appear (Hinkle et al., 2003, p. 735).

Guiding coalition: in Kotter's Eight Stages of Change Model, a group in the organization tasked to shepherd the change process (Kotter, 1995).

Hybrid learning – see blended learning

Innovator: one of the 5-adopter categories in Rogers Diffusion of Innovation Theory (Rogers, 2003).

Intellectual property rights: rights granted creators of intellectual works by copyright and trademark laws.

Inter-rater reliability: when two or more coders agree on codes used for the same passages in the text (Creswell, 2007, p. 229).

LEARN: the Learning Ecosystem Assessment Review of Needs, an evaluation of the learning ecosystem at Iowa State University (Iowa State University, Learning Ecosystem Assessment and Review of Needs, (2012).

Laggard: one of the 5-adopter categories in Rogers Diffusion of Innovation Theory (Rogers, 2003).

Late majority: one of the 5-adopter categories in Rogers Diffusion of Innovation Theory (Rogers, 2003).

Learning ecosystem: at Iowa State University, the Learning Ecosystem encompasses both the physical and virtual learning spaces and their supporting technologies, both critical components to teaching and learning experiences.

Learning management system: commonly referred to as an LMS or Content Management System, a software application used for the administration, delivery and storage of content, assessment, and communication of academic courses and programs.

Likert item: a statement designed to measure attitudes in a survey instrument with a range of bi-polar response anchors (Allen & Seaman, 2007).

Mental models: mental models are deeply held internal images of how the world works, images that limit us to familiar ways of thinking and acting. Mental models are one of the five disciplines, based on systems theory, to support organizational learning. (Senge, 1995).

Needs assessment evaluation: an evaluation concerned with (a) establishing whether a problem or need exists and describing that problem, and (b) making recommendations for ways to reduce the problem (Worthen, Sanders, & Fitzpatrick, 2011, p. 26).

Mixed methods research: an approach to inquiry that combines or associates both qualitative and quantitative forms of research (Creswell, 200, p. 230).

Non-parametric procedures: statistical tests of significance that require fewer assumptions than parametric tests (Hinkle et al., 2003, p. 736).

Online learning: online learning is a term that distinguishes courses delivered over the Internet from traditional face-to-face courses (Sloan Consortium Commons, 2014).

Organizational learning: a concept in organizational theory about how organizations learn and adapt. In Senge's Fifth Discipline, organizational learning is the generative process of a community to co-construct transformation through self-reflection, inquiry, dialogue, team learning, a shared vision, and systems thinking (Senge, 1990).

Practical participative evaluation: a collaboration between the evaluator(s) and the stakeholders to broaden decision-making, to co-construct knowledge, promote social change and support for decisions (Cousins & Whitmore, 1998).

Professional bureaucracy: an organizational structure with few managerial levels and groups of experts in diverse fields (Mitzenberg, 1979.)

Purposive sampling technique: in a research study, the selection of participants who will best help understand the research problem and the research questions (Creswell, 2007, p. 31).

Qualitative data: data obtained from qualitative research which is the process of research involving emerging questions and procedures, inductive analysis of data, building from particular to general themes, and making interpretations of the meaning of the data (Creswell, 2007, p. 232).

Reliability: refers to whether scores to items on an instrument are internally consistent, stable over time, and whether there was consistency in test administration and scoring (Creswell, 2007).

Remedial education: education designed to redress learning gaps of underprepared students.

Smart classroom: at Iowa State University, a media-enhanced physical classroom which typically included a projector, audio and video system, and an Internet connection.

Structural frame: one of the 4 frames in the Bolman and Deal framework. The structural frame focuses on the organizational structure and its influence on operation.

Systems thinking: a conceptual framework, a body of knowledge and tools to make full patterns clearer and to help us see how to change them effectively (Senge, 2006, p. 12).

Validity: in quantitative research refers to whether once can draw meaningful and useful inferences from scores on particular instruments (Creswell, 2007).

CHAPTER TWO: LITERATURE REVIEW

The LEARN study investigated three topics of inquiry including (a) technology in the classroom, (b) online and blended learning, and (c) support systems for academic technologies. Due to the breadth of topics covered in the study, the focus of this literature review is limited to the adoption and diffusion of blended learning in higher education from a leadership perspective. With 900 online courses in doctoral, masters, and certifcate online programs, Iowa State University has a solid start in the transformation and adoption of online learning. However, the institutional integration of blended learning is absent. The strategic diffusion of blended learning courses and programs has the potential to, benefit student learning outcomes and retention (Graham, 2013), increase faculty and student satisfaction (Dziuban, Hartman, Cavanagh, & Moskal, 2011), promote efficient utilization of overcrowded classrooms (Dziuban, et al., 2011), increase access to courses (Dziuban, Moskal, & Hartman, 2005), decrease cost of delivery (Bowen, 2013), and possibly serve as a transitional way to ease faculty toward online modalities. Using organizational learning as a conceptual foundation, the factors influencing the adoption of blended learning are discussed using Bolman and Deal's Four-Frame Model as an organizing framework.

The Professional Bureaucracy

Reflected in the beginnings of European universities, today's university graduations still embrace and re-enact the rituals, symbols, and ceremony of the academic rites of passage (Harvard University, 2014). Graduates don color-coded regalia in the fashion of medieval scholars (Hargreaves-Mawdsley, 1978), line up and march in procession, and give

salutatory addresses. Likewise, at many institutions, the organizational structure, role of the faculty, teaching methods and culture exhibit scant change over the centuries (Bates & Sangra, 2011). Change is very slow in higher education (Selingo, 2013) and is characteristic of its organizational structure, a professional bureaucracy (Mitzenberg, 1979). A professional bureaucracy has a flat organizational structure with few managerial levels and groups of experts in diverse fields (Mitzenberg, 1979.) Typically, a higher education professional bureaucracy has a decentralized structure, distributes power diffusely, has a professoriate insulated from formal interference, and a slow response to external change (Bolman & Deal, 2008). Higher education institutions are loosely coupled, meaning that they are composed of independent components that do not act responsively to external forces (Orten & Weick, 1990). Or as Arthur Cohen distills it, "…the system successfully resists, co-opts, or absorbs–eventually changing but with the glacial majesty befitting a venerable structure…" (p.1).

Organizational Learning: A Conceptual Framework

The Iowa Governor and Board of Regents are calling for transformational change in their state universities. But as Boyce ponders, "how is strategic change achieved where objectives are divergent, power is diffuse, and leadership roles are shared? How do institutions develop enough coherence among their parts to allow deliberate strategic change" (Boyce, 2003, p. 121)? According to a diverse group of educational thought leaders, a key ingredient to transforming and sustaining change in higher education is organizational learning (Bates, 2011; Beaudoin, 2012; Boyce, 2003; Moskal, Dziuban, & Hartman, 2013; Graham et al., 2013), the conceptual framework for this study. Boyce, in her literature review on the research on organizational change in higher education, concluded,

"successful change is about learning enough collectively so that institutional consequences, outcomes, and inquiry change" (Boyce, 2003, p. 133).

Organizational learning is the generative process of a community to co-construct the transformation through self-reflection, inquiry, dialogue, team learning, a shared vision, and systems thinking (Senge, 1990). In his book *The Fifth Discipline*, Peter Senge operationalized and popularized the organizational theories of a number of researchers (Hickman, 2010) including Argryis and Schön who champion the organizational learning system as "…capable of bringing about their own continuous transformation" (Argryis & Schön, 1974, in Hickman, 2010, p. 512). Senge (1990) categorizes the process of organizational learning into five disciplines. The fifth disciple, systems thinking, is the linchpin to his prescription for institutional learning. The concept of systems thinking is the ability to look at the whole, not just the parts, and to see the inter-connectedness of a system. The other four disciplines prescribe the methods to set aside biases, broaden a view, and reflect on a problem fully aware of our individual "mental models" while exploring options, creating solutions in a community environment by using methods of inquiry, dialogue, and team learning (Senge, 1990). The conceptual foundation for Senge's model dwells in cognitive and constructionist theory and research (Boyce, 2003). Through inquiry and dialogue, a group can explore their assumptions, possible strategies, make an action plan, reflect on the outcomes, and make adjustments that will foster sustainable change (Boyce, 2003).

The Practical Participatory Evaluation Approach

To facilitate organizational learning, a Practical Participative Evaluation (P-PE) approach is employed to engage stakeholders in the process (Cousins & Whitmore, 1998).

Cousins and Whitmore describe the P-PE approach as collaboration between the evaluator(s) and the stakeholders to broaden decision-making, to co-construct knowledge, promote social change and support for decisions (Cousins & Whitmore, 1998). In the P-PE approach, stakeholders work with an evaluator to design the evaluation and interpret the results. The benefits of stakeholder involvement in this process are, (a) better potential buy-in, (b) better understanding of the process by stakeholders, and (c) more potential to use the results (Torres & Preskill, 2001). Torres and Preskill, 2001, in their review of the past, present, and future of evaluation and organizational learning, advocate using a participatory approach to increase the relevance and use of the findings of an evaluation. They further advocate that evaluation can support organizational learning through: (a) a focus on key issues and concerns, (b) dialog and reflection about how to improve, (c) the courage to face realities, and (d) an astute and realistic analysis that serves as a foundation to a strategic plan.

A Situated Perspective of Adoption of Blended Learning in Higher Education

What is Blended Learning?

The definition of blended learning is ambiguous among higher education thinkers and practitioners and may refer to the combination of instructional modalities, instructional methods, or online and face-to-face modalities (Bonk & Graham, 2006, p.4). According to Moskal et al., (2013), "…blended learning has become an evolving, responsive and dynamic process that in many respects is organic, defying all attempts at universal definition" (p. 16). Though the nature of blended learning may defy a universal description, there are plenty of definitions circulated in the literature. Graham synthesized the gaggle of definitions and categorized the four central differentiators including, what is being

blended, the reduction in seat time, the quantity of online versus face-to-face instruction, and quality (Graham, 2013).

Table 1: Example Definitions of Blended Learning

Category	Example definition
What is being blended?	A combination of face-to-face and online modalities (Oliver & Trigwell, 2007).
Reduced seat time as a qualifier	When at least 30 percent of face-to-face meetings are substituted with online education (Sloan Consortium Commons, 2014).
Quantity	When a substantial portion of the content in a course is delivered online (24-75 percent) (Niemiec, 2006)
Quality	The effective integration of online and face-to-face modalities such to re-conceptualize, reorganize, and transform teaching and learning (Garrison & Kanuka, 2004)

A Lack of Scholarly Research

Scholarly research on the institutional adoption of blended learning is slow to emerge (Porter, Graham, Spring, & Welch, 2014). In a literature review of high impact scholarship about blended learning, the researchers cite a lack of empirical studies in the field noting that the research so far is primarily concentrated on pedagogy, conceptual models, definitions, and the transformational potential field with few studies focusing on adoption processes (Halverson, Graham, Spring, & Drysdale, 2012 (see Table 2).

Table 2: Topic Distribution of High Impact Scholarship in Blended Learning

Topic	Number of articles
Pedagogy and instructional design	30
Trends	12
Student experience and perceptions	8
Conceptual	6
Learning outcomes	6
Research	5
Cognitive learning	3
Administration topics	2
Other including discipline specific, corporate, k-12, international trends, etc.	28
Total	100

Derived from Halverson, L. R., Graham, C. R., Spring, K. J., & Drysdale, J. S. (2012). An analysis of high impact scholarship and publication trends in blended learning. Distance Education, 33(3), 381-413.

Blended Learning Adoption Framework

Citing the dearth of research guiding institutions in the adoption of blended learning, a group of researchers at Brigham Young University, set out to identify core issues and indicators related to the institutional strategy, structure, and support to measure progress in an institution's adoption cycle (Graham, Woodfield, & Harrison, 2012). Using the case study method, the researchers employed a purposive sampling technique to select six institutions that spanned the range in adoption of blended learning. From data collected in interviews of key administrators with close knowledge and experience with the policies and strategies employed to adopt blended learning, a framework was developed outlining the categories and stages in the blended learning adoption cycle (see Table 3).

Table 3: Blended Learning Adoption Framework

Matrix representing the categories and stages in the BL adoption framework used to organize the findings of this study.

Category	Stage 1—Awareness/Exploration	Stage 2—Adoption/Early implementation	Stage 3—Mature implementation/growth
Strategy			
Purpose	Individual faculty/administrators informally identify specific BL benefits	Administrators identify purposes to motivate institutional adoption of BL	Administrative refinement of purposes for continued promotion and funding of BL
Advocacy	Individual faculty and administrators informally advocate	BL formally approved and advocated by university administrators	Formal BL advocacy by university administrators and departments/colleges
Implementation	Individual faculty members implementing BL	Administrators target implementation in high impact areas and among willing faculty	Departments/colleges strategically facilitate wide-spread faculty implementation
Definition	No uniform definition of BL proposed	Initial definition of BL formally proposed	Refined definition of BL formally adopted
Policy	No uniform BL policy in place	Tentative policies adopted and communicated to stakeholders, policies revised as needed	Robust policies in place with little need for revision, high level of community awareness
Structure			
Governance	No official approval or implementation system	Emerging structures primarily to regulate and approve BL courses	Robust structures involving academic unit leaders for strategic decision making
Models	No institutional models established	Identifying and exploring BL Models	General BL models encouraged not enforced
Scheduling	No designation of BL courses as such in course registration/catalog system	Efforts to designate BL courses in registration/catalog system	BL designations or modality metadata available in registration/catalog system
Evaluation	No formal evaluations in place addressing BL learning outcomes	Limited institutional evaluations addressing BL learning outcomes	Evaluation data addressing BL learning outcomes systematically reviewed
Support			
Technical	Primary focus on traditional classroom technological support	Increased focus on BL/online technological support for faculty and students	Well established technological support to address BL/online needs of all stakeholders
Pedagogical	No course development process in place	Experimentation and building of a formal course development process	Robust course development process established and systematically promoted
Incentives	No identified faculty incentive structure for implementation	Exploration of faculty incentive structure for faculty training and course development	Well-established faculty incentive structure for systematic training and implementation

Source: Graham, C. R., Woodfield, W., & Harrison, J. B. (2012). A framework for institutional adoption and implementation of blended learning in higher education. *The Internet and Higher Education*. [Used with permission.]

The Blended Learning Adoption Framework (Graham, et al., 2012) categorizes three stages of adoption, stage 1–awareness/exploration, stage 2–adoption/early implementation, and stage 3–mature implementation/growth. The researchers created a 3-part schema to organize the core issues, policies and program indicators into categories of strategy, structure, and support. In Table 3, the matrix provides a guide for an institution to assess their institutional progress toward adoption of blended learning. For example, if an institution has no designations for blended learning courses in the course registration or catalog system, no official definition of blended learning, is primarily focused on the physical classroom, no faculty incentive plan for implementation, but there are grass-roots efforts by individual faculty to implement a blended learning course, then that institution would be considered in stage 1–awareness/exploration. The progression from little interest or awareness of blended learning to a mature implementation is measured within each category by the observed activities/accomplishments of each institution. While this study draws from a small sample, the framework offers a useful checklist for administrators to determine where their institution is on the path to adoption of blended learning. To further examine these influences and factors to adoption of blended learning, both positive and negative, the Bolman and Deal Four Frame Model (Bolman and Deal, 2008) provides a framework to analyze the literature about this complex problem of practice.

Bolman and Deal Four Frame Model

Using Bolman and Deal's Four Frames (2008) construct, the factors influential to adoption of blended learning, found in the literature, are organized into human resource, structural, political, and symbolic issues. This model organizes the analysis into domains, or frames, by asking: Is the challenge one of organizational structure, human resources,

politics and/or symbolic causes? Bolman and Deal's four frames construct advocates that administrators (managers) should consider a problem in multiple perspectives, lenses, or frames. Informed by academic organizational theory and research in the social sciences, each frame offers the examiner a unique vantage point from which to inspect a problem. The structural frame focuses on the organizational structure and its influence on operation. Structural elements can create inefficient tensions in organizations and thwart progression and change. The human resource frame focuses on the people in the organization, how to hire the right people, keep them, invest in them, empower them, and promote diversity. The political frame focuses on power, resources, and coalitions within an organization. And finally, the symbolic frame focuses on the shared values, culture, and shared beliefs within an organization.

Using the findings in the Blended Learning Adoption Framework (Graham et al., 2013) as a launching point and the Bolman and Deal Four Frames Model (2008) as a method to organize the literature, the current state of research on the adoption of blended learning in higher education is reviewed in 4 sections, structural factors, human resource factors, political factors, and symbolic factors.

Factors Influencing the Adoption of Blended Learning

Structural Frame Factors

Bolman and Deal (2008) characterize the structural frame as how organizations allocate, organize and integrate the work and how functional groups are organized. In the structural frame, institutions in the mature phase of blended learning adoption have developed robust strategic and operational structures (Graham et al., 2012). Identified in

the Blended Learning Adoption Framework are these structural elements in institutions at the mature phase of adoption:

- A well-established technological infrastructure
- A formal strategic and implementation plan established by academic unit leaders
- A refined blended learning definition and institutional awareness
- A designation of blended learning courses in registration or scheduling system
- Formal evaluation systems of blended learning outcomes

Graham et al. (2012) describe the structural elements present at the mature implementation stage and some historical descriptions of how each organization developed these strategies, structures, and support systems. Moskal, Dziuban, and Hartman of the University of Central Florida (UCF) provide more in-depth insight into evolution to blended learning at UCF in their article, *Blended learning: A dangerous idea?* (Moskal, et al., 2013).

Moskal et al. (2013) promote a collaborative approach to change management in the evolution of the strategic and operational structures. The authors advocate aligning institutional, faculty, and student goals and objectives. For institutions in the early stage of awareness and exploration, they suggest that institutional definitions of blended learning must make sense to their context, the needs of the students and faculty, and be co-developed by the campus constituencies. In the process of defining what blended learning means to their institution, those involved engage in a learning community to create a collective understanding and help drive institutional awareness of the innovation (Moskal et al., 2013). Engaging the university community in development of the definition of

blended learning and the strategic and implementation plans is an example of process used in an organizational learning system.

At the mature stage of adoption of blended learning, operational structures such as approval and implementation systems, registration, and scheduling are present at the institutional level (Graham et al., 2012). Bowen, in a study of academic leaders at 25 different institutions representing public and private research universities, four-year colleges and community colleges, found that the approval of online offerings follows traditional processes (Bowen, Guthrie, & Lack, 2012).

Evaluation systems are also embedded in a mature system (Graham et al., 2012) to provide formative assessment of the satisfaction of students and faculty as well as measure learning outcomes and withdrawal. This continuous feedback loop is another example of organizational learning. At UCF, "students' satisfaction plays an important role in curriculum planning, faculty development, building programs, hiring, faculty rewards, and the tenure and promotion process" (Moskal et al., 2013, p. 18).

Human Resource Factors

Bolman and Deal (2008) describe the human resource frame as the relationship between people and organizations (p. 137). Human resource factors found in the literature include faculty development and support, the time-consuming nature of online and blended learning modalities for faculty, lack of incentive to transition existing courses, and intellectual property issues.

Faculty Development and Support

Transitioning to blended learning requires faculty to expand their duties to include new roles including instructional designer (Baran, Correia, & Thompson, 2011), technology and course manager, and social media facilitator (Gerbic, 2011). Institutions in the mature phase of adoption of blended learning support faculty in this expanded role by providing technology, instructional and logistical support required for blended course development and ongoing implementation (Graham et al., 2012; Moskal et al., 2013). Not only do institutions in the mature phase of adoption support their faculty, so do 94 percent of all institutions surveyed that offer online and blended courses (Allen & Seaman, 2011). To differentiate and characterize the faculty development efforts by institutions in the mature versus early stages of blended learning adoption is difficult since comparative research is scarce (Ginsberg & Ciabocchi, 2014).

At institutions with more robust support structures like University of Central Florida in Orlando, Florida, instructional designers act as coaches to guide and assist faculty in the development of their courses which is "generally accepted as a path to higher levels of quality and consistency" (Moskal et al., 2013, p. 17). Transitioning from face-to-face to blended learning requires professional development, according to researchers at the University of Wisconsin-Milwaukee (UWM) since "blended teaching requires a significant course transformation" (Joosten, Barth, Harness, & Weber, 2013, p. 173). At UWM, the Learning Technology Center offers a program for blended teaching with an emphasis "on rethinking existing assumptions about effective pedagogical practices— as new skills and teaching techniques are required during the redesign process…combined with strategies to carefully utilize and integrate new learning environments (face-to-face and online)"

(Joosten et al., 2013, paragraph 10). Dziuban, Hartman, Moskal, and Robison (2007) support this view, explaining that transitioning courses to online modalities requires a re-examination of teaching methods, behaviors, and action plans. Lack of these instructional and technical support structures are cited as barriers to adoption of blended learning (Cook, Ley, Crawford, & Warner, 2009; Howell, Saba, Lindsay, & Williams, 2004: Ocak, 2011; Oh & Park, 2009).

Online Modalities are Time Consuming for Faculty

Instructors report that transitioning to a new modality requires a substantial investment in time and effort as compared to preparing a face-to-face session (Bowen et al., 2012; Ocak, 2011; Oh & Park, 2009). Over 44 percent of academic leaders surveyed agree that it takes more time and effort to teach an online course than a face-to-face course (Allen & Seaman, 2013). Beyond course development, blended learning encourages interaction between the faculty and students through learning communities and requires a teaching presence (Garrison, Anderson, & Archer, 2010) which faculty report to increase their communication workload and stress levels (Allen & Seaman, *Digital faculty: Professors, teaching and technology*, 2012). In tandem with providing the necessary course development support, institutions at a mature implementation phase provide a means to balance the faculty workload (Dziuban, Hartman, Cavanagh, & Moskal, 2011; Graham et al., 2012).

Lack of Incentives to Transition Existing Courses

Factors contributing to faculty dissatisfaction with blended learning include concern not only about additional workload but also compensation issues (Dziuban, Moskal, &

Hartman, 2000; Ocak, 2011; Rockwell, Schnauer, Fritz, and Marx, 1999; Shea, 2007). Professors may develop courses over many years, perfecting materials, exercises, and instructional experiences. To change the medium requires re-working their practiced performance into another format and re-thinking the pedagogy (Joosten et al., 2013). Faculty often cite lack of time or appropriate compensation for the additional work involved in developing and implementing online learning environments for which an incentive or some form of compensation for the extra effort is recommended (Cho & Berge, 2002; Oh & Park, 2009). Incentives may include release time (equivalent pay as if teaching a three-hour course) to develop and deliver courses, direct financial compensation, and/or funding to support course development (Ginsburg & Ciabocchi, 2014).

Conflict in Perceived Intellectual Ownership of Instructor-created Course Materials

By asking an instructor to help develop a course that may be scaled or used by other instructors, the concept of intellectual property rights is tested (Fisher, 2001). Bowen et al., (2012), asserts that the issue of intellectual property rights of content created and developed by individual professors may discourage wider adoption of online courses.

Symbolic Frame Factors

Bolman and Deal (2008) describe the organization through the symbolic frame centering on organizational culture. As they define it, organizational culture is shared basic assumptions adopted by a group to accomplish its mission, and is perpetuated and taught to new members as the accepted way to perceive, think and feel in relation to this mission. The culture of many higher education institutions (excluding for-profit institutions) is deeply ingrained in their beliefs that face-to-face teaching and learning is superior to online

modalities. Didactic teaching methods predominate despite academic research that other methods increase deeper learning and improve learning outcomes (Christensen, Hughes, & Mighty, 2010 as cited in Bates & Sangra, 2011). Of academic leaders polled, almost a quarter believe that online courses are inferior to face-to-face and only 30 percent of these same leaders "believe that their faculty accept the legitimacy of online education" (Allen & Seaman, 2013, p.10). However the rate of acceptance varies depending on the robustness of the institution's offerings, i.e., greater acceptance is associated with institutions with more online courses and less acceptance with institutions with fewer online courses. Institution type and mission predict acceptance and growth of online courses with private for-profit and public institutions leading the way with over 70 percent offering online courses and full programs while less than half of private non-profit do so (Allen & Seaman, 2013).

Organizational culture is reflective of the values of a community as evidenced in the reward structure of the institution and the resulting behavior of the faculty. Tenure and professional advancement decisions often place a higher value on research and a lesser value on teaching (Chalmers, 2011). Bates (2011) notes that the faculty committees, not senior management, control the tenure system and describes higher education as "one of the last guild systems by which a trade or profession protects itself from outside influences" (p. 187). With an emphasis on recognition weighted on the side of research, faculty members do not believe that online teaching promotes their pursuit for tenure (Allen & Seaman, 2012). Though these possible causes to the lack of adoption are advanced, Gerbic (2011), in a literature review on blended learning, cites a paucity of empirical studies on

teacher perspectives about the practice and identifies the topic as an area ripe for new research.

Political Frame Factors

Bolman and Deal (2008) describe the organization through the political frame as coalitions, or social networks, composed of individual and groups with enduring differences competing for resources and power. Factors in the political frame related to the adoption of blended learning include the acceptance of an innovation by individuals, coalitions, and the dissemination or diffusion of the innovation through social networks in the institution. Bolman and Deal (2008) propose advocacy for addressing factors in the political frame, one of the key strategies identified by Graham et al. (2013) and included in their Blended Learning Adoption Framework. Porter et al. (2014) extended the investigation of the Blended Learning Adoption Framework (Graham et al., 2013) by studying an additional 11 institutions and found that a successful implementation of blended learning required blended learning advocacy from the ranks of students, faculty, staff, and administrators.

Even with goals and policies aligned, definitions set, and structures in place to promote blended learning, adopting an innovative practice is a gradual and sometimes lengthy process for a community (Rogers, 2003). While Graham et al. (2013) advanced knowledge in the field with the Blended Learning Adoption Framework about the stages and the strategy, structure, and support practices and mechanisms of a small number of institutions, less is known about how blended learning is diffused through social networks in higher education. While there are articles by authors from individual institutions providing a glimpse of some aspects of effective change management practice in specific

programs (Beaudoin, 2013), there are few studies in the literature about managing the diffusion process.

With meager research on how to successfully lead change in blended learning, expanding the literature search to include leadership in distance education resulted in a modest amount of articles and book chapters from which to draw. Beaudoin reviewed the literature on leadership in distance education and characterized it as conspicuously thin (Beaudoin, 2013). With few generalizable studies to draw from in leadership in distance education, Beaudoin mines the literature on change management drawn from other settings that he believes can be "appropriately applied" (p. 470). Among these general works, he cites Kotter's *Leading Change* (1996) and Schön's *The Reflective Practitioner: How Professionals Think in Action* (1983), a precursor to his work with Chris Argyris on organizational learning and a foundation upon which Senge writes *The Fifth Discipline* (1997).

Several researchers use Rogers' Diffusion of Innovations Theory (Rogers, 2003) as the conceptual foundation for their inquiry in the adoption of educational technologies and innovations (Sahin, 2006) to understand the adoption process of the individual and the propagation of the innovation through social networks in an organization or system. With little specific research surrounding the adoption of blended learning, this section of the literature review considers these two conceptual frameworks of organizational change management as they relate to individual, coalition, and eventually institutional adoption of an innovation, Rogers' (2003) Diffusion of Innovations Theory and John Kotter's (1995) Eight Stages of Change Model.

Rogers' Diffusion of Innovations Theory

Everett Rogers, a sociologist and scholar in communications and the author of *Diffusion of Innovations*, a book first published in the early 60s and in its fifth edition in 2003, outlined a corpus of research on the process of the diffusion of innovations. Rogers (2003) defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). In his book, Rogers (2003) describes how and why innovations are accepted and propagated by individuals. Rogers' work illuminates the complex and highly social process by which people adopt and diffuse innovation. By describing the individual decision process, Rogers' supplies insight to the human psychology of acceptance of change. For each individual, the phases of deciding on whether to accept a new practice involves:

- Awareness
- Being persuaded
- Deciding
- Implementing the change
- Confirming the decision

This individual process is played out with each person and at different rates depending on their psychological propensity to accept change. Rogers' describes five different categories of adopter profiles ranging from innovator, early adopter, early majority, late majority, and laggards, each with their own characteristics.

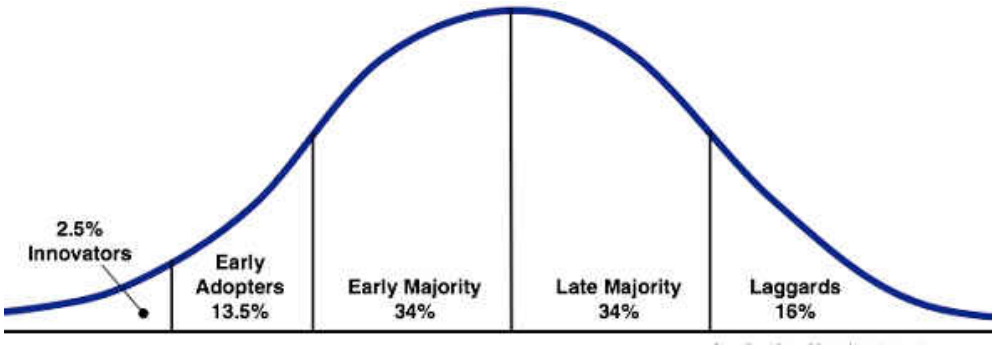


Figure 4: Rogers' Diffusion of Innovation Adopter Categories
Source: Rogers, E. M. (2003). Diffusion of innovations. Free Press. New York, NY.

Kotter's Change Management Model

John Kotter, former Harvard Business School professor, after analyzing dozens of organizational initiatives over a 15-year period, proposed an eight-step process for successful change (Kotter, 1995) that extended psychologist, Kurt Lewin's model (Hickman, 2010). Lewin, in 1951 conceived a simple three-step model using the analogy of the changing phases of water to ice and ice to water. The three steps in his approach outline (1) unfreezing the behavior of the individual, (2) making the change process, and then (3) re-crystallizing the behavior of the individual to solidify the change (Hickman, 2010). Kotter's model expanded Lewin's model by explicitly identifying actionable processes for leaders to follow.

Kotter's eight steps include:

- Establishing urgency
- Forming a guiding coalition
- Creating a vision
- Communicating the vision
- Empowering others to act
- Planning for change
- Consolidating improvements, and lastly
- Institutionalizing new approaches

Melding Rogers' and Kotter's Conceptual Models

Rogers' insights into the human psychology of the individual's decision and the social nature of diffusion of innovations can augment and inform Kotter's eight-stage process of change prescription. Though there is no mention of Rogers in Kotter's book *Leading Change,* many aspects of the eight-stage model support and build upon the Diffusion of Innovations Theory. In Kotter's first stage, a leader must create urgency through communicating the problem or challenge facing the organization. In Rogers' explanation of an individual's decision process, the first step is making the individual knowledgeable that there is a problem, challenge, or an innovation waiting to be employed. Both models first consider the importance of communication of the problem and need for change. In the second stage, Kotter advises that the leader must form a guiding coalition. The guiding coalition is a group devoted to developing the vision and shepherding the change by bringing others into the fold. This stage represents the strongest intersection between the

two models. While Kotter calls for forming the guiding coalition, Rogers is specific about who is most likely and should be part of that coalition. He describes those who are willing to adopt an innovation and who are influential in the social system as *early adopters*. These early adopters are generally well respected and integrated into the social fabric of the organization. They serve as role models and are careful about their decisions to adopt. By choosing a guiding coalition with the proper characteristics, the leader is providing a catalyst for change. By understanding that each individual has a personal change process that runs on a varied schedule from innovator to laggard, the leader can adapt the process with situational awareness. In the third, fourth, and fifth stages of creating and communicating vision and empowering others to act, Kotter proposes empowered leadership and distributed leadership models. Kotter believes like Schön, that "we must develop institutions which are "learning systems" … systems capable of bringing about their own continuous transformations" (Hickman, 2010, p. 512). In stage 6, planning for change and creating short-term wins, Kotter overlaps Rogers' notion that for an individual to try an innovation, they must be persuaded. Even after trying an innovation, an individual must confirm their experience after implementation for them to continue using the innovation. By planning for short-term wins, the leader has the opportunity to persuade those who have yet to try the innovation and also can confirm and celebrate the experience of those successful with the innovation.

The Role of Organizational Learning in Kotter's Model of Change Management

Kotter's model outlines operational steps to affect change in an organization. In step two, Kotter (1995) describes the formation of a guiding coalition to develop the change

vision. While the concept of organizational learning is a prescribed as a continuous state for change management (Argyris & Schön, 1974), the guiding coalition is the catalyst for wider organizational learning (Kotter, 1995; Senge, 1995). The guiding coalition is tasked with examining their own mental models, developing a shared vision, examining the problem through team learning and systems thinking (Senge, 1995).

Summary of Factors Influencing Adoption of Blended Learning

Together the structural, human resources, symbolic, and political factors influence the diffusion of academic technologies and transformational pedagogies. Table 4 summarizes the factors outlined in this chapter.

Table 4: Factors Influencing Adoption of Blended Learning

Structural factors	Technology infrastructure
	Blended learning definition and institutional awareness
	Strategic and implementation plan
	Blended learning courses recognized in registration and scheduling system
	Formal course evaluation system
Human resource factors	Support systems; technologic and pedagogic
	Incentive systems for support to transition courses
	Conflict in intellectual property
Symbolic factors	Changing role of instructor
	Faculty belief in status quo culture; didactic teaching methods
	Faculty belief that face-to-face teaching methods are superior
	Tenure and promotion system: misalignment of faculty and institutional goals
Political factors	Individual's propensity to adopt innovation
	Diffusion of innovation through institution; advocacy
	Change management process

CHAPTER THREE: METHODOLOGY

A needs assessment evaluation of the learning ecosystem at Iowa State University was conducted to answer these research questions:

- What educational technologies are currently used and what technologies will be needed in the future?
- What are the attitudes and practices toward online and blended learning?
- What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

Program and Setting

The learning ecosystem, as defined by the ISU administration, includes physical and virtual learning spaces, academic technologies, and the support for the technologies and people using the technologies. The learning ecosystem is not a traditional program tackling one specific problem. Rather, it is a system of solutions serving an array of stakeholders in varying configurations and supported by the Academic Technologies Department and the Center for Excellence in Learning and Teaching (CELT) (ISU, eLearning, 2014).

Technologies and Support for Physical Learning Spaces

The ISU Academic Technologies Department supports classroom teaching and learning with presentation and interactive technologies including data projectors and monitors, video capture, video decks, document cameras, audio systems, audience response systems and access to the campus network. These media-enhanced classrooms are referred to as "smart classrooms" (ISU, Academic Technologies, 2014).

Technologies and Support for Virtual Learning Spaces

The Academic Technologies Department collaborates with the Center for Excellence in Learning and Teaching (CELT) to support online learning by facilitating the learning management systems (LMS), and a variety of collaboration and software applications by providing server support, recovery, and troubleshooting. The Academic Technologies Department also offers software programming and server support for the ThinkSpace Web-based instructional platform (ISU, Academic Technologies, 2014). The Center for Excellence in Teaching and Learning supports E-learning through workshops and one-to-one guidance on how to effectively use the technology, including both procedural instructions and pedagogic strategies. For faculty considering developing a blended or online course or digital components for a face-to-face course, CELT provides assistance in developing a teaching strategy, conceptualizing and outlining the elements of the course, as well as guiding grant-writing and developing a budget for the project (ISU, eLearning, 2014).

Online and Distance Learning

Iowa State University offers approximately 50 programs and certificates, and over 900 online/distance education courses annually of a total of 5000 undergraduate and graduate courses. Nearly all online/distance programs are graduate, certification, and professional development programs with the exception of one bachelor's program and two Ph.D. online programs (http://www.distance.iastate.edu). There is no formal policy, definition, or registration designation for blended learning courses at this institution although there is

anecdotal evidence that blended learning, in a variety of forms, is occurring, though to what extent is uncertain (Twetten, 2014).

Evaluation Framework

To assess the needs of the learning ecosystem in this complex environment, a Practical Participatory Evaluation (P-PE) approach was employed for this study in combination with a context evaluation model. A needs assessment evaluation is an instrumental tool for aligning strategic thinking, planning, implementation, evaluation, and continuous improvement (Watkins, Kaufman, & Odunlami, 2013). Needs assessment can serve a leadership team by diagnosing an organization and "determining its readiness for moving in a new direction" (Watkins et al., 2013).

Practical Participatory Evaluation Approach

Cousins and Whitmore describe the P-PE approach as a collaboration between the evaluator(s) and the stakeholders to broaden decision-making, to co-construct knowledge, and promote social change and support for decisions (Cousins & Whitmore, 1998). The P-PE approach supports organizational change by aiding in making plans and decisions and serving an educative or organizational learning function (Cousins & Chouinard, 2011, p. 23). Conducting a needs evaluation using the P-PE approach not only has value in its findings but also in the process of engaging constituents in the conversation. The process of evaluation becomes a facet of the change agent (Cousins & Chouinard, 2011). Returning to the conceptual foundation of organizational learning discussed in Chapter Two, the needs assessment facilitated in the P-PE approach is a tool to assist the institution in the broader conversation about their strategy for leveraging academic educational technologies. To

guide the development of the participatory evaluation, Ralph Napolitano, Associate Director of Online Learning, the Center for Excellence in Learning and Teaching and Jim Twetten, Director of Academic Technologies (co-chairs) invited and organized participants to form a Steering Committee (see Table 5).

Table 5: ISU LEARN Steering Committee

Jim Twetten	Information Technology Services, Director of Academic Technologies
Ralph Napolitano	Associate Director for Online Learning and Teaching
Thomas Brumm	Associate Professor, Agricultural and Biosystems Engineering
Veronica Dark	Director of Undergraduate Studies in Psychology
Allan Schmidt	Assistant Director for Learning Technologies, Center for Learning and Teaching

Additionally a Representative Committee of 30 participants was also convened. This approach cast a wide net to facilitate a participative evaluation approach and involved participants in a variety of disciplines and positions.

Table 6: Representative Committee Members

Ted MacDonald	College of Agriculture & Life Sciences
Gaylan Scofield	College of Agriculture & Life Sciences
Scott Grawe	College of Business
Greg Buttery	College of Business
MIke Miller	College of Design
Gary Mirka	College of Engineering
Margi Tabor	Facilities Planning & Management
Katie Baumgarn	Facilities Planning & Management
Wes Hamstreet	Government of the Student Body
Carla Peterson	College of Human Sciences
Jenn Plagman-Galvin	College of Human Sciences
Heather Thompson-Bolles	College of Liberal Arts & Sciences
Dave Anderson	College of Liberal Arts & Sciences
Greg Davis	ISU Library
Amy Tehan	Professional & Scientific Council
Clair Andreasen	College of Veterinary Medicine
Denise Crawford	Faculty Senate IT Committee
Robert Hartzler	Faculty Senate IT Committee
Brian Mennecke	Faculty Senate IT Committee
Alex Braidwood,	Faculty Senate IT Committee
Ana-Paula Correia	Faculty Senate IT Committee
Jacob Harrison	Faculty Senate IT Committee
Larry Booth	Faculty Senate IT Committee
Kristine Stacy-Bates	Faculty Senate IT Committee

Context Evaluation Model

Daniel Stufflebeam categorized the context evaluation as one of the types of evaluation in his CIPP evaluation framework. CIPP is an acronym representing the types of evaluations: context, input, process, and product (Stufflebeam, The 21st century CIPP model, 2004). The context evaluation serves the decision-making process by studying the current context and asking:

- What are the needs and problems of the constituencies?
- What assets are being deployed and what else might be required to meet the needs?
- What opportunities may be exploited to meet the identified needs?
- What are the core values and goals of the organization as they relate to the subject of inquiry (Stufflebeam, 2004)?

These questions help decision-makers assess the context, prioritize needs, and provide guidance for next steps (Worthen, Sanders, & Fitzpatrick, 2011).

Applying this model to the context at ISU to assess the needs of the students, faculty, and teaching assistants related to the learning ecosystem and the supporting technologies and services resulted in three areas of inquiry. The first line of inquiry surrounded the academic technologies currently used or desired in the physical and virtual classrooms. The second line of inquiry examined the experience, attitudes, and motivations related to online and blended learning. The context of importance in this line of inquiry did not center on technology, rather it focused on the organizational culture and each constituency's preparedness and propensity to adopt online and blended learning modalities. The last line of inquiry was on the current and desired support structures and services to facilitate use of

the academic technologies to promote learning. The process followed the *Evaluation Plans and Operations Checklist* developed by Daniel Stufflebeam with the following stages and themes considered: (a) conceptualization of the evaluation, (b) socio-political factors, (c) technical design, (d) management plan, and (e) moral/ethical imperatives, and (f) utility provisions (Stufflebeam, Evaluation design checklist, 2004).

Evaluation Methodology

Instruments

The Learning Ecosystem Assessment and Review of Needs (LEARN) evaluation entails interviews of the deans of each college, focus groups and surveys of faculty and teaching assistants, and students at ISU. The three broad topics of inquiry are:

- What educational technologies are currently used and what technologies will be needed in the future?
- What are the attitudes and practices toward online and blended learning?
- What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

The study is a sequential mixed methods design combining qualitative and quantitative data. The purpose of collecting qualitative data from interviews and focus groups is to inform the development of the survey instrument reflective of the topics important to the community and to triangulate data sources. A primary benefit of combining qualitative and quantitative methods is that by using both types of research, "the overall strength of a study is greater than either qualitative or quantitative research" (Creswell & Plano Clark, 2007).

Interviews with the Deans

Design, data collection procedures, and data analysis

In Spring 2013, Deans and Associate Deans were interviewed to investigate background information about the unique needs of each college and perceptions of the deans about their constituency's use and attitudes toward academic technologies at ISU.

Focus Groups

Design, Data Collection Procedures, and Data Analysis

Focus groups were conducted in Fall 2013 to further develop topics to be surveyed. The Representative Committee invited faculty, staff, and students to create a convenience or volunteer sample of participants that represented all colleges and position types. Notices of the sessions were posted by e-mail and in the campus notification system to anyone wishing to participate. The focus group protocol developed by the evaluators was reviewed and further developed by the Steering Committee. The external evaluators conducted 10 (8 faculty and staff and 2 student) sessions with 8–12 participants each over a two-week period. Each evaluator, using a protocol of questions (see Appendix A), conducted the one and a half hour sessions. Evaluators collected data through note taking and recording (audio) of the sessions. Results of the focus group discussions were compiled and coded by theme and then summarized for the Representative Committee. The focus group sessions served to refine the survey instrument. Although the survey instrument was under simultaneous development, any new topics mentioned in the focus groups (and worthy of inclusion) and not in the survey were added before the survey was implemented.

Surveys

Design, Data Collection Procedures, and Data Analysis

As a participatory evaluation design, the Steering Committee was actively involved in the development of the topics and reviewing drafts of the survey instruments.

To focus the evaluation, the major topical evaluation questions were explored with the Steering Committee in a series of meetings to answer the following questions.

- What is it that ISU and the stakeholder clients and participants want to know?
- What type of evaluation is feasible with the data available or that can be gathered?
- Who are the targets of the investigation?
- What sampling techniques should be employed?
- What instruments and protocols need to be developed, if any?

After a series of discussions and drafts of topics to be explored, it was determined that three major research questions would be investigated:

- What educational technologies are currently used and what technologies will be needed in the future?
- What are the attitudes and practices toward online and blended learning?
- What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

Faculty, graduate teaching assistants, and students, were surveyed at Iowa State University's seven colleges. See the faculty, teaching assistant, and student survey instruments in Appendix B.

Sampling of Faculty, Teaching Assistants, and Students

Faculty members were defined as tenured, non-tenured eligible, non-tenured eligible, continuing appointment, and probationary and included all ranks (professor, associate professor, or lecturer) including both full-time and part-time status. Sampling of teaching assistants were defined as Graduate Assistants – TA and Graduate Assistants – TA/RA. Students were defined as undergraduate and graduate, full-time and part-time students currently enrolled in classes. Entire faculty, teaching assistant and student populations were invited to participate in the survey through university e-mail notification. The university population and response rate for faculty, teaching assistants, and students appear in Table 7.

Table 7: Survey Population and Responses

Population	University Population	Survey Responses	Response Rate (percent)
Faculty	1825	458	25.1
Teaching Assistants	1125	198	17.6
Students	31109	5225	16.8
Total	34059	5881	17.3

Survey Development, Testing, and Distribution

The Institutional Review Board, Office of Responsible Research at Iowa State University, Ames, Iowa approved the study (see Appendix C for approval document). Through a participative evaluation process, the ISU Learn Steering Committee and the external evaluators collaborated to develop the survey instruments. The ISU Research Institute for Studies in Education, Iowa State University, piloted the survey instrument through the Qualtrics Research Suite to a small group of volunteers. The pilot test was conducted to determine understandability and readability of content as well as the

reliability of the operation of the adaptive questions. Based on the volunteer survey-takers feedback, revisions were made to the final survey. The final survey was announced in advance in the Iowa State Daily newspaper and web site and through personal contact of the LEARN Steering Committee and Representative Committee to their departments and other constituencies. A hyperlink to the voluntary survey was sent to potential participants via their university e-mail address. Those not responding within a week were sent follow-up e-mails with the link. According to Dillman (a graduate of ISU), repeating contact with potential survey participants can increase participation and reduce non-response error (Dillman, 2011). There were no incentives for the faculty and teaching assistant surveys. However, an incentive of a chance to win an Apple iPad in a drawing was offered to students participating. Survey invitations were open to the participants for two weeks from the first invitation. The survey consisted of three sections: Educational Technologies, Online and Blended Learning Environments, and Technology Support, had 35 questions including some that were adaptive to reduce the number and complexity of the inquiry.

Data Collection Procedures

Data were collected through open e-mail surveys of the entire faculty, teaching assistant and student populations with reminder follow-ups e-mails sent to non-respondents. See Table 2 for the population, survey responses, and response rates by each sub-population. The sample sub-populations were tested for representativeness using a *z* test of proportions (see Appendix XX).

All questionnaires by respondents who completed the last question of the survey were analyzed. Each version of the survey includes 5,6, and 7 point Likert items of bi-polar

choices, categorical scale, and open-ended items. The quantitative data were evaluated using the Statistical Package for Social Sciences (SPSS). Results were reported with descriptive statistics. To analyze the data, non-parametric procedures including frequencies, contingency tables, and chi-square statistics were performed.

The qualitative data from the open-responses were imported to NVIVO for further analysis and a coding scheme developed to determine emerging themes. Inter-rater reliability was not an issue since one evaluator reviewed all survey data.

Limitations

This sampling procedure for this evaluation limits the ability to generalize results to the entire population. For the focus groups, the Steering Committee invited participation creating a convenience sample, though there were efforts to create a purposive sample representing various constituencies. The sampling procedure for the surveys was through a census e-mail (with follow up reminders to participate) and volunteer response rather than random selection. Non-response is a possible source of error. The instruments were not tested for reliability and validity. A test of representativeness revealed many, but not all, sub-populations were proportionately represented.

CHAPTER FOUR: RESULTS

The Iowa State University Learning Ecosystem Assessment and Review of Needs (LEARN) study, conducted in 2013, surveyed faculty, teaching assistants, and students in three areas of inquiry, (a) educational technologies, (b) online and blended learning, and (c) academic technology support. The Learning Ecosystem encompasses both the physical and virtual learning spaces and their supporting technologies, both critical components to teaching and learning experiences. The evaluation questions were:

- What educational technologies are currently used and what technologies will be needed in the future?
- What are the attitudes and practices toward online and blended learning?
- What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

The goal of the study was to inform the university's strategic plan for academic technologies, support for the technologies, and the strategy for adoption of online and blended learning. The results from each of the surveys are organized by the corresponding evaluation question. The survey instruments appear in Appendix B and all charts and figures for each survey question appear in Appendix B without annotation.

LEARN Faculty Survey Results Executive Summary

Results to answer the evaluation question: What educational technologies are currently used and what technologies will be needed in the future?

The educational technologies used by most of the faculty are those facilitating communication (e-mail), presentation (classroom projectors and applications like PowerPoint), and administration (LMS) (Table 8). Technologies least used by faculty are collaboration tools, social networking, assessment technologies, and class response systems (Table 8). Video capture systems are used by 43 percent of the respondents but it unclear how frequently. Allen & Seaman (2012) found that nationally only a small proportion of faculty (20 percent) employ lecture capture on a regular basis.

Table 8: Q3 Educational Technologies That Faculty Currently Use or Plan to Use to Support Courses this Academic Year (Percent)

Educational technology	
Email	98
Projector and/or other audio visual (AV) enhancements	96
Presentation software applications (e.g., PowerPoint, Keynote)	92
Learning management software (e.g., Blackboard, Moodle)	91
Online library resources	7
Document sharing (e.g., Google docs, Dropbox)	57
Online or digital resources provided by others (e.g., educational publishers or open education resources)	55
Online discussion groups or group assignments	52
Computer simulations/exercises	51
Computer labs	45
Lecture capture or video-capture systems	43
Out-of-class online testing–from home or other unsupervised location	29
Classroom response systems (e.g., clickers)	29
Collaboration tools (e.g., Whiteboard, Illuminator)	28
Live synchronous video systems (e.g., video conference)	26
Student & community writing tools (e.g., blogs, wikis)	23
Out-of-class online testing--proctored testing center	23
Social networking sites (e.g., Facebook, Twitter, Google+)	19
Classroom response systems using student mobile devices	18
In-class online testing	17
Live chat rooms	15
Social bookmarking sites (e.g., Diigo, Reddit)	4

Smart Classrooms, a designation by Iowa State University meaning a media-enhanced physical classroom which typically includes a projector, audio and video system, and an Internet connection, are in demand with only 6 percent never or rarely using the classroom technology (Table 9).

Table 9: Q10 Faculty Use of Smart Classrooms
(Classroom with Projector and/or Other AV Enhancements (Percent)

Never	Rarely	Sometimes	Often	Always
4	2	8	17	69

Though faculty members generally agree that the Smart Classroom technology improves the students' learning experience (68 percent), there is a frequent call for better maintenance of the systems and standardization of equipment in every classroom.

Table 10: Q11 Faculty Response to:
When you teach a course in a smart classroom (e.g., classroom with a projector, other AV enhancements) compared to a classroom without technology, how would you rate the students' learning experience? (Percent)

Much Worse	Somewhat Worse	About the Same	Somewhat Better	Much Better
5	6	21	29	39

The Learning Management System, while broadly employed (Figure 5), is used mostly as an administrative tool or 'file cabinet' with only 48 percent using it for collaboration functionality and 54 percent for class discussions (Table 11). With 95 percent of those polled reporting that they use the LMS for uploading documents (e.g., class materials, syllabus) and 88 and 87 percent, respectively, using it to collect assignments and report grades, faculty use is largely transactional.

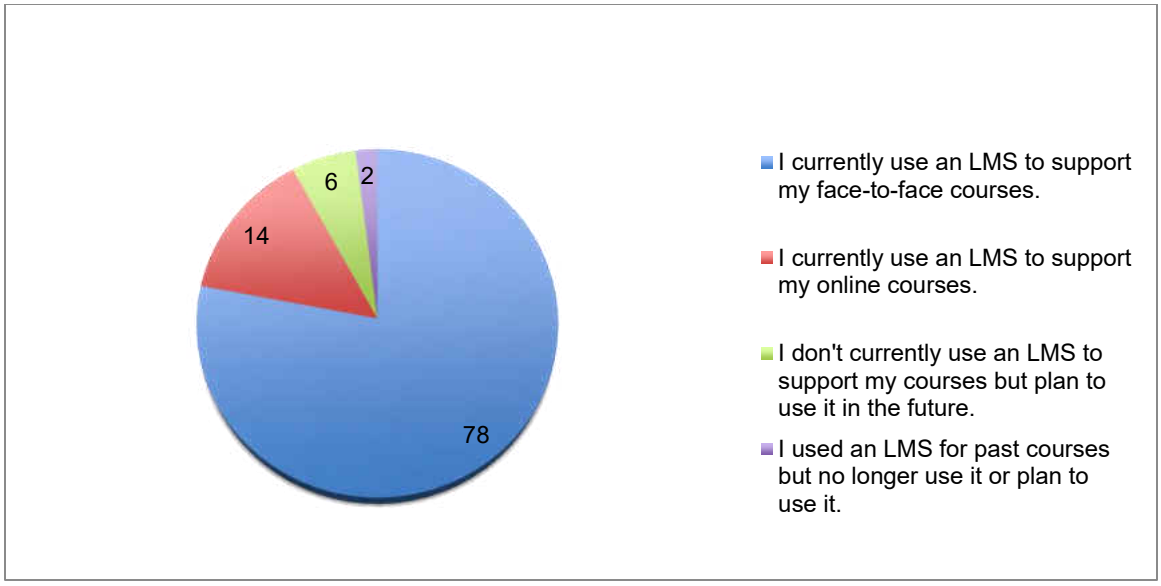


Figure 5: Q6 Faculty Use of a Learning Management System to Support Courses (Percent)

Table 11: Q6 Faculty Use of a Learning Management System to Support Courses (Percent)

I currently use an LMS to support my face-to-face courses.	78
I currently use an LMS to support my online courses.	14
I don't currently use an LMS to support my courses but plan to use it in the future	6
I used an LMS for past courses but no longer use it or plan to use it.	2

According to Lou Pugilese, CEO of Moodlerooms (acquired by Blackboard in 2012), the current versions of LMS technology are built on a core system that was devised to "simplify, how learning is scheduled, deployed, and tracked as a means to organize and manage learning materials" (Pugilese, 2012, p. 50). The faculty pattern of usage of the LMS aligns with national surveys conducted by Allen and Seaman (2012).

When asked what additional LMS features faculty would like to use, most of the comments are suggestions for improvement on existing features, reliability and efficiency of the system, or substitutions to features of the system. A recurring theme in various parts of the survey is that faculty do not need more technology tools, they need reliable, standard, better-designed, and

functional tools. The LMS topped the list as both the "biggest frustration" and "biggest satisfaction" with technology at ISU. However, when asked "If you could make one change to how technology is used at ISU, what would that change be?" the LMS was not a frequent response. The educational technologies least used by faculty are social learning tools and online testing systems. It is unclear whether lack of use of the social communication and assessment tools is a pedagogic choice or a reaction to the transactional nature or design of the current LMS. While there was not universal agreement about whether the current LMS meets faculty needs, the prospect of transitioning to and learning a new system was met with circumspection.

One confounding element to use of assessment features in the LMS is the reports of overloads to the system infrastructure and frequent crashes when large numbers of students are engaging in an online quiz. Likewise students report that when trying to upload online homework to meet a deadline, they are frequently unable to complete the task due to crashes and poor connectivity. Though it is unclear where this problem resides, in the LMS, the IT infrastructure, or at the client site (possible WiFi connectivity issues), failure of the system to perform will discourage use and become a barrier to adoption of more online and blended courses. Likewise faculty members voiced their concern with student cheating using online assessment systems.

Online content sources supplement physical course materials and lectures with 49 percent of faculty using online publisher resources, 60 percent using free open educational resources like Wikipedia and YouTube, but very few use content from MOOCs (Table 12).

Table 12: Q5 Content Sources Faculty Use to Accompany Classroom Face-to-face Courses (Percent)

Content Source	Never	Rarely	Sometimes	Often	Always
Online publisher course materials	35	26	22	12	5
Online free open educational resources (e.g., Wikipedia, Khan Academy, YouTube)	20	19	34	23	3
Content from MOOCs (Massive Open Online Courses, e.g., Coursera, edX, iTunesU, offerings directly from other universities like MIT Open Courseware)	77	14	6	2	0

Results to answer the evaluation question: What are the faculty attitudes and practices toward online and blended learning?

Experience teaching an online course varied by college, with 50 percent or more of the faculty reporting experience teaching an online course in the Colleges of Agriculture and Life Sciences, Engineering, and Human Sciences, while the other colleges reported experience in online teaching of less than 30 percent (Figure 6). Experience teaching in a blended learning modality was low across the board with (less than 35 percent reporting experience teaching at least one course) with the exception of the College of Human Sciences at 52 percent (Figure 6).

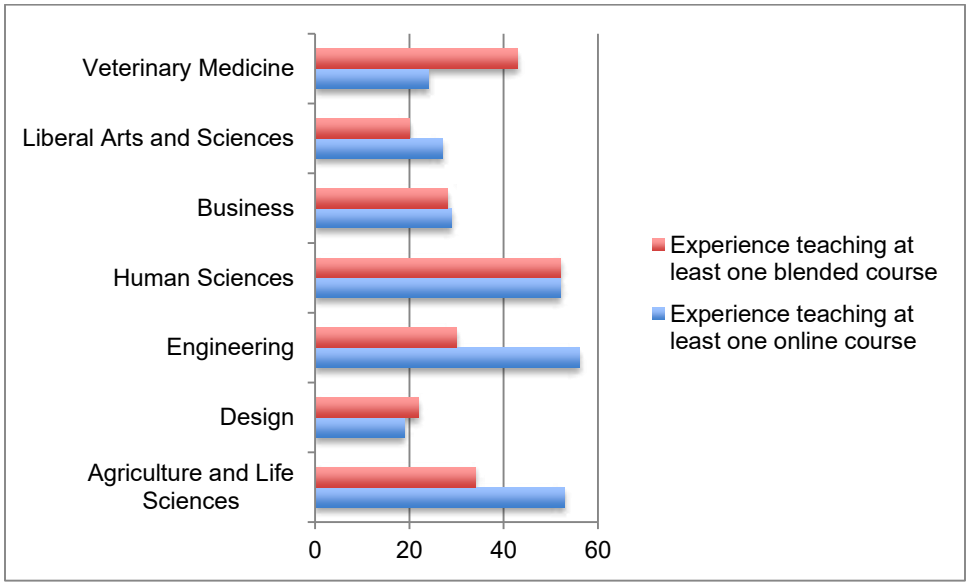


Figure 6: Q13 & 18 Faculty Experience Teaching
in Online and Blended Modalities By College Affiliation (Percent)

For those with experience teaching an online course, satisfaction varied widely by college affiliation. The College of Human Sciences reported the greatest satisfaction teaching online while the College of Design had the least satisfaction. Again, blended courses had higher satisfaction rates than online courses across the board (Figure 7).

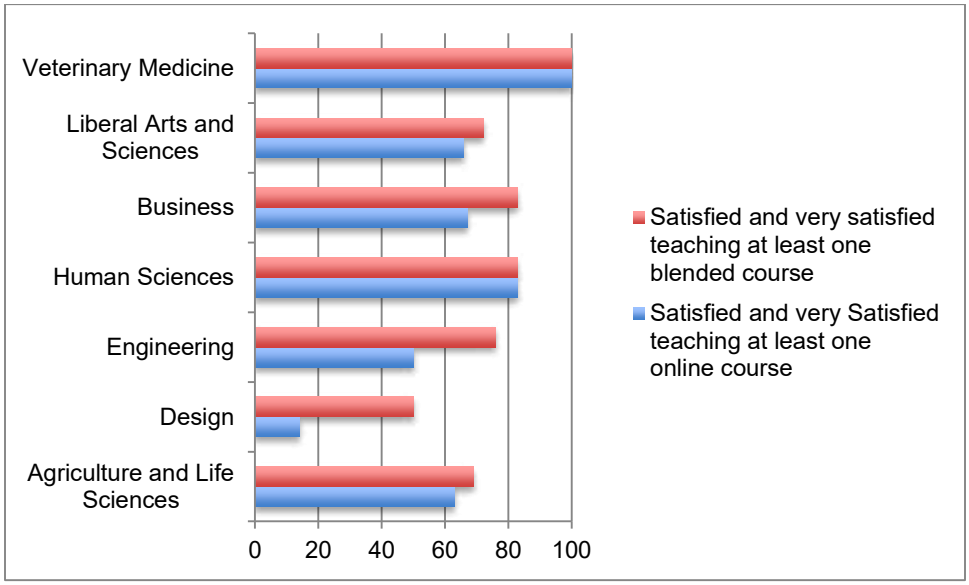


Figure 7: Q14 & Q19 Faculty Satisfaction in Teaching in Online and Blended Modalities (Includes Satisfied and Very Satisfied Responses) By College Affiliation (Percent)

While experience teaching online and blended courses is low overall, the majority of faculty is willing to consider teaching an online or blended course in the future, 75 percent would consider teaching an online course and 84 percent would consider teaching a blended course (Figure 8).

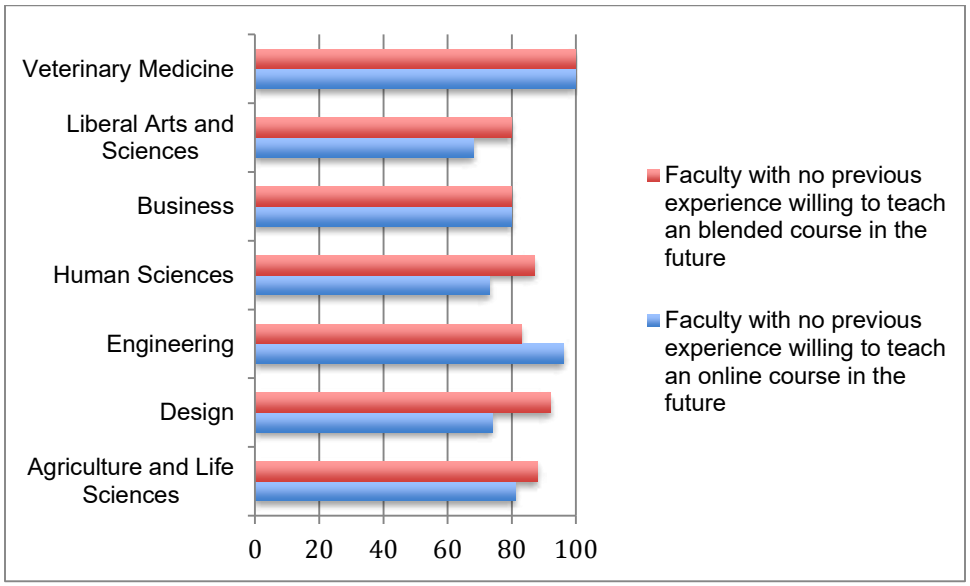


Figure 8: Q15 & Q20 Faculty Attitude Toward Teaching
in Online and Blended Modalities with No Former Experience
(Includes Perhaps and Yes Responses) By College Affiliation (Percent)

Of the faculty who would not consider teaching online or blended courses, most took the time to write an open-ended response explaining why they would not consider online modalities, citing the following reasons.

- Increase in workload, the perceived inefficiency of an online system, and a lack of time to develop and administer an online course
- Belief that online instruction is not appropriate for what they teach, how they teach, and the type of student they teach.

- Many simply prefer the experience of being face-to-face and the personal interactions of classroom teaching.
- The loss of non-verbal cues would be detrimental to their ability to teach.
- Lack of belief in online learning; belief that it is an inferior modality

Although a majority of faculty would consider teaching an online or blended course, they do not believe that the learning outcomes of online and blended modalities are equivalent with a face-to-face course (42 percent and 32 percent, respectively) (Figure 9).

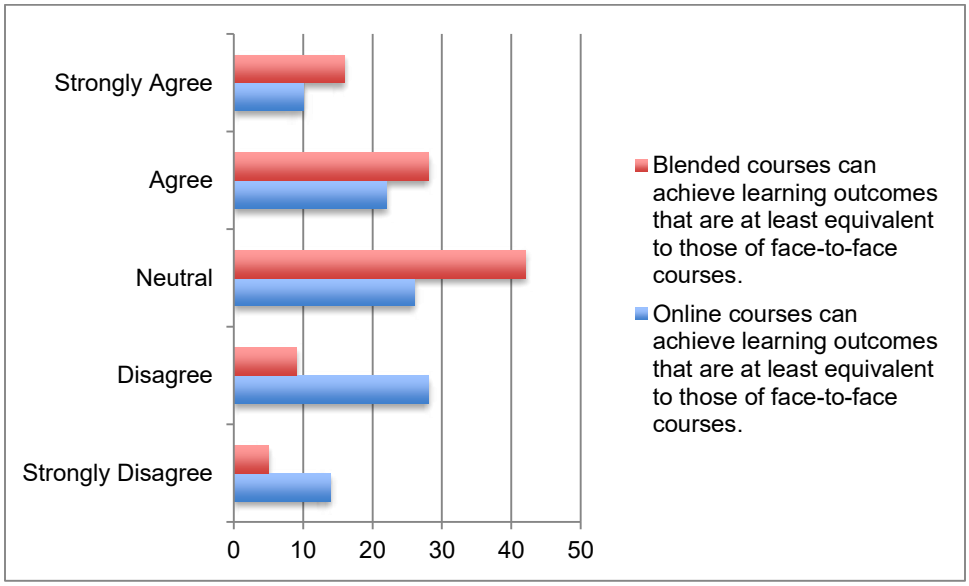


Figure 9: Q17 & Q22 Faculty Agreement that Online or Blended Learning Can Achieve Outcomes Equivalent to Face-to-Face Courses (Percent)

The proportion of ISU faculty believing online courses are inferior exceeds that measured by a national poll conducted by Allen & Seaman (2013) of 25 percent. When the ISU data is disaggregated, the results illustrate that those with experience teaching an online or blended course have a more positive belief about learning outcomes with online modalities (Table 13).

Table 13: Crosstabs Comparing Experience Teaching Online and Blended Modalities with Belief that Face-to-Face Courses and Online or Blended Courses Can Achieve Equivalent Outcomes

	Online		Blended	
	Agree and Strongly agree	Disagree and Strongly disagree	Agree and Strongly agree	Disagree and Strongly disagree
Experience teaching modality	66	26	72	9
No experience teaching modality	18	50	32	15

The data also reveal less faculty skepticism about the efficacy of blended learning regardless of experience. However it is unclear whether those who teach online and blended modalities have a predilection before ever engaging in the practice or if through experience are convinced that equal learning outcomes are achievable.

The top three barriers overall to teaching in these modalities included lack of time, funding and technical skills to develop an online or blended course (Figure 10).

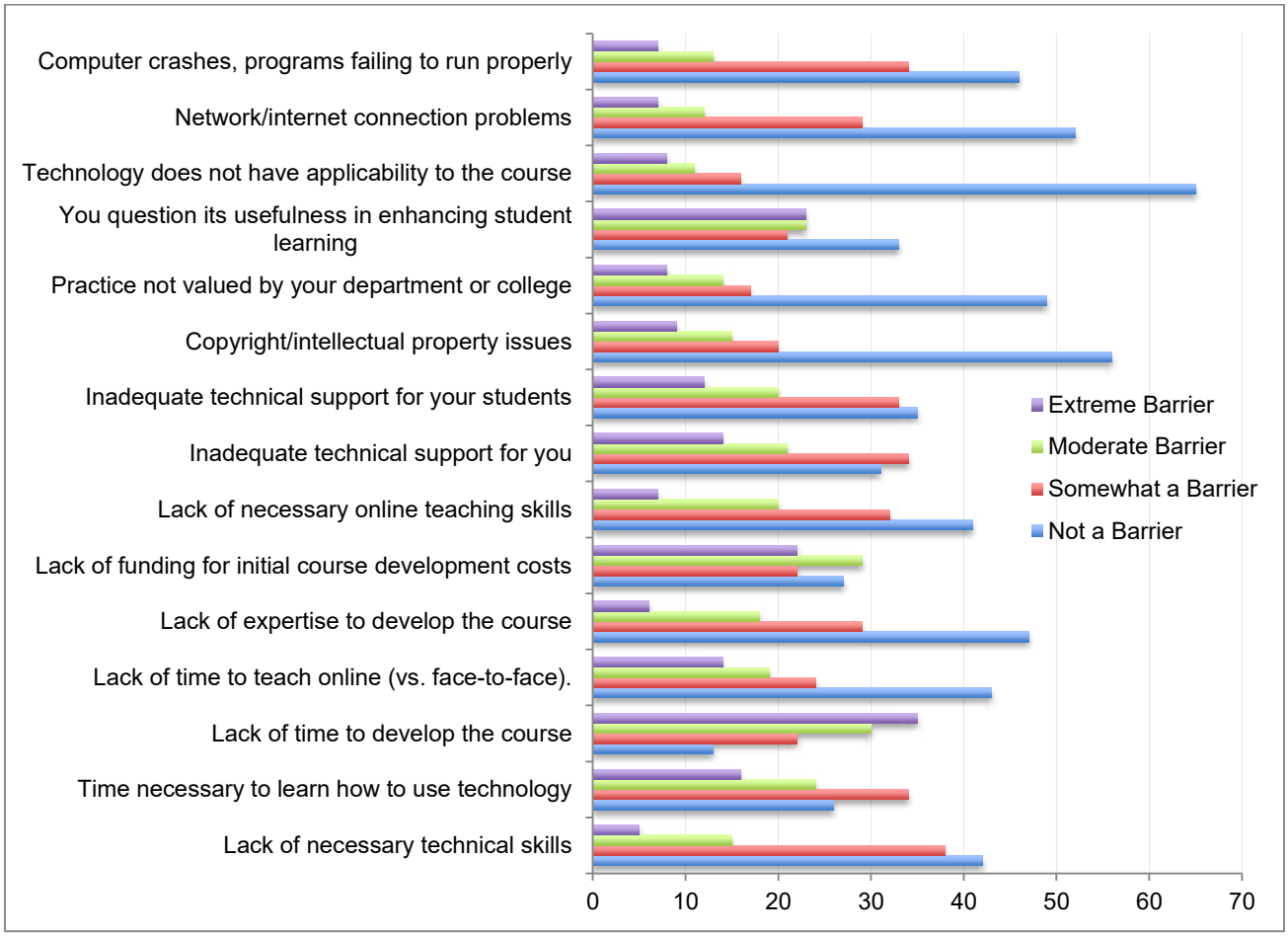


Figure 10: Q26 Barriers to Faculty Teaching an Online or Blended Course (Percent)

If faculty were asked to teach an online or blended course, a majority (58 to 76 percent) reported that they would need instructional design, technical, and course development support, financial incentives and release time (Table 14).

Table 14: Q36 Types of Faculty Support Required for Online Teaching (Percent)

Instructional design support	67
Pedagogic support	39
Technical support	76
Financial incentive	61
Release time	58
Course development	62
Assessment design	53

Providing robust support structures and incentives that address the needs of faculty in the transition, development, and ongoing implementation of blended courses is a hallmark of institutions in the mature phase of adoption (Graham et al., 2012) and key to quality blended courses (Moskal et al., 2013). Lack of these instructional and technical support structures are cited as barriers to adoption of blended learning (Cook, Ley, Crawford, & Warner, 2009; Howell, Saba, Lindsay, & Williams, 2004: Ocak, 2011; Oh & Park, 2009).

The top three motivators to teaching an online or blended course included flexibility in the schedule, the ability to work from home, and to meet the demand of students who like online and blended courses (Figure 11).

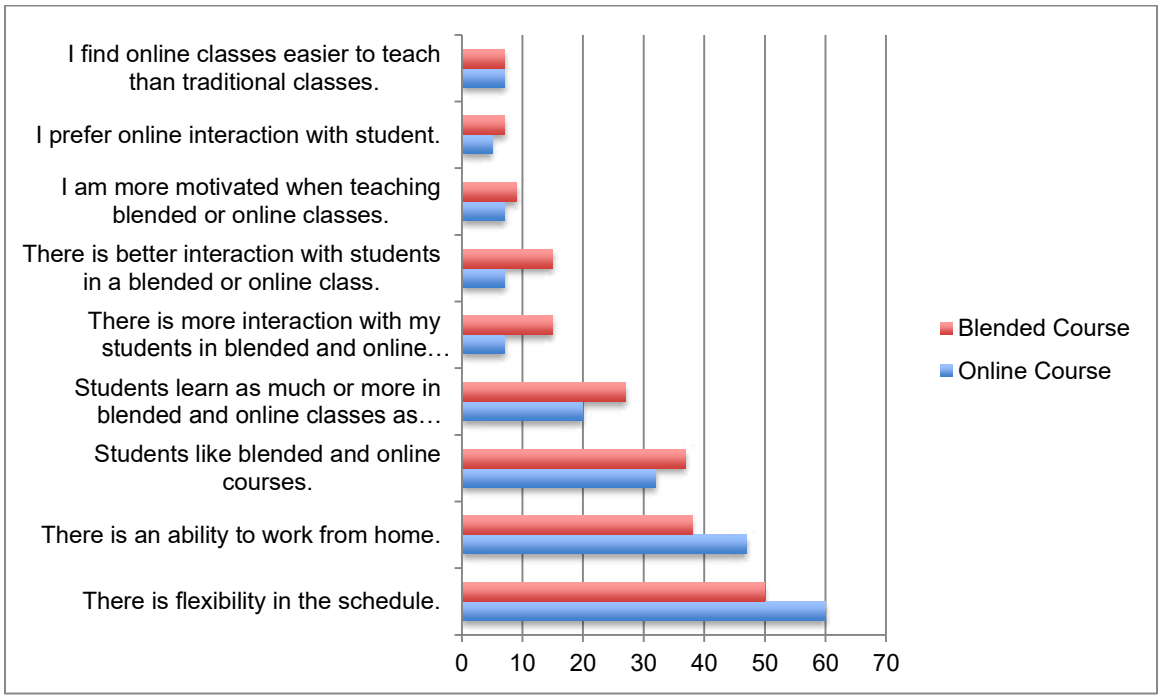


Figure 11: Q25 Reasons Faculty Would Consider Teaching an Online or Blended Course (Percent)

Results to answer the evaluation questions: What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

There is broad satisfaction with technology support services with less than less than 10 percent dissatisfaction in most categories (Table 15).

Table 15: Q28 Faculty Satisfaction With the Following Aspects of the Central Support Help Desks (ITS, CELT, FPM) (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Overall quality of help desk support	2	6	19	40	33
Knowledge and professionalism of the help desk support staff	1	6	20	38	35
Communication and follow-up on problem resolution	3	7	20	36	35
Ability of help desk to diagnose your problem	2	8	23	34	32
Ability of help desk to solve your problem	2	9	22	36	31
Time required to resolve the problem	4	9	22	35	30
Overall quality of the solution	2	7	24	34	33
Hours of help desk availability	2	8	28	35	28
Documentation to solve a problem	3	10	35	28	23

Generally faculty are more satisfied with their college support desk than central services support (Table 16) and more likely to call on them when they need support (Table 17). Calling on the colleague down the hall for tech support is a very close second to the college support staff (Table 17).

Table 16: Q29 Faculty Satisfaction with the Following Aspects of Their College/Department Educational Technology Help Desk (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Overall quality of help desk support	2	7	15	35	41
Knowledge and professionalism of the help desk support staff	3	5	16	33	44
Communication and follow-up on problem resolution	2	9	18	29	42
Ability of help desk to diagnose your problem	2	8	17	33	41
Ability of help desk to solve your problem	2	8	19	32	40
Time required to resolve the problem	5	11	18	31	35
Overall quality of the solution	2	7	20	30	42
Hours of help desk availability	2	11	24	32	31
Documentation to solve a problem	3	8	33	22	33

Table 17: Q34 Preferences in Rank Order in Response to the Question:
When you need support for the technology you use, where do you prefer to receive it? (Percent)

	Rank 1	Rank 2	Rank 3	Rank 4
Colleague down the hall/in my building	37	26	27	10
Colleague in my discipline (on and off campus)	4	16	36	44
College support staff	35	28	16	21
Central support staff (ITS/CELT)	25	30	21	24

While faculty are pleased with the overall quality of helpdesk support and the professionalism of the staff, they feel there needs to be more timely support and that the support teams are understaffed.

Satisfaction in training service is highest when conducted on a one-to-one basis (Table 18). Disaggregated data of faculty satisfaction by college appears in Table 61 in Appendix C. Also noted in Table 61 is the number of responses that was significantly lower than for other questions in the survey. It is unclear whether respondents simply chose to skip these questions or if very few use the training services.

Table 18: Q30 Faculty Satisfaction with the Following Training Provided by Central Services (ITS, CELT, FPM) (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
One-on-one consultation	1	4	15	29	51
Material available on ISU website	2	9	29	42	18
Email notifications of new technology services	2	7	32	36	22
Workshops on how to use technology	2	6	28	37	26
Workshops on best instructional practices to integrate technology with classroom teaching	3	6	30	36	26

Respondents commented equally with a variety of complaints and compliments. The compliments fell into two categories, (a) general comments of satisfaction with the services provided, and (b) compliments specifically for the CELT and ITS teams. The complimentary comments were either very general or uniquely specific and no themes emerged. The complaints and suggestions for improvement were predominately about slow time to response, lack of problem resolution, and poor customer service skills by help desk staff. The strongest theme in this response set was about the satisfaction with CELT support.

Other Notable Findings

With several open-ended opportunities to comment, faculty raised issues not explicitly asked in the survey. Some used the opportunity to lobby for a thoughtful conversation about the role of technology in education. Others raised policy issues surrounding the use of technology in education and the move toward online modalities.

LEARN Student Survey Results Executive Summary

Results to answer the evaluation question: What educational technologies are currently used and what technologies will be needed in the future?

The educational technologies most used by the faculty as reported by the students are similar to those reported by faculty with near universal use (greater than 90 percent) of presentation software applications, a learning management system, e-mail, and equipment in a Smart Classroom (Table 19).

Table 19: Q6 Student Reported Versus Faculty Reported Educational Technologies Used In Their Courses (Percent)

	Student	Faculty
Presentation software applications (e.g., PowerPoint, Keynote)	94	92
Learning management software (e.g., Blackboard, Moodle)	94	91
Email	93	98
Projector and/or other audio visual (AV) enhancements	90	96
Document sharing (e.g., Google docs, Dropbox)	52	57
Online discussion groups or group assignments	50	52
Computer simulations/exercises	49	51
Computer labs	49	45
Online or digital resources provided by others (e.g., educational publishers or open education resources)	48	55
Classroom response systems (e.g., clickers)	48	18
Online library resources	40	7
Out-of-class online testing–from home or other unsupervised location	39	29
Collaboration tools (e.g., Whiteboard, Illuminator)	38	28
Out-of-class online testing--proctored testing center	31	23
Pre-recorded video lectures	28	43
Social networking sites (e.g., Facebook, Twitter, Google+)	22	19
In-class online testing	18	17
Student & community writing tools (e.g., blogs, wikis)	16	23
Classroom response systems using student mobile devices	13	18
Live synchronous video systems (e.g., video conference)	8	26
Live chat rooms	7	15

The major differences noted in the reporting between the two groups were in the following categories:

- use of classroom response systems (students report 48 percent, faculty report 29 percent)
- use of live synchronous video systems (students report 8 percent, faculty report 26 percent)
- use of online library resources (students report 40 percent, faculty report 67 percent)

The Learning Management System, while broadly employed, is used mostly as an administrative tool or "file cabinet" with only 50 percent using it for collaboration functionality and 52 percent for class discussions (Table 20).

Table 20: Q11 Student Use of a Learning Management System (Percent)

To check your grades	97
To submit an assignment	91
To upload documents (e.g., class materials, syllabus, class notes)	89
Online quizzes or tests	82
For class discussion	52
For group collaboration	50

When asked what additional LMS features students would like to use, most of the comments were suggestions for improvement on existing features, mostly surrounding the grade book and calendar features. Students like using Learning Management Systems with the affordances of aggregated materials and information about their courses (Table 20).

While the LMS appears high on the list as both the "biggest frustration" and "biggest satisfaction" with technology at ISU, the students view the problems differently than faculty.

Students are frequent users of the LMS with over 75 percent of the students logging in and checking the LMS daily or multiple times per day (Table 22).

Table 21: Q64 Frequency of Student Log In to LMS (Percent)

Monthly or less	Weekly	A Few Times per Week	Daily	Multiple Times per Day
1	6	18	30	45

Many students wish that all of their professors used an LMS. However, they want faculty to use only one LMS, not Blackboard and Moodle and the instructor's own web site. Students report that nearly 70 percent have courses using multiple learning management systems (Table 22).

Table 22: Q10 Student Reported Use of Simultaneous Multiple Learning Management Systems (Percent)

Never	Rarely	Sometimes	Often	Always
13	18	16	22	31

Students report weariness of trying to figure out the interface and functionality for multiple sites. And if the University could settle on one LMS, they seek uniformity in the appearance of each course site. However, these comments paled by comparison to the amount and insistence on the need for better Internet and Wi-Fi connection, in general and to the Learning Management Systems. Crashes, slow response, and the inability to complete assigned homework due to poor network infrastructure are the most frequent complaints and the biggest area for improvement from the student's perspective.

A vast majority (90 percent) of the students take courses in Smart Classrooms (Table 23) and appreciate the functionality and generally believe it enhances their learning (Table 24).

Table 23: Q14 Student Reported Faculty Use of Smart Classrooms (Classroom with Projector and/or Other AV Enhancements (Percent)

Never	Rarely	Sometimes	Often	Always
5	5	15	35	40

Table 24: Q15 Student Response to: When you take a course in a smart classroom (e.g., classroom with a projector, other AV enhancements) compared to a classroom without technology, how would you rate your learning experience? (Percent)

Much Worse	Somewhat Worse	About the Same	Somewhat Better	Much Better
1	6	27	40	26

While students recommended numerous ideas for more technologies to enhance learning, a common refrain was for more recorded videos of face-to-face lectures posted online. Students value the flexibility in time and space of online technologies and appreciate the ability to see a lecture they missed or the ability to review a lecture to gain more clarity or study for an exam.

Table 25: Q7 Frequency of Student Access of Pre-recorded Lectures (Percent)

Once a Day	Once a Week	Only to Review for an Exam
10	40	50

Results to answer the evaluation question: What are the student attitudes and practices toward online and blended learning?

Students have more experience taking an online course (65 percent) than faculty members have teaching one (38 percent) (Table 27). Students also have more experience taking a blended course (38 percent) than faculty members have teaching one (29 percent).

Table 26: Q18 & Q25 Student Experience Taking at Least One Online or Blended Course (Percent)

Experience taking at least one online course	65
Experience taking at least one blended course	38

For students with no experience taking online or blended courses, the majority is willing to consider taking an online or blended course in the future (79 percent would consider taking an online course and 87 percent would consider taking a blended course) (Table 26).

Table 27: Q22 & Q27 Students Without Previous Experience Taking an Online or Blended Course Who Would Consider Taking an Online or Blended Course in the Future (Percent)

Students with no previous experience willing to consider taking an online course in the future	79
Students with no previous experience willing to consider taking an blended course in the future	87

Students who would not consider taking online or blended courses, explain why they would not consider online modalities, citing the following reasons.

- A preference for a face-to-face modality
- A lack of interest in the modality
- Meta-cognitive awareness that face-to-face classes are required for self-motivation
- A desire for peer and instructor collaboration and discussion

Although a majority of students would consider taking an online or blended course, many do not believe that the learning outcomes of the online modality are equivalent with a face-to-face course (44 percent) (Table 28). When the same question is posed about blended learning having equivalent learning outcomes as face-to-face courses, almost 70 percent of the students are neutral, neither agreeing nor disagreeing (Table 28). This may reflect their lack of experience in taking blended courses or not understanding what is meant by the term (an issue raised in the faculty survey, despite a definition).

Table 28: Q24 & Q29 Student Agreement that Online or Blended Learning Can Achieve Outcomes Equivalent to Face-to-Face Courses (Percent)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Online courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	12	31	26	23	8
Blended courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	1	9	69	18	3

The top two motivators to taking an online or blended course included flexibility in the schedule and the ability to work from home (Table 29).

Table 29: Q32 Reasons Students Would Consider Taking an Online or Blended Course (Percent)

Motivating Factors	Online Course	Blended Course
There is flexibility in the schedule.	78	45
There is an ability to work from home.	79	43
I like or think I would like blended and online courses.	40	44
Students learn as much or more in blended and online classes as compared to face-to-face classes.	25	36
There is more interaction with my instructor in blended and online courses.	13	31
There is better interaction with my instructor in a blended or online class.	13	30
I am more motivated when taking blended or online classes.	18	26
I prefer online interaction with my instructor.	21	22

The top three reasons to not take an online or blended course are, (1) lack of motivation in an online or blended environment, (2) technical obstacles, and (3) lack of feedback from an instructor (Table 30).

Table 30: Q33 Student Reasons Not to Take an Online or Blended Course (Percent)

Reason	Online Course	Blended Course
Lack of motivation in an online environment.	61	35
Technical obstacles like browser issues, computer crashes, or poor Internet connection.	42	26
Lack of feedback from instructor.	30	30
Lack of necessary technical skills	28	14
Lack of academic skills for an online environment.	28	15
Lack of computer or Internet connection.	24	15
Time necessary to learn how to use technology	23	14

Results to answer the evaluation questions: What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

While there is not broad satisfaction with technology support services there is likewise little dissatisfaction. Students prefer to seek help from a friend (70 percent), online (57 percent), or their instructor (56 percent) rather than from ITS Central Services (23 percent) or their college held desk (6 percent) (Table 31) and are satisfied with the results (Table 32).

Table 31: Q35 Technology Support Sources Used by Students (Percent)

Another student	70
Online resources	57
Instructor/TA	56
ITS help desk (solution Center)	23
College help desk	6

Table 32: Q41 Student Satisfaction with the Following Sources of Technology Support

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Another student	1	1	19	55	24
Online resources	1	2	22	53	22
Instructor/TA	3	5	21	50	21
ITS help desk (Solution Center)	4	6	36	37	17
College help desk	3	5	59	25	8

Other Notable Findings

With several open-ended opportunities to comment, students raised issues mostly covered in this summary with the exception of their suggestion that faculty need training in how and when to use technology for best results in teaching and learning.

CHAPTER FIVE: DISCUSSION

The Iowa State University Learning Ecosystem Assessment and Review of Needs (LEARN) study, conducted in 2013, surveyed faculty, teaching assistants, and students in three areas of inquiry, (a) educational technologies, (b) online and blended learning, and (c) academic technology support. The Learning Ecosystem encompasses both the physical and virtual learning spaces and their supporting technologies, both critical components to teaching and learning experiences. The evaluation questions were:

- What educational technologies are currently used and what technologies will be needed in the future?
- What are the attitudes and practices toward online and blended learning?
- What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

The goal of the study was to inform the university's strategic plan for academic technologies, support for the technologies, and the strategy for adoption of online and blended learning. The following discussion including implications and recommendations is organized by the evaluation questions posed.

Educational Technologies

What educational technologies are currently used and what technologies will be needed in the future?

Learning management system

The LEARN evaluation began with the question of whether to renew the current vendor's learning management system (LMS) contract or consider a new LMS. Neither a majority of faculty or students is calling for a new LMS solution nor additional technology features. Although there is a contingent that are ready to move to a new LMS, for most faculty surveyed, a transition to a new LMS is a worrisome prospect. The predominant message was to make the current system work more efficiently and be more reliable. However, it is unclear whether the problems being reported are the fault of the LMS or the network infrastructure. With most of the faculty using the LMS as an administrative and communication tool, many of the more sophisticated affordances are not leveraged. Whether the limited use of the LMS by most faculty members is a pedagogic choice, a lack of training, or an avoidance of a poorly designed feature is not clear.

Implication 1: Consider renewing the LMS contract on a yearly basis due to the lack of broad support to change the system. However, with the evolution of newer learning management systems built on more robust and configurable architectures, consider a longer-term plan to transition. The design of the current LMS solution may inhibit growth in online and blended expansion where collaboration and learning analytics play a larger role. Planning for the transition from an LMS system originally designed for mostly transactional and administrative functions to systems that are natively designed to facilitate learning communities, effectively employ learning analytics, leverage content clouds and open educational resources, and have ease of use for faculty

creating online course components will require a guiding coalition. There will need to be faculty education about the possibilities, models and benefits to catalyze the demand to change to a new LMS.

Implication 2: Determine if the failure of the grade book feature of the LMS to calculate grades based on a supplied algorithm is a problem of educating the faculty on the feature or a design constraint of the system. The students also remark that the grading feature lacks sophistication.

Implication 3: Investigate the reports of difficulty in administering large sections of online assessments as well as student difficulties in posting homework assignments. It is crucial to address these transactional barriers to continue expansion of online and blended learning as well as to support face-to-face programs and courses with large growth in enrollments.

Smart Classrooms

The media-enhanced Smart Classrooms are well used and an expected resource for teaching in a physical environment by faculty and students. Faculty members appreciate the upgraded classrooms but call for standardization in devices, proactive maintenance, and on-demand and speedy support.

Implication 4: Consider a proactive maintenance plan to ensure systems are operating when faculty arrive to teach.

Implication 5: Consider standardizing equipment in each classroom for ease of use by faculty.

Implication 6: Consider a plan to assist faculty in the classroom in a more timely fashion.

Implication 7: The top pick by students for greater use of a technology is video recorded lectures. About half the students responding indicate that they view the recorded lectures to

review for exams and the other half more frequently. Less than half of the faculty report that they record lectures or plan to use the technology in the future.

Online and Blended Learning

What are the attitudes and practices toward online and blended learning?

Although this evaluation investigated the experience, attitudes, practices, and beliefs of faculty and students regarding both online and blended learning, this discussion is limited to factors promoting blended learning. ISU currently offers approximately 50 programs and certificates, and over 900 online/distance education courses annually of a total of 5000 undergraduate and graduate courses. However, the university is not formally leveraging blended learning to help meet the needs of the students, faculty, and the institution. ISU has no blended learning formal definition, policies, course designation, or scheduling scheme to leverage the potential of combining face-to-face and online learning. ISU is experiencing increased enrollments, difficulty in scheduling facilities, decreasing funding, and a governor and Board of Regents demanding efficiency and transformation in how education is delivered. The adoption of blended learning on an institutional scale can be part of the solution.

The benefits of strategically scaling blended learning on an institutional level include, increased access for students, higher student retention, efficient use of facilities by reducing seat time, an improved return on investment, and an opportunity for faculty to design improved learning experiences (Moskal et al., 2012). Blended learning also offers the faculty opportunities to design teaching and learning environments that promote interaction through facilitating a community of inquiry that can lead to increased student engagement (Dzuiban, Hartman, &

Moskal, 2005). Researchers, at the University of Central Florida, report that student perceptions of blended learning environments are more positive when compared to face-to-face environments and that when designed well, blended environments can improve learning outcomes (Dzuiban, Hartman, & Moskal, Accessibility, 2005). Lastly, blended learning offers a "toe in the water" approach for faculty to try online modalities, to learn how best to incorporate online into their course. The LEARN faculty survey revealed that faculty had fewer reservations about blended learning environments and better attitudes about learning outcomes and would be more apt to adopt this this modality versus teaching an all online course. Blended learning may act as a gateway to transforming how faculty use online technologies and promote the adoption of more effective and efficient learning environments.

The following implications of survey results about online and blended learning are organized in the Bolman and Deal (2008) framework, previously discussed in the literature review (Table 4). The Bolman and Deal Four Frame Model construct advocates that administrators should consider a problem in multiple perspectives, lenses, or frames. Informed by academic organizational theory and research in the social sciences, each frame offers the examiner a unique vantage point from which to inspect a problem (see Chapter 2 for a more in-depth explanation of the model). Using the four frames including structural, human resources, symbolic, and political factors, the current literature on the adoption of blended learning guided the inquiry and now provides the scaffold for the discussion and recommendations. Examining this complex problem of practice in a complex organizational system, using the Bolman and Deal framework, allows the researcher to consider the problem and possible solutions using multiple lenses. The framework also organizes the

thinking and inquiry that may be used by the ISU guiding coalition to promote organizational learning about the factors and strategies influencing the adoption of blended learning.

Table 33: Factors Influencing Adoption of Blended Learning

Structural factors	Strategic and implementation plan
	Technology infrastructure
	Blended learning definition and institutional awareness
	Blended learning courses recognized in registration and scheduling system
	Formal course evaluation system
Human resource factors	Support systems; technologic and pedagogic
	Incentive systems for support to transition courses
	Conflict in intellectual property
Symbolic factors	Changing role of instructor
	Faculty belief in status quo culture; didactic teaching methods
	Faculty belief that face-to-face teaching methods are superior
	Tenure and promotion system: misalignment of faculty and institutional goals
Political factors	Individual's propensity to adopt innovation
	Diffusion of innovation through institution; advocacy
	Change management process

Structural Factors

Bolman and Deal (2008) characterize the structural frame as how organizations allocate, organize and integrate the work and how functional groups are organized. In the structural frame, institutions in the mature phase of blended learning adoption have developed robust strategic and operational structures (Graham et al., 2012).

Implication 8: Develop a blended learning strategic plan with broad participation from the university community and aligned with the overall university strategic plan. According to Hitt and Hartman, in the Educause Review article "Two Views of Alignment", the inclusion, visibility, and accountability of the entire university community in strategic planning is essential for alignment of institutional, college, program, and faculty goals (Hitt & Hartman, 2010). Faculty responding to the

prompt, "If you could make one change to how technology is used at ISU, what would that change be?" demonstrated the desire to affect institutional policy and the culture of teaching and learning as they relate to technology. Through survey responses, focus groups, and discussions with faculty, it was observed that faculty seek to examine the role of technology and the institutional motivations to leverage online learning. An organizational learning approach to strategic planning will give voice to a variety of stakeholder perspectives.

Implication 9: Determine if the technology infrastructure is adequately serving the campus. Both student and faculty responses indicate that network and Internet connection, computer crashes, and applications failing to run properly are significant frustrations and barriers to adoption of online modalities (Table 30). Investigate the reports of LMS crashes during large-scale assessments and the inability to upload homework. Once a strategic plan for blended and online learning growth is completed, perform a needs assessment for infrastructure to meet that growth.

Implication 10: Currently ISU has no institutional definition of blended learning, no designation in the registration system, no apparent policy regarding blended learning, and little institutional awareness. Create a guiding coalition to evaluate and adopt a definition of blended learning, make recommendations for policy, and increase awareness of pedagogic and logistical affordances and benefits of blended learning. In the process of defining what blended learning means to their institution, those involved engage in a learning community to create a collective understanding and help drive institutional awareness of the innovation (Moskal et al., 2013). Create a designation for blended learning in the registration system and coordinate with facilities scheduling to leverage the decrease in seat time for courses with the designation.

Implication 11: Develop a course evaluation plan for continuous improvement. Consider adopting the Sloan-C 5 Pillars Quality Framework that measures (a) learning effectiveness, (b) cost effectiveness and commitment, (c) access, (d) faculty satisfaction, and (e) student satisfaction (The Sloan Consortium, 2014). Sloan-C also offers a scorecard measuring 70 quality indicators to measure and quantify elements of online learning programs (The Sloan Consortium, Sloan-C Quality Scorecard for the Administration of Online Education Programs, 2014).

Consider gathering longitudinal data for future researchers and evaluators to measure the impact of implementing blended learning. At the University of Central Florida, researchers have the benefit of rich data sets from which they pose research questions to help to assess, track, plan, and continuously improve blended learning implementations (Moskal et al., 2013).

Human Resource Factors

Bolman and Deal (2008) describe the human resource frame as the relationship between people and organizations (p. 137). Human resource factors found in the literature include faculty development and support, the time-consuming nature of online and blended learning modalities for faculty, lack of incentive to transitions existing courses, and intellectual property issues.

Implication 12: Evaluate the faculty development support structures for online and blended teaching. To plan and implement an online or blended course, more than half of all faculty members indicate there are barriers for which they need support (Table 30). Faculty survey responses indicate the majority will need technical, pedagogic, and developmental support to transition their courses to online or blended modalities. Contrasted to the need for support, the faculty satisfaction with support in these areas is high. However, an in-depth program evaluation of

the Center for Teaching and Learning (CELT) is recommended to determine if there is alignment with the strategic plan and to determine if the support structures are scalable.

Hartman, Dzuiban, and Brophy-Ellison (2007) advocate that scalable support is essential for sustained growth in their Educause Review article entitled *Faculty 2.0*. Building on Clark and Dede's concept (2009) that scalable educational innovation should be simultaneously replicable and adaptable, *Faculty 2.0* argues against the boutique faculty development model where assistance is delivered lacking a systematic approach. The Instructional Technologies and Resources Department at UCF operates with a systematic approach to faculty development with an umbrella of support services including the Center for Distributed Learning, Course Development, and The Research Initiative for Teaching Effectiveness. This group is responsible for academic planning and prioritization, faculty support, course development, applied research for instructional innovation, program evaluation and an array of other services related to online and blended teaching.

Implication 13: Conduct a policy review to determine whether faculty goals and institutional goals align. Faculty cite the following barriers to teaching an online or blended course: lack of time to develop the course (87 percent), lack of time to teach online versus face-to-face (57 percent), lack of funding for initial course development costs (73 percent), and lack of value by their department or chair (51 percent). Provide incentives to overcome these barriers such as, release time, one-to-one development support, funding of course development, and finally, recognition of faculty for excellence in online and blended teaching.

Implication 14: Review the intellectual property policy, if one exists. Develop an intellectual property policy that is clearly articulated and transparent.

Symbolic Factors

Bolman and Deal (2008) describe the organization through the symbolic frame centering on organizational culture. Organizational culture, as defined by Bolman and Deal (2008), is shared basic assumptions adopted by a group to accomplish its mission, and is perpetuated and taught to new members as the accepted way to perceive, think and feel in relation to this mission.

Implication 15: Be aware of the various belief systems held by faculty regarding their role and the role of technology in education. Though few faculty members have experience teaching in online (37 percent) and blended (29 percent) modalities, they are more optimistic about the effectiveness of blended learning, despite lack of experience. Only 14 percent disagree or strongly disagree that blended learning can achieve outcomes equivalent to face-to-face courses versus 42 percent who disagree or strongly disagree with the same statement about online learning. Blended courses may act as drivers of institutional transformation (Dziuban et al., 2011) since they combine the familiar face-to-face mode with some of the flexibility in time and space of online learning. The faculty members most strongly opposed to online modalities express the need to interact face-to-face with their students, see their expressions, and engage in person. Blended learning allows for the continuation of that didactic role.

Political Factors

Bolman and Deal (2008) describe the organization through the political frame as coalitions, or social networks, composed of individual and groups with enduring differences competing for resources and power. Factors in the political frame related to the adoption of blended learning include the acceptance of an innovation by individuals, coalitions, and the dissemination or

diffusion of the innovation through social networks in the institution. Bolman and Deal (2008) propose advocacy for addressing factors in the political frame, one of the key strategies identified by Graham et al. (2013) and included in their Blended Learning Adoption Framework.

Implication 16: Develop a long-term change management process based on organizational learning. The LEARN study involves a wide swath of stakeholders to help guide the endeavor. Continuing to involve the university community to co-construct the transformation through self-reflection, inquiry, dialogue, team learning, a shared vision, and systems thinking (Senge, 1990) employing the tenets of organizational learning. The goal of organization learning, according to Argyris and Schön is to create a system that is "…capable of bringing about their own continuous transformation" (Argryis & Schön, 1974, in Hickman, 2010, p. 512).

Implication 17: Operationalize the change management plan using Kotter's Eight Stages of Change Model (1995).

- Establish urgency
- Form a guiding coalition
- Create a vision
- Communicate the vision
- Empower others to act
- Plan for change
- Consolidate improvements, and lastly
- Institutionalize new approaches

Implication 18: Consider that promoting and diffusing an innovation such as blended learning, as Rogers' explains it, is a social process propagated by individuals with varying propensities and

timetables to adopt innovations. In forming the guiding coalition, consider Rogers' (2003) Diffusion of Innovation Theory in choosing participants. The guiding coalition should represent a range of attitudes, roles, and adopter characteristics from innovator to laggard. However, include a majority of early adopters in the guiding coalition. Though innovators are champions of new innovations and early to adopt, often they are not influential convincing others to do the same. Leaders who fit the early adopter profile generally are more respected and integrated into the social fabric of the organization. They serve as role models and are careful about their decisions to adopt. By choosing a guiding coalition with the proper characteristics, the leader provides a catalyst for change (Rogers, 2003).

This same concept may be applied to a college or department that may have motivating factors or the propensity to embrace new methods of teaching with technology. For example, the responses from the College of Engineering about willingness to teach an online or blended course with no experience were very positive with 96 and 83 percent willing to teach an online and blended course, respectively (Table 23). The growth in enrollments in this college is spurring interest in new methods of instructional delivery. However, it is the College of Engineering that reported the failure of the LMS to handle large sections of students taking online assessments, so infrastructure needs to be in place for expansion. The largely positive College of Engineering response to the question of willingness to teach online or blended learning courses is contrasted with more tepid response from the faculty in the Colleges of Design and Liberal Arts and Sciences. Whereas the engineering faculty members embrace the idea of online teaching over blended teaching, the faculty in the College of Design and Liberal Arts and Sciences are more willing to try blended learning (Table 23). The entry point for these colleges may be a few carefully chosen

courses to blend and become the model for replication. Another group demonstrating more willingness to try online and blended teaching are the non-tenure eligible instructors when compared to probationary and tenured professors.

Technology Support

What academic technology support services are used?
What are the perceptions of the support provided for the application of academic technologies?

Implication 19: Consider supporting faculty in a more timely fashion when called about an issue in a Smart Classroom. There is broad satisfaction with technology support services in other areas with less than less than 10 percent dissatisfaction in most categories (Table 31). Generally faculty are more satisfied with their college support desk than central services support (Table 32) and more likely to call on them when they need support (Table 37). While faculty are pleased with the overall quality of helpdesk support and the professionalism of the staff, they feel there needs to be more timely support and that the support teams are understaffed.

Implication 19: Evaluate the enrollment patterns for training and survey participants to determine how best to serve the training needs. Although satisfaction in the training service is highest when conducted on a one-to-one basis, this concierge model may not be a logical choice for scalability.

Conclusion

The LEARN evaluation was a first step in understanding the academic technology needs of the ISU community. The evaluation provided insight into answering: (a) What educational technologies are currently used and what technologies will be needed in the future? (b) What are the attitudes

and practices toward online and blended learning? (c) What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies? Taken together, the answers to these questions, can inform the university on next steps to ready the institution for leveraging technology and preparing for the transformation sought by the governor and Board of Regents.

Subsequent to the reporting of the results from the LEARN evaluation, the LEARN Steering Committee formulated a set of recommendations (apart from the implications in this dissertation) currently being reviewed by the provost. Attention to the LEARN evaluation results was delayed by competing priorities and events at ISU. Reflecting on the LEARN evaluation, the Director of Academic Technologies, Jim Twetten, relayed that the process was a good exercise to start the conversation with the university community about their educational technology needs. He also noted that the process opened channels of communication between the departments and the provost concerning academic technology issues (J. Twetten, personal communication, May 23, 2014). Kickstarting the academic technologies conversation is the first step in organizational learning, a process, according to Argryis and Schön (1974), enabling an organization to collectively bring about their own continuous transformation (1974).

Limitations

The limitations of this study reside in the sampling procedures that limit the ability to generalize results to the entire University population. For the focus groups, the Steering Committee invited participation creating a convenience sample, though there were efforts to

create a purposive sample representing various constituencies. The sampling procedure for the surveys was through a census e-mail (with follow up reminders to participate) and volunteer response rather than random selection. Non-response is a possible source of error. The instruments were not tested for reliability and validity. A test of representativeness revealed many, but not all, sub-populations were proportionately represented.

Further Research

Further research and evaluation of these topics focused on individual colleges and departments would refine the analysis. While there were several discrete implications (previously discussed) with definable objectives, more research is necessary about the following topics.

- How are faculty members using technology for assessment? What is working and what is not? How would they like to leverage technology for assessment?
- What is the role of the recorded-lecture? Students would like more instructors to offer recorded lectures, but faculty use is low. What are the barriers to increasing the availability of recorded-lectures? Are recorded-lectures beneficial to student learning outcomes?
- There is little awareness and experience in blended learning modalities by faculty. Since the institution has no definition and blended learning is developing in a grass-roots manner, an evaluation to understand who is blending and how they are doing it is recommended.
- An evaluation of the training programs of the Center for Excellence in Learning and Teaching (CELT) is recommended to better understand the effectiveness of

programming and to determine if the model is scalable to expand online and blended learning.

APPENDIX A: FOCUS GROUP PROTOCOL

Focus Group Protocol

Introduction

Self-introduction and thank you for coming

Background on LEARN Project

The LEARN Project (Learning Ecosystem Assessment & Review of Needs)

The Learning Ecosystem at ISU encompasses both the physical and virtual learning spaces and their supporting technologies, both critical components to teaching and learning experiences.

The purpose of this focus group is to learn more about:

- *Your perceptions of the current state of this learning ecosystem and the support provided.*
- *Which aspects of the learning ecosystem you currently use and what would you like to be using.*
- *Your attitudes toward educational technologies, blended, and online learning.*

The information gathered here and in the surveys will be used to report back to the stakeholders to inform future decisions about the Learning Ecosystem. Identities will remain confidential to the investigators. We ask all participants to also practice confidentiality with what is discussed here today. This allows a free exchange of information and a richer discussion.

Round-Robin Introductions

Let's start by introducing ourselves. Please tell us your name and department/college, and share one example of how you use technology to support instruction.

Questions

Educational Technology Usage

- *How do you currently use or plan to use technology to support your teaching?*
- *What other technology / tools would you like to use?*
- *What video related technologies (e.g., lecture capture, video conferencing) are you currently using in your teaching?*

- *What support do you need for using video? (e.g., centralized video storage service, training sessions)*
- *What physical or technology changes to classrooms would you like to see to better support your pedagogical approaches?*
- *Tell us about how you currently use technology tools in the classroom.*
- *What technology tools would you like to be using in the classroom?*
- *How important is it to you to teach in a "smart" classroom — a classroom with a projector, other AV enhancements or computer? Would you be willing to walk across campus to be able to use a "smart" classroom?*
- *Is the support for classrooms meeting your needs?*

Support

- *Is the support for technology on campus meeting your needs? Why or why not?*
- *How do you use the help desk services provided by CELT and ITS?*
- *Are you aware that these are two different services?*
- *What types of support are missing that you would like to have available?*

Online and Blended

Online and Blended courses are evolving and can mean different things to different people. For the purpose of the LEARN Needs Assessment, we have adopted the following definitions:

Online course: A course that is deliberately designed for online learning, with at least 90% of the learning activities scheduled for online methods. The class would only meet in person at the beginning of the term or not at all.

Blended course: A course that is deliberately designed for blended learning, with at least 25% of the learning activities scheduled for online methods and at least 75% scheduled for face-to-face methods.

- *How do these definitions meet or not meet your definitions of online and blended learning?*
- *Tell us about your experience teaching an online or blended course.*
- *What additional support do you need for teaching an online or blended course?*

Wrap-up

Thank you again for taking time out of your busy schedules to participate in the focus group today. We have several groups scheduled with faculty, staff and students over the next couple of weeks. Please let your colleagues know about the LEARN Assessment and if they would like to participate in a group, contact Jim Twetten (jtwetten@iastate.edu) or Ralph Napolitano (ren1@iastate.edu). Feel free also to contact Jim or Ralph if you have questions about the project.

APPENDIX B: SURVEY INSTRUMENTS

Faculty Survey Instrument

The physical and virtual learning spaces and their supporting technologies are critical components to teaching ar learning experiences and outcomes. Together, these two components comprise the Learning Ecosystem at Iowa State University. The purpose of this survey is to assess: 1) your perceptions of the current state of this learning ecosystem and the support provided, 2) aspects of the learning ecosystem that you currently use and what you envision as future needs, and 3) your attitudes toward educational technologies and online teaching. This information will help inform future plans to improve the Learning Ecosystem at Iowa State University.

Thank you for your participation in this survey. For more information about the LEARN project, visit http:/learn.provost.iastate.edu or contact Jim Twetten (jtwetten@iastate.edu) or Ralph Napolitano (ren1@iastate.edu)

This survey has three parts and should take approximately 20 minutes to complete.
- Section 1 has questions about educational technologies.
- Section 2 has questions about virtual learning spaces like online, blended, and distance learning environments.
- Section 3 has questions about support for the learning ecosystem.

Your responses will be kept confidential. Only key research personnel from Iowa State University will have access to the data. No personal identifiable information will be linked to your responses. When we report the data, we will report aggregate responses, and no one will have access to your individual responses.

Please answer each question in the survey.

Section 1: Educational Technologies

Question 3

1. Indicate the technologies you currently use or plan to use to support your courses this academic year.

	Do not use	Currently use	Plan to us
Projector and/or other audio-visual (AV) enhancements	○	○	○
Presentation software applications (e.g., PowerPoint, Keynote)	○	○	○
Learning management software (e.g., Blackboard, Moodle)	○	○	○
Online or digital resources provided by others (e.g., educational publishers or open education resources)	○	○	○
Online library resources	○	○	○
Classroom response systems (e.g., clickers)	○	○	○
Classroom response systems using student mobile devices	○	○	○
Collaboration tools (e.g., Whiteboard, Illuminator)	○	○	○
Online discussion groups or group assignments	○	○	○
Document sharing (e.g., Google docs, Dropbox)	○	○	○
Student & community writing tools (e.g., blogs, wikis)	○	○	○
Social networking sites (e.g., Facebook, Twitter, Google+)	○	○	○
Social bookmarking sites (e.g., Diigo, Reddit)	○	○	○
Email	○	○	○
Live chat rooms	○	○	○
Computer simulations/exercises	○	○	○
Computer labs	○	○	○
In-class online testing	○	○	○
Out-of-class online testing--proctored testing center	○	○	○
Our-of-class online testing--from home or other unsupervised location	○	○	○
Lecture capture or video-capture systems	○	○	○
Live synchronous video systems (e.g., video conference)	○	○	○
Other (please list below)	○	○	○

Question4

2. Please list any other technologies (tools) you **would like to use** to support your courses.

Question 5

3. In your classroom-based face-to-face courses, rate the frequency you use the following.

	Never	Rarely	Sometimes	Often	Alway
Online publisher course materials	○	○	○	○	○
Online free open educational resources (e.g., Wikipedia, Khan Academy, YouTube)	○	○	○	○	○
Content from MOOCs (Massive Open Online Courses, e.g., Coursera, edX, iTunesU, offerings directly from other universities like MIT Open Courseware)	○	○	○	○	○
Other	○	○	○	○	○

Question 6

4. Select the statement(s) that best describe your use of a Learning Management System (LMS) to support your courses (e.g., Blackboard). Select all that apply.

- ☐ I currently use an LMS to support my face-to-face courses.
- ☐ I currently use an LMS to support my online courses.
- ☐ I don't currently use an LMS to support my courses but plan to use it in the future.
- ☐ I used an LMS for past courses but no longer use it or plan to use it.

Question 7

4a. Indicate how you use or plan to use a Learning Management System.

	Do not use	Currently use	Plan to use
To upload documents (e.g., class materials, syllabus, class notes)	○	○	○
For class discussion	○	○	○
To post or or collect an assignment	○	○	○
To facilitate the reporting of grades	○	○	○
For group collaboration	○	○	○

Question 8

4b. What other features do you wish were available in an LMS, if any?

Question 9

5. How often do you permit the use of mobile devices (e.g., smart phones, laptops, and/or tablets) in your classroom?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Always

Question 10

6. Indicate your use of smart classrooms (e.g., classroom with a projector, other AV enhancements)?

- ○ I never use a smart classroom.
- ○ I rarely use a smart classroom.
- ○ I sometimes use a smart classroom.
- ○ I often use a smart classroom.
- ○ I always use a smart classroom.

Question 11

6a. When you teach a course in a smart classroom (e.g., classroom with a projector, other AV enhancements) compared to a classroom without technology, how would you rate the students' learning experience?

- ○ Much worse
- ○ Somewhat worse
- ○ About the same
- ○ Somewhat better
- ○ Much better

Section 2: Online and Blended Learning

In this section, two terms are frequently used, online learning and blended learning. Here are the definitions of these two terms for the purposes of this survey.

Online course: A course that is deliberately designed for online learning, with at least 90% of the learning activitie scheduled for online methods. The class could meet in person at the beginning of the term or not at all.

Blended course: A course that is deliberately designed for blended learning, with at least 25% of the learning activities scheduled for online methods and at least 25% scheduled for face-to-face methods.

Question 13

1. Have you ever taught an online course?

- ○ Yes, I have taught at least one online course.
- ○ No, I have never taught an online course.

Question 14

1a. Rate your overall level of satisfaction teaching online courses.

- ○ Very dissatisfied
- ○ Dissatisfied
- ○ Unsure
- ○ Satisfied
- ○ Very satisfied

Question 15

1b. Since you responded that you have never taught an online course, would you consider teaching an online course in the future?

- ○ No
- ○ Perhaps
- ○ Yes

Question 16

1c. Why wouldn't you consider teaching an online course?

Question 17

2. Please indicate your level of agreement with the following statement: Online courses can achieve student-learning outcomes that are at least equivalent to those of face-to-face courses.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Question 18

3. Have you taught at least one blended course?

- Yes, I have taught at least one blended course.
- No, I have never taught a blended course.

Question 19

3a. Rate your overall level of satisfaction teaching blended courses.

- ○ Very dissatisfied
- ○ Dissatisfied
- ○ Unsure
- ○ Satisfied
- ○ Very satisfied

Question 20

3b. Since you have responded that you have never taught a blended course, would you consider teaching a blended course in the future?

- ○ No
- ○ Perhaps
- ○ Yes

Question 21

3c. Why wouldn't you consider teaching a blended course?

Question 22

4. Please indicate your level of agreement with the following statement: Blended courses can achieve student-learning outcomes that are at least equivalent to those of face-to-face courses.

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ○ Agree
- ○ Strongly agree

Question 23

5. Rate the appropriateness of online instruction with how you teach.

- ○ Very inappropriate
- ○ Inappropriate
- ○ Neutral
- ○ Appropriate
- ○ Very appropriate

Question 24

6. Rate the appropriateness of online instruction with what you teach (eg., subjects, content, discipline).

- ○ Very inappropriate
- ○ Inappropriate
- ○ Neutral
- ○ Appropriate
- ○ Very appropriate

Question 25

7. Please indicate which of the following statements are reasons you would consider teaching an online or blende course. Select all that apply.

	Online Course	Blended Course
There is flexibility in the schedule.	☐	☐
There is an ability to work from home.	☐	☐
Students like blended and online courses.	☐	☐
Students learn as much or more in blended and online classes as compared to face-to-face classes.	☐	☐
There is more interaction with my students in blended and online courses.	☐	☐
There is better interaction with students in a blended or online class.	☐	☐
I am more motivated when teaching blended or online classes.	☐	☐
I prefer online interaction with students.	☐	☐
I find online classes easier to teach than traditional classes.	☐	☐

Question 26

8. How significant of a barrier to you is each of the following factors in teaching an online or blended course?

	Not a barrier	Somewhat of a barrier	Moderate barrier	Extrem barrier
Lack of necessary technical skills	○	○	○	○
Time necessary to learn how to use technology	○	○	○	○
Lack of time to develop the course	○	○	○	○
Lack of time to teach online (vs. face-to-face)	○	○	○	○
Lack of expertise to develop the course	○	○	○	○
Lack of funding for initial course development costs	○	○	○	○
Lack of necessary online teaching skills	○	○	○	○
Inadequate technical support for your students	○	○	○	○
Inadequate technical support for you	○	○	○	○
Copyright/intellectual property issues	○	○	○	○
Practice not valued by your department or college	○	○	○	○
You question its usefulness in enhancing student learning	○	○	○	○
Technology does not have applicability to the course	○	○	○	○
Network/internet connection problems	○	○	○	○
Computer crashes, programs failing to run properly	○	○	○	○

Section 3: Technology Support

Question 28

1. How satisfied are you with the following aspects of the **central support help desks (ITS, CELT, FPM)**?
If you do not use the Central Services, please check Not applicable.

	Very dissatisfied	Dissatisfied	Neither dissatisfied or satisfied	Satisfied	Very satisfied	* N applic
Overall quality of help desk support	○	○	○	○	○	○
Knowledge and professionalism of the help desk support staff	○	○	○	○	○	○
Communication and follow-up on problem resolution	○	○	○	○	○	○
Ability of help desk to diagnose your problem	○	○	○	○	○	○
Ability of help desk to solve your problem	○	○	○	○	○	○
Time required to resolve the problem	○	○	○	○	○	○
Overall quality of the solution	○	○	○	○	○	○
Hours of help desk availability	○	○	○	○	○	○
Documentation to solve a problem	○	○	○	○	○	○

Question 29

2. How satisfied are you with the following aspects of **your college/department educational technology help desk**?
If you do not use your college/department help desk, please check Not applicable.

	Very dissatisfied	Dissatisfied	Neither dissatisfied or satisfied	Satisfied	Very satisfied	× N applic
Overall quality of help desk support	○	○	○	○	○	○
Knowledge and professionalism of the help desk support staff	○	○	○	○	○	○
Communication and follow-up on problem resolution	○	○	○	○	○	○
Ability of help desk to diagnose your problem	○	○	○	○	○	○
Ability of help desk to solve your problem	○	○	○	○	○	○
Time required to resolve the problem	○	○	○	○	○	○
Overall quality of the solution	○	○	○	○	○	○
Hours of help desk availability	○	○	○	○	○	○
Documentation to solve a problem	○	○	○	○	○	○

Question 30

3. If you participated or used any of the following training or technology services provided by **central services (ITS, CELT, FPM)** to support your courses during the past year, rate your level of satisfaction.
If you do not use the Central Services, please check Not applicable.

	Very dissatisfied	Dissatisfied	Neither dissatisfied or satisfied	Satisfied	Very satisfied	× appli
One-on-one consultation	○	○	○	○	○	○
Material available on ISU website	○	○	○	○	○	○
Email notifications of new technology services	○	○	○	○	○	○
Workshops on how to use technology	○	○	○	○	○	○
Workshops on best instructional practices to integrate technology with classroom teaching	○	○	○	○	○	○
Other (please describe)	○	○	○	○	○	○

Question 31

4. If you participated or used any of the following training or technology services provided by **your college/department educational technology help desk** to support your courses during the past year, rate your level of satisfaction. If you do not use your college/department help desk, please check Not applicable.

	Very dissatisfied	Dissatisfied	Neither dissatisfied or satisfied	Satisfied	Very satisfied	× I appli
One-on-one consultation	○	○	○	○	○	○
Material available on ISU website	○	○	○	○	○	○
Email notifications of new technology services	○	○	○	○	○	○
Workshops on how to use technology	○	○	○	○	○	○
Workshops on best instructional practices to integrate technology with classroom teaching	○	○	○	○	○	○
Other (please describe)	○	○	○	○	○	○

Question 32

5. Please comment here about any aspects of central services (ITS, CELT, FPM) support.

Question 33

6. Please comment here about any aspects of your college/department educational technology support.

Question 34

7. When you need support for the technology you use, where do you prefer to receive it? Rank the following choices by dragging them into your preferred order (most preferred choice at the top).

Colleague down the hall/in my building	1
Colleague in my discipline (on and off campus)	2
College support staff	3
Central support staff (ITS/CELT)	4

Question 35

8. How satisfied are you with the campus support structures for online teaching?

	Very dissatisfied	Dissatisfied	Unsure	Satisfied	Very satisfied
Technological infrastructure (network, hardware, software)	○	○	○	○	○
Support for online development	○	○	○	○	○
Support for online delivery	○	○	○	○	○
Support for online students	○	○	○	○	○
Policy on intellectual property	○	○	○	○	○
Recognition in tenure and promotion	○	○	○	○	○
Incentives for developing/teaching an online course	○	○	○	○	○

Question 36

9. If you were asked to teach an online course, indicate what types of support you would need. Select all that appl

- ☐ Instructional design support
- ☐ Pedagogic support
- ☐ Technical support
- ☐ Financial incentives
- ☐ Release time
- ☐ Course development support
- ☐ Assessment design support

Question 37

10. Please describe your biggest **satisfaction** with technology at Iowa State University to support your instructional missio

Question 38

11. Please describe your biggest **frustration** with technology at Iowa State University to support your instructional mission

Question 39

12. If you could make one change to how technology is used at Iowa State University, what would that change be?

Thank you for participating in this survey. Please click on the >> to submit your responses.

Student Survey Instrument

The *Learning Ecosystem* at Iowa State University (ISU) encompasses both the physical and virtual learning space and their supporting technologies, both critical components to teaching and learning experiences.

The purpose of this survey is to gather your thoughts and opinions about the ISU *Learning Ecosystem*. All ISU students are receiving this survey.

By answering the survey questions, you will help us understand:
- Your perceptions of the current state of this *learning ecosystem* and the support provided.
- The aspects of the *learning ecosystem* you currently use and the aspects you would like to be using.
- Your attitudes toward (a) educational technologies and (b) blended and online learning.

This survey has three parts and should take approximately 20 minutes to complete.
- Section 1 has questions about educational technologies.
- Section 2 has questions about virtual learning spaces like online, blended, and distance learning environments.
- Section 3 has questions about support for the learning ecosystem.

Thank you for participating in this survey. This information will help us improve the *Learning Ecosystem* at ISU.

Your responses will be kept confidential. Only key research personnel from Iowa State University will have acces to the data. No personal identifiable information will be linked to your responses. When we report the data, we wil report aggregate responses, and no one will have access to your individual responses.

Please answer each question in the survey.

What is your current employment status?

- ○ I am employed less than 10 hours per week
- ○ I am employed between 10 and 20 hours per week
- ○ I am employed between 20 and 30 hours per week
- ○ I am employed more than 30 hours per week
- ○ I am not currently employed

Please type in your age.

Please check the box that most closely describes your classes.

- ◯ At ISU, all of my classes are completely face-to-face classes
- ◯ At ISU, all of my classes are completely online, with no face-to-face meeting times
- ◯ At ISU, I take a mixture of completely face-to-face and completely online classes
- ◯ At ISU, some of my classes require both face-to-face and online sessions

Section 1: Educational Technologies

Question 6

1. Please check the technologies that you (or your instructor) currently use in your courses.

	Currently Use
Projector and/or other audio-visual (AV) enhancements	☐
Presentation software applications (e.g., PowerPoint, Keynote)	☐
Learning Management System (e.g., Blackboard, Moodle)	☐
Online or digital resources provided by others (e.g., educational publishers or open education resources)	☐
Online library resources	☐
Classroom response systems (e.g., clickers)	☐
Classroom response systems using mobile devices	☐
Collaboration tools (e.g., Whiteboard, Illuminator)	☐
Online discussion groups or group assignments	☐
Document sharing (e.g., Google docs, Dropbox)	☐
Student and community writing tools (e.g., blogs, wikis)	☐
Social networking sites (e.g., Facebook, Twitter, Google+)	☐
Social bookmarking sites (e.g., Diigo, Reddit)	☐
Email	☐
Live chat rooms	☐
Computer simulations/exercises	☐
Computer labs	☐
In-class online testing	☐
Out-of-class online testing - proctored testing center	☐
Out-of-class online testing - from home or other unsupervised location	☐
Pre-recorded video lectures	☐
Live synchronous video systems (e.g., video conference)	☐
Other (Please describe)	☐

Question 7

Display This Question:

If 1. Please check the technologies that you (or your instructor) currently use in your courses. **Pre-recorded video lectures - Currently Use Is Selected**

1a. How often do you access video lectures during a course?

- ○ Once a day
- ○ Once a week
- ○ Only to review for an exam

Question 8

2. Please list any other technologies (tools) you **would like to use** to support your learning.

Question 9

3. How often do your ISU courses use a Learning Management System like Blackboard or Moodle?

- ○ Never
- ○ Rarely
- ○ Occasionally
- ○ Sometimes
- ○ Always

Question 11

Display This Question:

If 3. How often do your ISU courses use a Learning Management System like Blackboard or Moodle? **Rarely** **Is** **Selected**

Or 3. How often do your ISU courses use a Learning Management System like Blackboard or Moodle? **Occasionally** **Is** **Selected**

Or 3. How often do your ISU courses use a Learning Management System like Blackboard or Moodle? **Sometimes** **Is** **Selected**

Or 3. How often do your ISU courses use a Learning Management System like Blackboard or Moodle? **Always** **Is** **Selected**

3a. Indicate how you use the Learning Management System.

	Do Not Use	Currently Use	Plan to Use
To upload documents (e.g., class materials, syllabus, class notes, assignments)	○	○	○
For class discussion	○	○	○
To submit an assignment	○	○	○
To check your grades	○	○	○
For group collaboration	○	○	○
Online quizzes or tests	○	○	○

Question 64

4. For courses that use a learning management system like Blackboard or Moodle, how often do you log in?

- ○ Monthly or less
- ○ Weekly
- ○ A few times a week
- ○ Daily
- ○ Multiple times a day

Question 10

5. Rate how often your courses at ISU simultaneously use multiple Learning Management Systems like Blackboar and/or Moodle and/or a course website.

- ○ Never
- ○ Rarely
- ○ Occasionally
- ○ Sometimes
- ○ Always

Question 12

6. What other features do you wish were available in an LMS (e.g., Blackboard, Moodle), if any?

Question13

7. How often do instructors permit the use of mobile devices (e.g., smart phones, laptops, and/or tablets) in your classroom?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Always

Question 14

8. How often do you take courses in *smart classrooms* (e.g., classroom with a projector, other AV enhancements, or computer)?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Always

Question 15

Display This Question:

If 8. How often do you take courses in smart classrooms (e.g., classroom with a projector, other AV ... **Rarely** **Is** **Selected**

Or 8. How often do you take courses in smart classrooms (e.g., classroom with a projector, other AV ... **Sometimes** **Is** **Selected**

Or 8. How often do you take courses in smart classrooms (e.g., classroom with a projector, other AV ... **Often** **Is** **Selected**

Or 8. How often do you take courses in smart classrooms (e.g., classroom with a projector, other AV ... **Always** **Is** **Selected**

8a. When you take a course in a smart classroom (e.g. classroom with a projector, other AV enhancements or computer) compared to a classroom without technology, how would you rate your learning experience?

- ○ Much worse
- ○ Somewhat worse
- ○ About the same
- ○ Somewhat better
- ○ Much better

Question 16

Display This Question:

If 8a. When you take a course in a smart classroom (e.g. classroom with a projector, other AV enhanc... **Somewhat better** **Is** **Selected**

Or 8a. When you take a course in a smart classroom (e.g. classroom with a projector, other AV enhanc... **Much better** **Is** **Selected**

8b. You indicated that you have take a course in *smart classroom* and believe that the use of a *smart classroom* can result in better learning experiences. Please provide an example of how the *smart classroom* improved your learning experiences.

Section 2: Online and Blended Learning

In this section, two terms are frequently used, online learning and blended learning. Here are the definitions of these two terms for the purposes of this survey.

Online course: A course that is deliberately designed for online learning, with at least 90% of the learning activitie scheduled for online methods. The class would only meet in person at the beginning of the term or not at all.

Blended course: A course that is deliberately designed for blended learning, with at least 25% of the learning activities scheduled for online methods and at least 25% scheduled for face-to-face methods.

Question 18

1. Have you ever taken an online course?

- Yes, I have taken at least one online course.
- No, I have never taken an online course.

19

Display This Question:

If 1. Have you ever taken an online course? Online course: A course that is deliberately designed fo... **Yes, I have taken at least one online course.** **Is Selected**

1a. How many online classes have you completed?

- ○ 0
- ○ 1
- ○ 2-5
- ○ greater than 5

Question 20

Display This Question:
If 1. Have you ever taken an online course? Online course: A course that is deliberately designed fo... **Yes, I have taken at least one online course.** **Is Selected**

1b. How many online classes have you dropped?

- 0
- 1
- 2-5
- Greater than 5

Question 21

Display This Question:
If 1. Have you ever taken an online course? Online course: A course that is deliberately designed fo... **Yes, I have taken at least one online course.** **Is Selected**

1c. Rate your overall level of satisfaction as a student in (an) online course(s).

- Very dissatisfied
- Dissatisfied
- Unsure
- Satisfied
- Very satisfied

Question 22

Display This Question:
If 1. Have you ever taken an online course? Online course: A course that is deliberately designed fo... **No, I have never taken an online course.** **Is** **Selected**

1a. Since you responded that you have never taken an online course, would you consider enrolling in an online course in the future?

- ○ No, I would not consider it
- ○ I might or might not consider it
- ○ I would definitely consider it

Question 23

Display This Question:
If 1a. Since you responded that you have never taken an online course, would you consider enrolling ... **No, I would not consider it** **Is** **Selected**

1b. Why wouldn't you consider enrolling in an online course?

Question 24

Display This Question:
If 1. Have you ever taken an online course? Online course: A course that is deliberately designed fo... **Yes, I have taken at least one online course.** Is **Selected**

2. Please indicate your level of agreement with the following statement:
I can or did learn as much in an online course as in a face-to-face course.

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ○ Agree
- ○ Strongly agree

Question 25

3. Have you taken at least one blended course?

- ○ Yes, I have taken at least one blended course.
- ○ No, I have never taken a blended course.

Question 26

Display This Question:
If 3. Have you taken at least one blended course? Blended course: A course that is deliberately desi... **Yes, I have taken at least one blended course.** Is **Selected**

3a. Rate your overall level of satisfaction taking (a) blended course(s).

- ○ Very dissatisfied
- ○ Dissatisfied
- ○ Unsure
- ○ Satisfied
- ○ Very satisfied

Question 27

Display This Question:
If 3. Have you taken at least one blended course? Blended course: A course that is deliberately desi... **No, I have never taken a blended course.** **Is** **Selected**

3a. Since you have responded that you have never taken a blended course, would you consider enrolling in a blended course in the future?

- ○ No, I would not consider it
- ○ I might or might not consider it
- ○ I would definitely consider it

Question 28

Display This Question:
If 3a. Since you have responded that you have never taken a blended course, would you consider enrol... **No, I would not consider it** **Is** **Selected**

3b. Why wouldn't you consider taking a blended course?

29

Display This Question:

If 3a. Since you have responded that you have never taken a blended course, would you consider enrol... I might or might not consider it Is Selected

Or 3a. Since you have responded that you have never taken a blended course, would you consider enrol... would definitely consider it Is Selected

3b. Please indicate your level of agreement with the following statement:
I can or did learn as much in a blended course as in a face-to-face course.

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ○ Agree
- ○ Strongly agree

Question 57

4. Please indicate your level of agreement with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Online instruction is appropriate to the way I learn.	○	○	○	○	○
Online instruction is appropriate for the subjects I study.	○	○	○	○	○

Question 32

5. Please indicate which of the following statements are reasons you would consider taking an online or blended course. Select all that apply.

	Online Course	Blended Course
There is flexibility in the schedule.	☐	☐
There is an ability to work from home.	☐	☐
I like or think I would like a blended and/or online class.	☐	☐
I can learn as much or more in blended and online classes as compared to face-to-face classes.	☐	☐
There is more interaction with my instructor in blended and online courses.	☐	☐
There is better interaction with my instructor in a blended or online class.	☐	☐
I am more motivated when taking blended or online classes.	☐	☐
I prefer online interaction with instructors.	☐	☐

Question 33

6. Please indicate which of the following statements are reasons you would **NOT** consider taking an online course? Select all that apply.

	Online Course	Blended Course
Lack of necessary technical skills	☐	☐
Time necessary to learn how to use technology	☐	☐
Lack of face-to-face interaction with peers	☐	☐
Lack of face-to-face interaction with instructor	☐	☐
Lack of feedback from instructor	☐	☐
Lack of motivation in an online environment	☐	☐
Lack of academic skills for an online environment	☐	☐
Lack of computer or internet connection	☐	☐
Technical obstacles like browser issues, computer crashes, or poor internet connection	☐	☐

Section 3: Technology Support

Question 35

1. When you need assistance with technology in your coursework, which of the following sources do you use? Check all that apply.

- ☐ Instructor/TA
- ☐ ITS help desk (Solution Center)
- ☐ College help desk
- ☐ Another student
- ☐ Online resources

Question 65

2. Rate your satisfaction with the technology support you receive from these sources. If you do not use the support listed, please check Not applicable.

	Very dissatisfied	Dissatisfied	Neither dissatisfied or satisfied	Satisfied	Very satisfied	* Not applicable
Instructor/TA	○	○	○	○	○	○
ITS help desk (Solution Center)	○	○	○	○	○	○
College help desk	○	○	○	○	○	○
Another student	○	○	○	○	○	○
Online resources	○	○	○	○	○	○

Question 41

3. When you need support for the technology you use, where do you prefer to receive it? Rank the following choices by dragging them into your preferred order (most preferred choice at the top).

Another student	1
Your instructor/TA	2
College support staff	3
ITS help desk (Solution Center)	4
Online resources	5
Other, please describe	6

Question 42

4. How do you rate the campus support structures for online learning?

- ○ Very dissatisfied
- ○ Dissatisfied
- ○ Neither satisfied or dissatisfied
- ○ Satisfied
- ○ Very satisfied

Question 43

5. Please describe your biggest **satisfaction** with technology at ISU to support your learning.

Question 55

6. Please describe your biggest **frustration** with technology at ISU to support your learning.

Question 44

7. If you could make one change to how technology is used at ISU, what would that change be?

Thank you for your responses. Please click on >> to submit your survey.

APPENDIX C: SURVEY RESULTS

Section 1: Educational Technologies

Results to answer the research question: What educational technologies are currently used and what technologies will be needed in the future?

Table 34: Q3 Educational Technologies That Faculty Currently Use or Plan to Use to Support Courses this Academic Year (Percent)

Educational technology	
Email	98
Projector and/or other audio visual (AV) enhancements	96
Presentation software applications (e.g., PowerPoint, Keynote)	92
Learning management software (e.g., Blackboard, Moodle)	91
Online library resources	7
Document sharing (e.g., Google docs, Dropbox)	57
Online or digital resources provided by others (e.g., educational publishers or open education resources)	55
Online discussion groups or group assignments	52
Computer simulations/exercises	51
Computer labs	45
Lecture capture or video-capture systems	43
Out-of-class online testing–from home or other unsupervised location	29
Classroom response systems (e.g., clickers)	29
Collaboration tools (e.g., Whiteboard, Illuminator)	28
Live synchronous video systems (e.g., video conference)	26
Student & community writing tools (e.g., blogs, wikis)	23
Out-of-class online testing--proctored testing center	23
Social networking sites (e.g., Facebook, Twitter, Google+)	19
Classroom response systems using student mobile devices	18
In-class online testing	17
Live chat rooms	15
Social bookmarking sites (e.g., Diigo, Reddit)	4

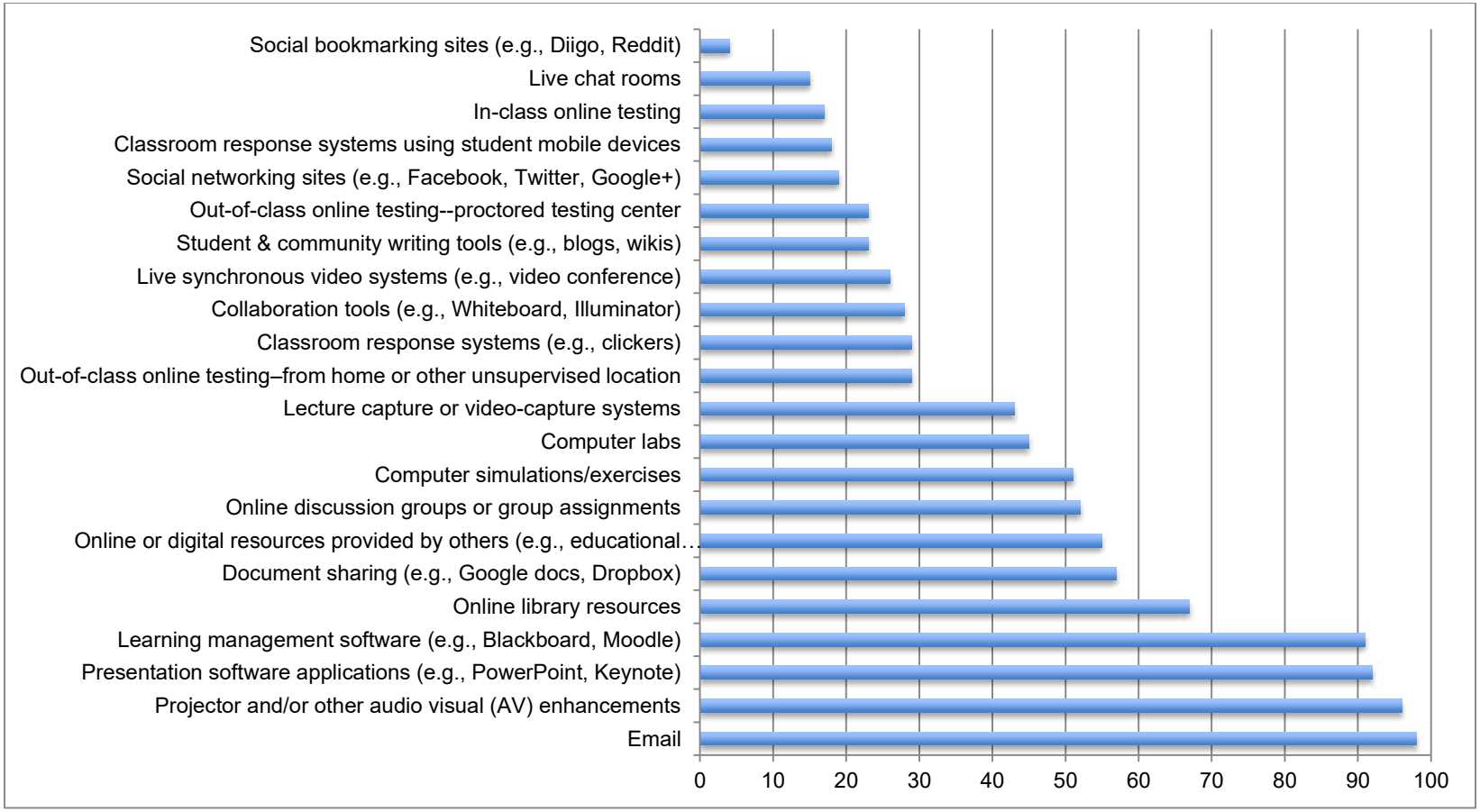


Figure 12: Q3 Educational Technologies That Faculty Currently Use or Plan to Use to Support Courses this Academic Year (Percent)

Table 35: Q5 Content Sources Faculty Use to Accompany Classroom Face-to-face Courses (Percent)

Content Source	Never	Rarely	Sometimes	Often	Always
Online publisher course materials	35	26	22	12	5
Online free open educational resources (e.g., Wikipedia, Khan Academy, YouTube)	20	19	34	23	3
Content from MOOCs (Massive Open Online Courses, e.g., Coursera, edX, iTunesU, offerings directly from other universities like MIT Open Courseware)	77	14	6	2	0

Table 36: Q6 Faculty Use of a Learning Management System to Support Courses (Percent)

I currently use an LMS to support my face-to-face courses.	78
I currently use an LMS to support my online courses.	14
I don't currently use an LMS to support my courses but plan to use it in the future	6
I used an LMS for past courses but no longer use it or plan to use it.	2

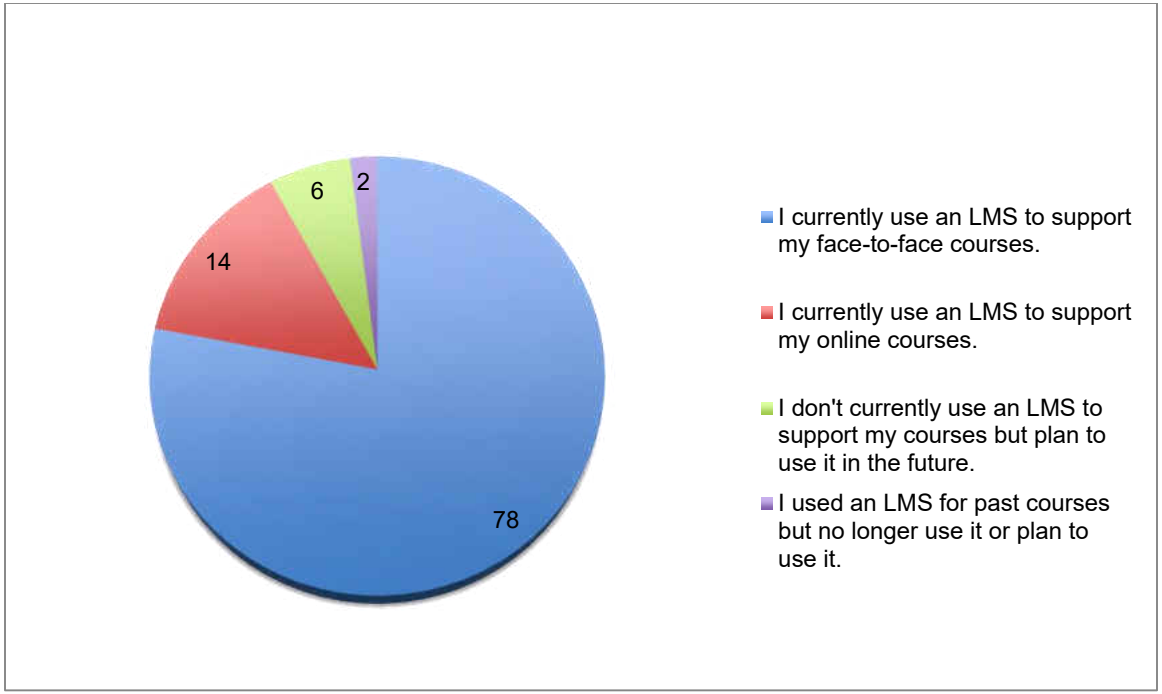


Figure 13: Q6 Faculty Use of a Learning Management System to Support Courses (Percent)

Table 37: Q7 Faculty Use of a Learning Management System Features to Support Courses (Currently Use and Plan to Use Responses) (Percent)

To upload documents (e.g., class materials, syllabus, class notes)	95
For class discussion	54
To post or collect an assignment	88
To facilitate the reporting of grades	87
For group collaboration	48

Q8 Open-ended Response to: What other features do you wish were available in an LMS, if any?

The general themes emerging from this prompt include LMS features offering learning analytics, assessment management, class management, collaboration and communication tools, and grade management. While there were unique suggestions for features not offered by the current system (or not known by the responder), most of the comments were suggestions for improvement on existing features, reliability and efficiency of the system, or substitutions to features of the system. A recurring theme in various parts of the survey is that faculty do not need more technology tools, they need reliable, standard, better-designed, and functional tools.

"We don't need more features. In fact, the profusion of features on Blackboard makes it more difficult to use. And by 'more difficult' I mean intensely aggravating. How about we make sure the basic features work properly and can be easily configured before we start adding bells and whistles?"

Notable themes include:

- Suggestions for user interface improvement
- Suggestions for a variety of functionality improvements
- The need for a faster and more reliable system
- A better way for students to collaborate in team-based learning activities
- The BB grading system frustrates many users due to lack of the ability to calculate grades. Users would like to have Excel-like spreadsheet ability for grade management.

Table 38: Q9 Faculty Allowing Student Use of Mobile Devices in the Classroom (Percent)

Never	Rarely	Sometimes	Often	Always
19	17	21	15	28

Table 39: Q10 Faculty Use of Smart Classrooms (Classroom with Projector and/or Other AV Enhancements (Percent)

Never	Rarely	Sometimes	Often	Always
4	2	8	17	69

Table 40: Q11 Faculty Response to: When you teach a course in a smart classroom (e.g., classroom with a projector, other AV enhancements) compared to a classroom without technology, how would you rate the students' learning experience? (Percent)

Much Worse	Somewhat Worse	About the Same	Somewhat Better	Much Better
5	6	21	29	39

Table 41: Q10 & Q11 Faculty Use and Attitude About Using a Smart Classroom By College
(Responses Include Sometimes, Often, and Always) (Percent)

	Agriculture and Life Sciences	Design	Engineering	Human Sciences	Business	Liberal Arts and Sciences	Veterinary Medicine
Indicate your use of a smart classroom (e.g., classroom with a projector, other AV enhancements).	84	89	98	98	95	92	100
When you teach in a smart classroom (e.g., classroom with a projector, other AV enhancement) compared to a classroom without technology, how would you rate the student's learning experience? (Responses include *Somewhat Better* and *Much Better*)	90	94	93	84	84	88	95

Section 2: Online and Blended Learning

Results to answer the research question: What are the faculty attitudes and practices toward online and blended learning? Online and Blended Learning

Table 42: Q13 & Q18 Faculty Experience Teaching at Least One Online or Blended Course (Percent)

Experience teaching at least one online course	37
Experience teaching at least one blended course	29

Q16 Open-ended response to: Why wouldn't you consider teaching an online course?

There were 170 faculty members (37 percent) who responded that they have experience teaching at least one online course. Of the remaining 285 respondents who have no experience teaching an online course, 70 would not consider teaching an online course in the future (25 percent). Open-ended comments were offered by 90 percent of those reluctant to adopt an online modality (63 total responses.) Those who would not consider teaching an online course in the future cited reasons centering on the following themes.

- Many believe that online instruction is not appropriate for what they teach, how they teach, and the type of student they teach.
- Many simply prefer the experience of being face-to-face and the personal interactions of classroom teaching.
- The loss of non-verbal cues would be detrimental to their ability to teach.

- Other don't believe in online learning; they think it is an inferior modality
- Others cite an increase in workload, the perceived inefficiency of an online system, and a lack of time to develop and administer an online course.

Q21 Open-ended response to: Why wouldn't you consider teaching a blended course?

There were 130 faculty members (29 percent) who responded that they have experience teaching at least one blended course. Of the remaining 323 respondents who have no experience teaching an online course, 51 would not consider teaching a blended course in the future (16 percent). Open-ended comments were offered by 88 percent of those reluctant to adopt an online modality (45 total responses.) Those who would not consider teaching a blended course in the future cited reasons centering on the following themes.

- A lack of understanding what is meant by the term blended learning (although it was defined in the survey)
- A lack of interest in the modality
- A parallel belief system that like online learning, the blended modality is inferior to face-to-face learning
- Integration of two modalities is too much work

Table 43: Q13 & Q18 Faculty Experience Teaching in Online and Blended Modalities By Sex and Tenure Classification (Percent)

	Female	Male	Non-Tenure Eligible	Probationary	Tenured
Experience teaching at least one online course	33	41	38	24	42
Experience teaching at least one blended course	30	28	32	26	28

Table 44: Q13 & 18 Faculty Experience Teaching in Online and Blended Modalities By College Affiliation (Percent)

	Agriculture and Life Sciences	Design	Engineering	Human Sciences	Business	Liberal Arts and Sciences	Veterinary Medicine
Experience teaching at least one online course	53	19	56	52	29	27	24
Experience teaching at least one blended course	34	22	30	52	28	20	43

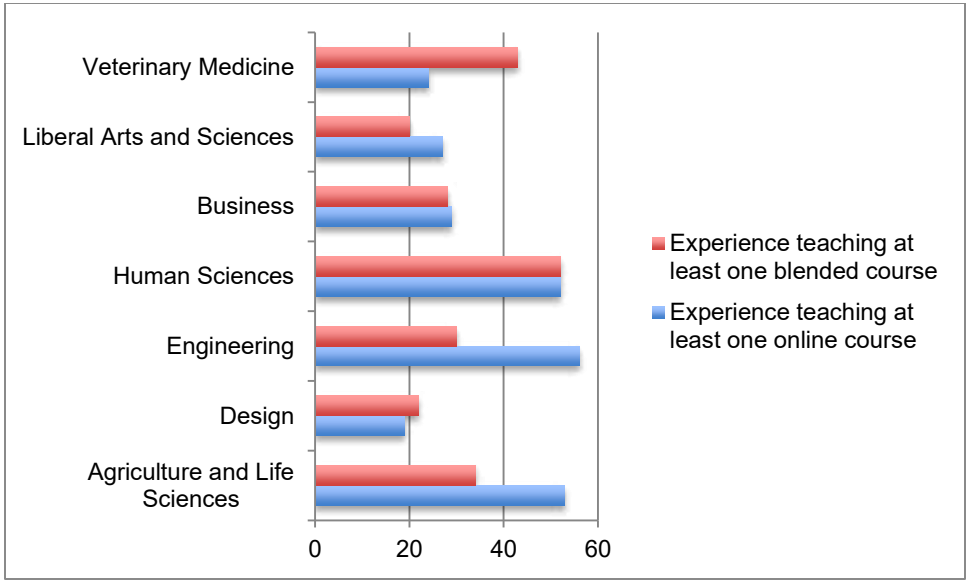


Figure 14: Q13 & 18 Faculty Experience Teaching
in Online and Blended Modalities By College Affiliation (Percent)

Table 45: Q14 & Q19 Faculty Satisfaction in Teaching in Online and Blended Modalities (Includes Satisfied and Very Satisfied Responses) By Sex and Tenure Classification (Percent)

	Female	Male	Non-Tenure Eligible	Probationary	Tenured
Satisfied and very Satisfied teaching at least one online course	61	66	62	55	66
Satisfied and very satisfied teaching at least one blended course	74	76	79	91	70

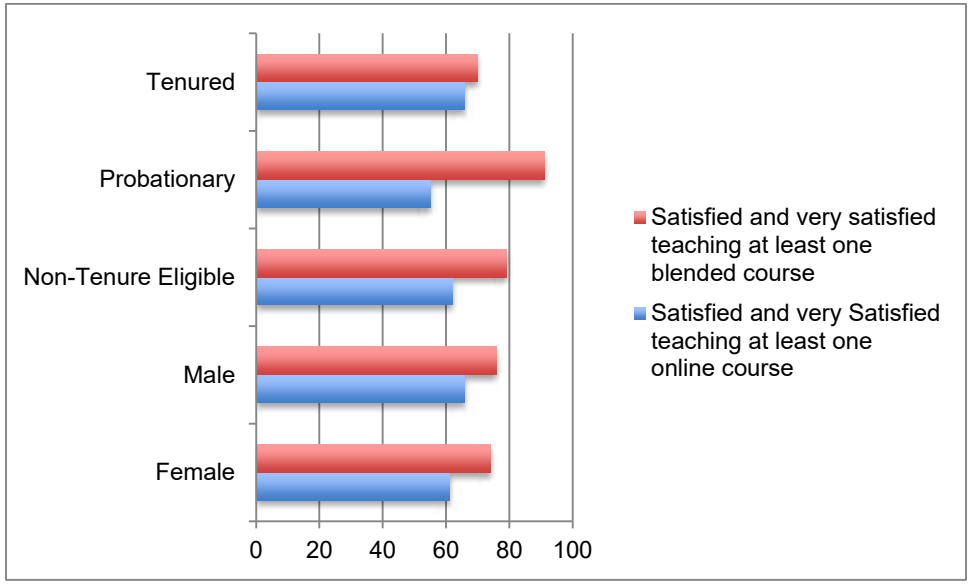


Figure 15: Q14 & Q19 Faculty Satisfaction in Teaching in Online and Blended Modalities (Includes Satisfied and Very Satisfied Responses) By Sex and Tenure Classification (Percent)

Table 46: Q14 & Q19 Faculty Satisfaction in Teaching in Online and Blended Modalities (Includes Satisfied and Very Satisfied Responses) By College Affiliation (Percent)

	Agriculture and Life Sciences	Design	Engineering	Human Sciences	Business	Liberal Arts and Sciences	Veterinary Medicine
Satisfied and very Satisfied teaching at least one online course	63	14	50	83	67	66	100
Satisfied and very satisfied teaching at least one blended course	69	50	76	83	83	72	100

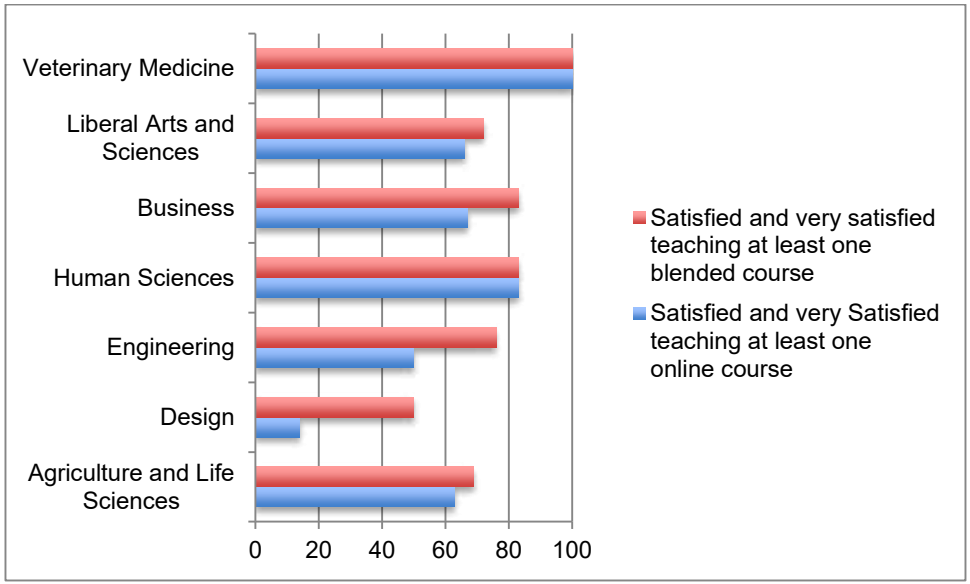


Figure 16: Q14 & Q19 Faculty Satisfaction in Teaching in Online and Blended Modalities (Includes Satisfied and Very Satisfied Responses) By College Affiliation (Percent)

Table 47: Q15 & Q20 Faculty Without Previous Experience Teaching an Online or Blended Course Who Would Consider Teaching an Online or Blended Course in the Future (Percent)

Faculty with no previous experience willing to teach an online course in the future	75
Faculty with no previous experience willing to teach an blended course in the future	84

Table 48: Q15 & Q20 Faculty Attitude Toward Teaching in Online and Blended Modalities with No Former Experience (Includes Perhaps and Yes Responses) By Sex and Tenure Classification (Percent)

	Female	Male	Non-Tenure Eligible	Probationary	Tenured
Faculty with no previous experience willing to teach an online course in the future	73	78	81	73	75
Faculty with no previous experience willing to teach an blended course in the future	86	84	93	82	82

Table 49: Q15 & Q20 Faculty Attitude Toward Teaching in Online and Blended Modalities with No Former Experience (Includes Perhaps and Yes Responses) By College Affiliation (Percent)

	Agriculture and Life Sciences	Design	Engineering	Human Sciences	Business	Liberal Arts and Sciences	Veterinary Medicine
Faculty with no previous experience willing to teach an online course in the future	81	74	96	73	80	68	100
Faculty with no previous experience willing to teach an blended course in the future	88	92	83	87	80	80	100

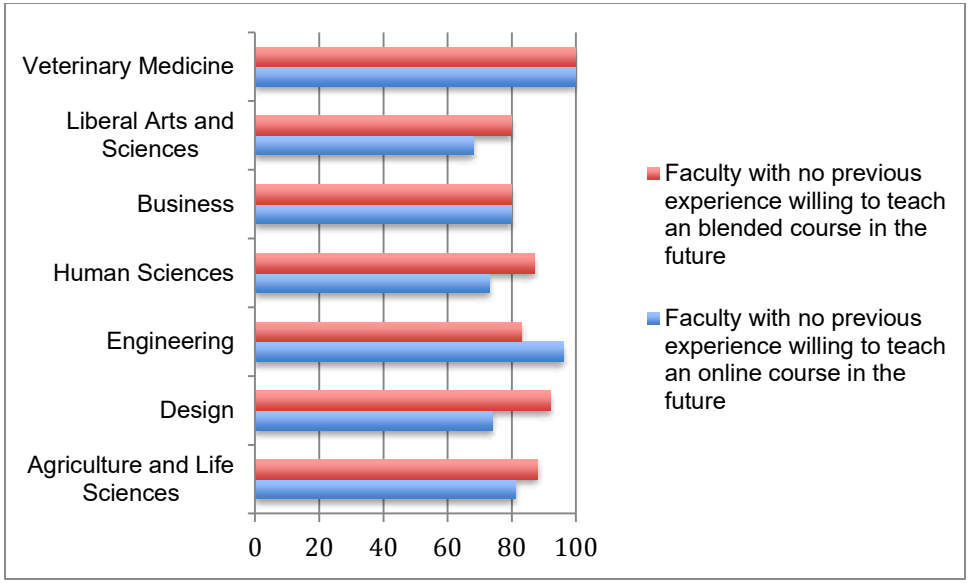


Figure 17: Q15 & Q20 Faculty Attitude Toward Teaching in Online and Blended Modalities with No Former Experience (Includes Perhaps and Yes Responses) By College Affiliation (Percent)

Table 50: Q17 & Q22 Faculty Agreement that Online or Blended Learning Can Achieve Outcomes Equivalent to Face-to-Face Courses (Percent)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Online courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	14	28	26	22	10
Blended courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	5	9	42	28	16

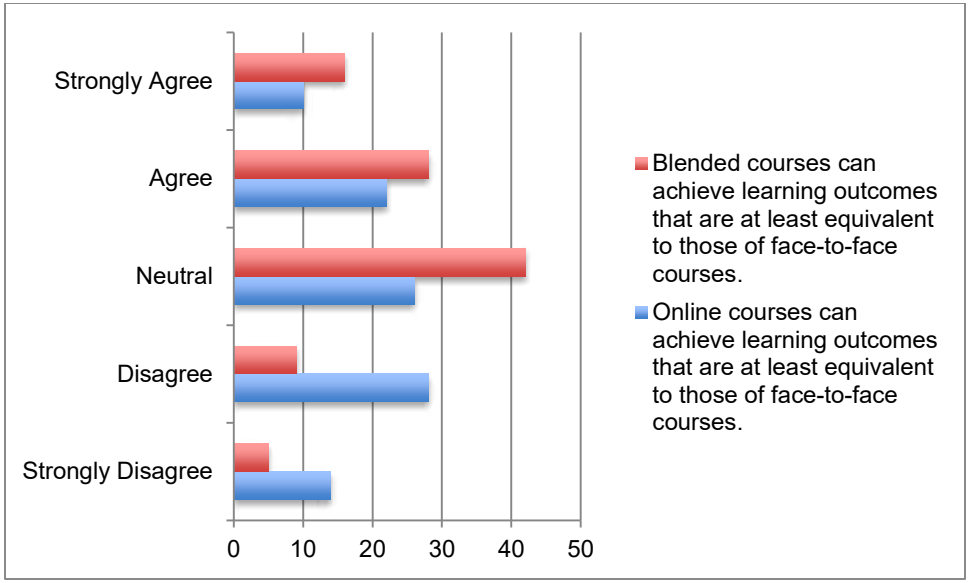


Figure 18: Q17 & Q22 Faculty Agreement that Online or Blended Learning Can Achieve Outcomes Equivalent to Face-to-Face Courses (Percent)

Table 51: Q17 & Q22 Faculty Attitude Toward the Effect of Modality on Learning Outcomes (Includes Agree and Strongly By Sex and Tenure Classification (Percent)

	Female	Male	Non-Tenure Eligible	Probationary	Tenured
Agreement with the statement: Online courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	34	30	30	30	31
Agreement with the statement: Blended courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	47	42	50	43	42

Table 52: Q17 & Q22 Faculty Attitude Toward the Effect of Modality on Learning Outcomes (Includes Agree and Strongly Agree Responses) By College Affiliation (Percent)

	Agriculture and Life Sciences	Design	Engineering	Human Sciences	Business	Liberal Arts and Sciences	Veterinary Medicine
Agreement with the statement: Online courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	38	13	37	49	33	39	32
Agreement with the statement: Blended courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	53	24	36	67	43	38	48

Table 53: Q25 Reasons Faculty Would Consider Teaching an Online or Blended Course (Percent)

Motivating Factors	Online Course	Blended Course
There is flexibility in the schedule.	60	50
There is an ability to work from home.	47	38
Students like blended and online courses.	32	37
Students learn as much or more in blended and online classes as compared to face-to-face classes.	20	27
There is more interaction with my students in blended and online courses.	7	15
There is better interaction with students in a blended or online class.	7	15
I am more motivated when teaching blended or online classes.	7	9
I prefer online interaction with student.	5	7
I find online classes easier to teach than traditional classes.	7	7

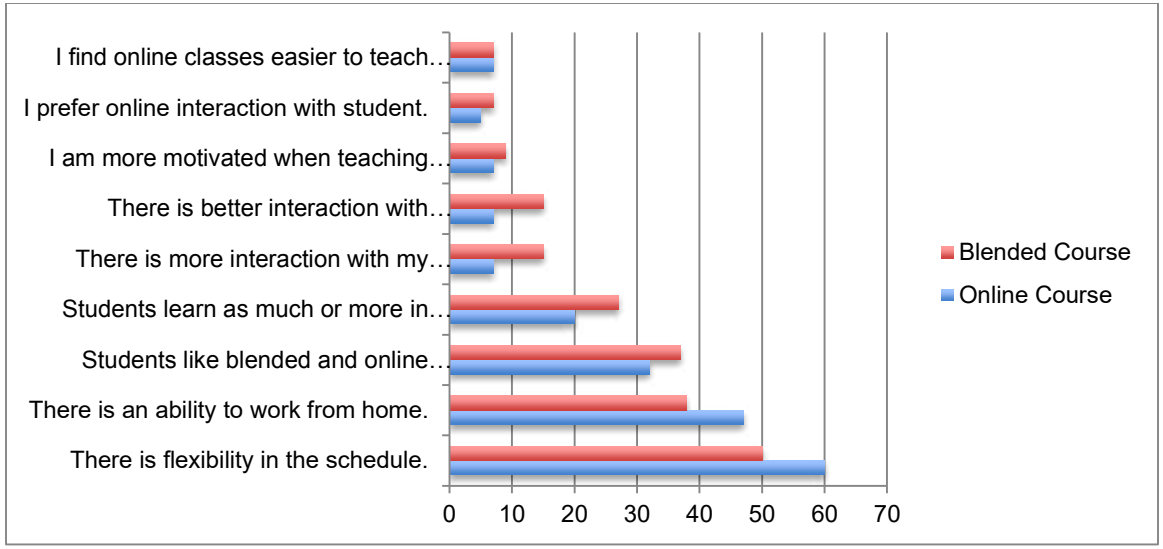


Figure 19: Q25 Reasons Faculty Would Consider Teaching an Online or Blended Course (Percent)

Table 54: Q23 & Q24 Faculty Attitude Toward the Appropriateness of Online Instruction with How and What They Teach (Percent)

Statement	Very Inappropriate	Inappropriate	Neutral	Appropriate	Very Appropriate
Rate the appropriateness of online instruction with how you teach.	11	20	31	26	12
Rate the appropriateness of online instruction with what you teach (e.g. subjects, content, discipline).	10	18	31	30	11

Table 55: Q23 & Q24 Faculty Attitude Toward the Appropriateness of Online Instruction with How and What They Teach (Includes Appropriate and Very Appropriate Responses) By Sex and Tenure Classification (Percent)

	Female	Male	Non-Tenure Eligible	Probationary	Tenured
Agreement with the statement: Online courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	40	36	38	35	40
Agreement with the statement: Blended courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	41	41	35	32	43

Table 56: Q26 Barriers to Faculty Teaching an Online or Blended Course (Percent)

Barrier	Not a Barrier	Somewhat a Barrier	Moderate Barrier	Extreme Barrier
Lack of necessary technical skills	42	38	15	5
Time necessary to learn how to use technology	26	34	24	16
Lack of time to develop the course	13	22	30	35
Lack of time to teach online (vs. face-to-face).	43	24	19	14
Lack of expertise to develop the course	47	29	18	6
Lack of funding for initial course development costs	27	22	29	22
Lack of necessary online teaching skills	41	32	20	7
Inadequate technical support for you	31	34	21	14
Inadequate technical support for your students	35	33	20	12
Copyright/intellectual property issues	56	20	15	9
Practice not valued by your department or college	49	17	14	8
You question its usefulness in enhancing student learning	33	21	23	23
Technology does not have applicability to the course	65	16	11	8
Network/internet connection problems	52	29	12	7
Computer crashes, programs failing to run properly	46	34	13	7

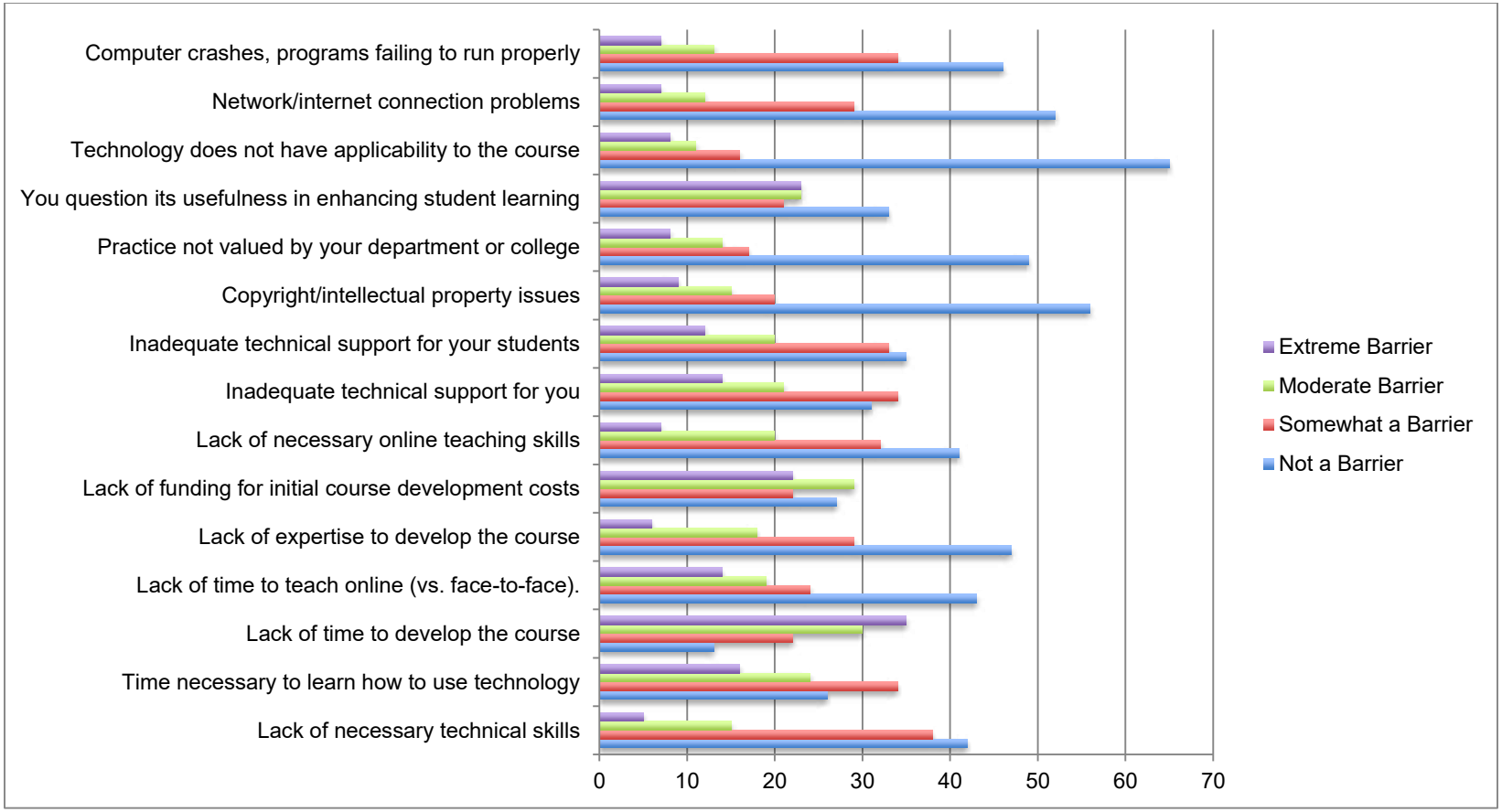


Figure 20: Q26 Barriers to Faculty Teaching an Online or Blended Course (Percent)

Table 57: Q26 Faculty Barriers to Teaching Using Online and Blended Modalities
(includes somewhat, moderate, and extreme barrier responses) By Sex and Tenure Classification (Percent)

Barrier	Female	Male	Non-tenure Eligible	Probationary	Tenured
Lack of necessary technical skills	68	50	50	55	63
Time necessary to learn how to use technology	61	70	70	69	77
Lack of time to develop the course	86	88	84	84	90
Lack of time to teach online (vs. face-to-face).	60	56	58	50	59
Lack of expertise to develop the course	58	51	48	54	53
Lack of funding for initial course development costs	74	72	68	76	75
Lack of necessary online teaching skills	64	55	55	57	63
Inadequate technical support for your students	69	61	60	60	69
Inadequate technical support for you	71	67	56	62	78
Copyright/intellectual property issues	53	45	45	42	53
Practice not valued by your department or college	42	47	36	44	44
You question its usefulness in enhancing student learning	69	65	66	66	67
Technology does not have applicability to the course	39	32	33	29	39
Network/internet connection problems	59	41	58	40	47
Computer crashes, programs failing to run properly	63	49	59	46	56

Section 3: Technology Support

Results to answer the research question: What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

Table 58: Q28 Faculty Satisfaction With the Following Aspects of the Central Support Help Desks (ITS, CELT, FPM) (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Overall quality of help desk support	2	6	19	40	33
Knowledge and professionalism of the help desk support staff	1	6	20	38	35
Communication and follow-up on problem resolution	3	7	20	36	35
Ability of help desk to diagnose your problem	2	8	23	34	32
Ability of help desk to solve your problem	2	9	22	36	31
Time required to resolve the problem	4	9	22	35	30
Overall quality of the solution	2	7	24	34	33
Hours of help desk availability	2	8	28	35	28
Documentation to solve a problem	3	10	35	28	23

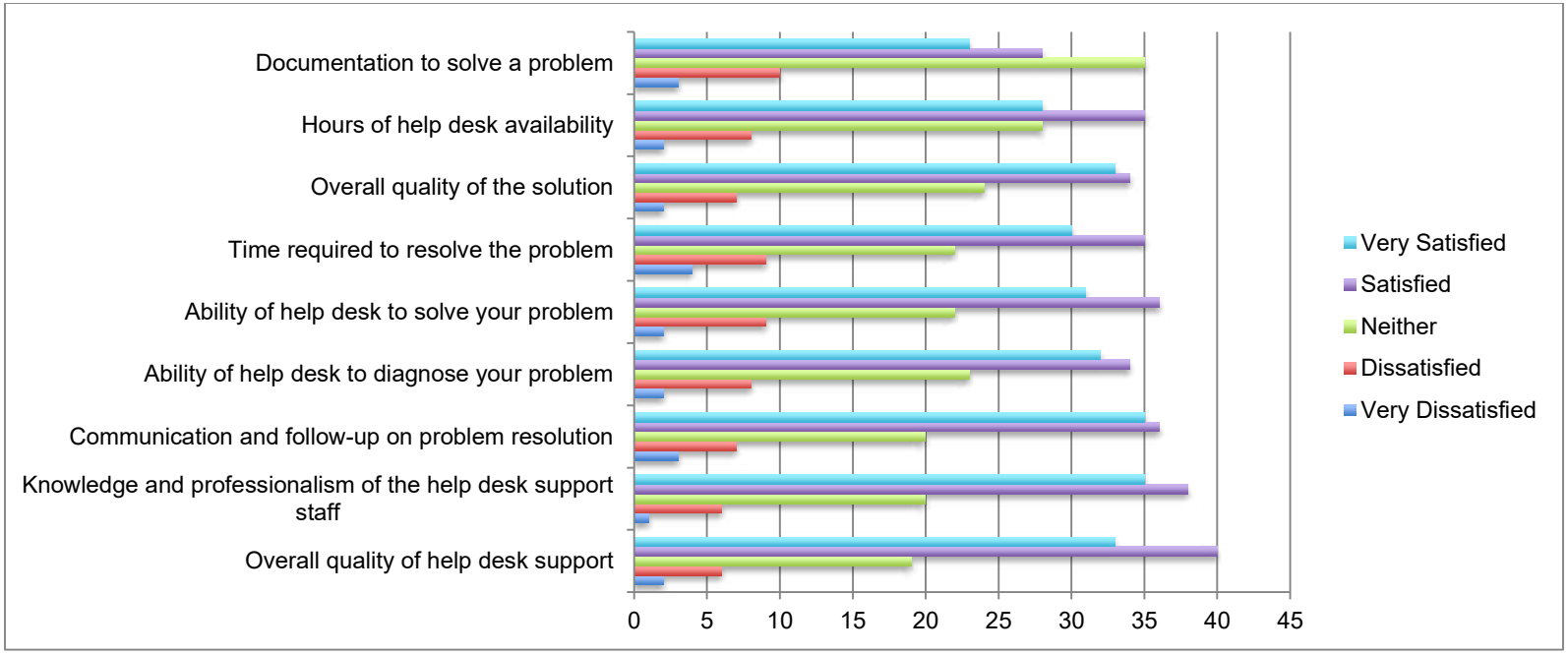


Figure 21: Q28 Faculty Satisfaction With the Following Aspects of the Central Support Help Desks (ITS, CELT, FPM) (Percent)

Table 59: Q29 Faculty Satisfaction with the Following Aspects of Their College/Department Educational Technology Help Desk (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Overall quality of help desk support	2	7	15	35	41
Knowledge and professionalism of the help desk support staff	3	5	16	33	44
Communication and follow-up on problem resolution	2	9	18	29	42
Ability of help desk to diagnose your problem	2	8	17	33	41
Ability of help desk to solve your problem	2	8	19	32	40
Time required to resolve the problem	5	11	18	31	35
Overall quality of the solution	2	7	20	30	42
Hours of help desk availability	2	11	24	32	31
Documentation to solve a problem	3	8	33	22	33

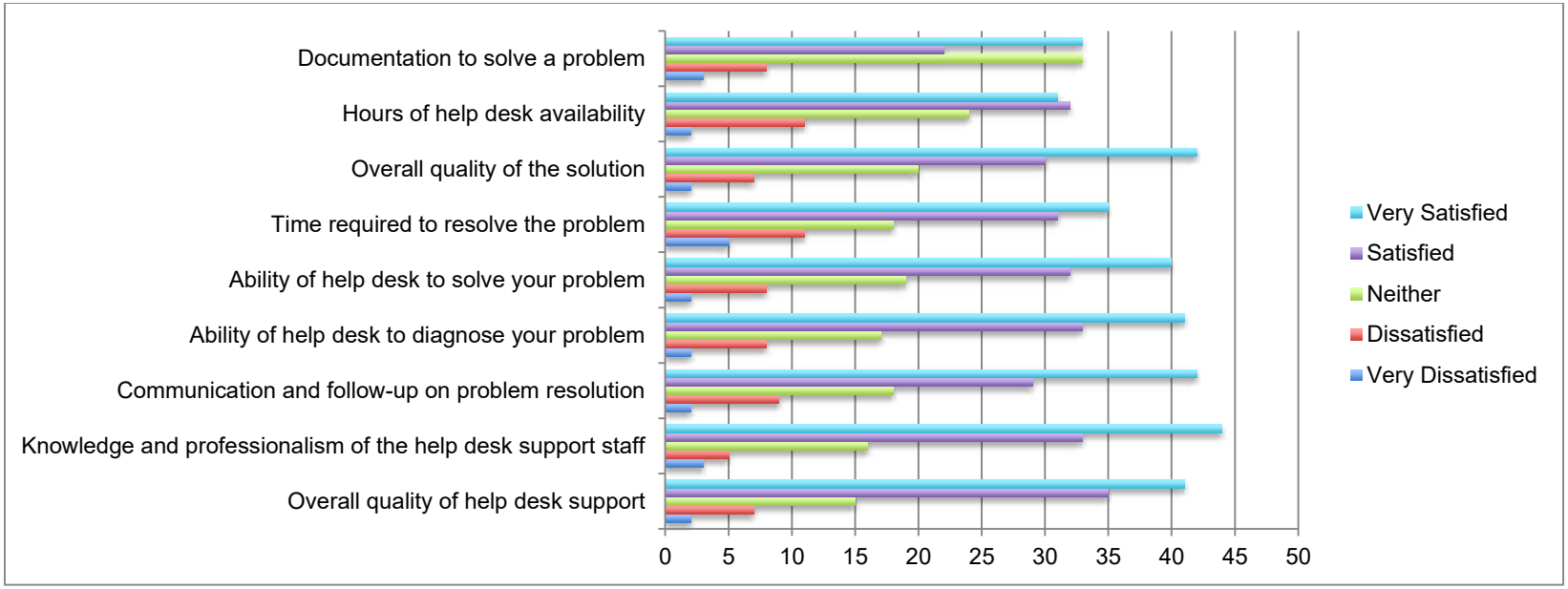


Figure 22: Q29 Faculty Satisfaction with the Following Aspects of Their College/Department Educational Technology Help Desk (Percent)

Table 60: Q30 Faculty Satisfaction with the Following Training Provided by Central Services (ITS, CELT, FPM) (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
One-on-one consultation	1	4	15	29	51
Material available on ISU website	2	9	29	42	18
Email notifications of new technology services	2	7	32	36	22
Workshops on how to use technology	2	6	28	37	26
Workshops on best instructional practices to integrate technology with classroom teaching	3	6	30	36	26

Table 61: Q31 Faculty Satisfaction with the Following Training Provided by Their College/Department Educational Technology Help Desk (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
One-on-one consultation	1	5	17	25	52
Material available on ISU website	4	10	34	33	19
Email notifications of new technology services	3	9	30	35	23
Workshops on how to use technology	2	14	36	28	20
Workshops on best instructional practices to integrate technology with classroom teaching	3	16	39	22	20

Table 62: Q30 Faculty Satisfaction with the Following Training Provided by Central Services (ITS, CELT, FPM) By College Affiliation (Percent)

	Agriculture and Life Sciences	Design	Engineering	Human Sciences	Business	Liberal Arts and Sciences	Veterinary Medicine
One-on-one consultation	68	75	80	81	100	74	53
Number of Responses	41	12	24	33	13	78	15
Material available on ISU website	53	9	71	54	63	57	20
Number of Responses	30	11	24	24	11	56	15
Email notifications of new technology services	50	30	70	75	67	54	43
Number of Responses	36	10	24	28	15	61	14
Workshops on how to use technology	44	0	42	57	67	50	43
Number of Responses	25	6	12	21	9	34	14
Workshops on best instructional practices to integrate technology with classroom teaching	39	0	46	47	63	44	31
Number of Responses	23	7	13	17	8	34	13

Table 63: Q31 Faculty Satisfaction with the Following Training Provided by the Respondent's College/Department Educational Technology Help Desk) By College Affiliation (Percent)

	Agriculture and Life Sciences	Design	Engineering	Human Sciences	Business	Liberal Arts and Sciences	Veterinary Medicine
One-on-one consultation	82	64	77	85	80	89	50
Number of Responses	34	11	13	20	5	72	10
Material available on ISU website	65	53	52	69	55	60	40
Number of Responses	46	15	23	26	11	90	10
Email notifications of new technology services	60	64	53	62	64	53	40
Number of Responses	40	14	19	24	11	83	10
Workshops on how to use technology	77	69	70	57	55	59	37
Number of Responses	39	13	17	21	11	65	8
Workshops on best instructional practices to integrate technology with classroom teaching	74	60	68	59	63	55	37
Number of Responses	35	10	15	22	8	56	8

Q32 Open-ended response to: Please comment here about any aspects of central services (ITS, CELT, FPM) support. Number of responses (105)

Respondents commented equally with a variety of complaints and compliments. The compliments fell into two categories, 1) general comments of satisfaction with the services provided, and 2) compliments specifically for the CELT and ITS teams. The complimentary comments were either very general or uniquely specific and no themes emerged. The complaints and suggestions for improvement were predominately about slow time to response, lack of problem resolution, and poor customer service skills by help desk staff. The strongest theme in this response set was about the satisfaction with CELT support.

Q33 Open-ended response to: Please comment here about any aspects of your college/department educational technology: support.

Each college had about an equal mix of complaints and compliments. Themes across all colleges centered on lack of knowledge by help desk staff, the need for more help desk support staff, the slow response time. The compliments were very general and no themes emerged.

Number of responses (112)

Table 64: Q34 Preferences in Rank Order in Response to the Question:
When you need support for the technology you use, where do you prefer to receive it? (Percent)

	Rank 1	Rank 2	Rank 3	Rank 4
Colleague down the hall/in my building	37	26	27	10
Colleague in my discipline (on and off campus)	4	16	36	44
College support staff	35	28	16	21
Central support staff (ITS/CELT)	25	30	21	24

Table 65: Q35 Faculty Satisfaction with Support Structures for Online Teaching (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Technological infrastructure (network, hardware, software)	3	11	37	40	9
Support for online development	7	10	55	21	7
Support for online delivery	4	8	54	27	7
Support for online students	5	8	62	21	4
Policy on intellectual property	3	5	72	16	4
Recognition in tenure and promotion	10	15	61	12	2
Incentives for developing/teaching an online course	15	21	49	12	3

Table 66: Q36 Types of Faculty Support Required for Online Teaching (Percent)

Instructional design support	67
Pedagogic support	39
Technical support	76
Financial incentive	61
Release time	58
Course development	62
Assessment design	53

Table 67: Q37 Top 3 themes by faculty commenting about their "biggest satisfaction" with technology at ISU. Number of faculty responding = 268

	Number of responses
Learning management system	104
Support	94
Equipment	67

Table 68: Q38 Most Frequent Themes by Faculty Commenting About Their "biggest frustration" with Technology at ISU. Number of faculty responding = 275

	Number of responses
Learning management system	60
Technology support	58
Technology improvement	32
Equipment	44
Institutional culture regarding educational technology	27
Institutional policy regarding educational technology	25

Table 69: Q35 Faculty Satisfaction With the Following Campus Support Structures for Online Teaching (Includes Satisfied and Very Satisfied Responses) By Tenure Classification

	Non-tenure eligible	Probationary	Tenured
Technological infrastructure (network, hardware, software)			
Satisfied	55	43	46
Dissatisfied	13	15	14
Support for online delivery			
Satisfied	38	19	27
Dissatisfied	10	20	18
Support for online development			
Satisfied	40	23	35
Dissatisfied	10	15	12
Support for online students			
Satisfied	28	22	25
Dissatisfied	9	15	13
Policy on intellectual property			
Satisfied	25	21	17
Dissatisfied	4	11	9
Recognition in tenure and promotion			
Satisfied	9	15	16
Dissatisfied	17	26	28
Incentives for developing/teaching an online course			
Satisfied	28	12	14
Dissatisfied	27	40	42

Table 70: Q35 Faculty Satisfaction with the Following Campus Support Structures for Online Teaching (Includes Satisfied and Very Satisfied Responses) By Tenure Classification (Percent)

	Agriculture and Life Sciences	Design	Engineering	Human Sciences	Business	Liberal Arts and Sciences	Veterinary Medicine
Technological infrastructure (network, hardware, software)							
Satisfied	63	36	55	56	60	42	21
Dissatisfied	16	22	23	14	15	11	42
Support for online delivery							
Satisfied	32	15	33	37	25	29	5
Dissatisfied	12	19	13	6	10	10	42
Support for online development							
Satisfied	39	15	33	37	25	29	5
Dissatisfied	16	22	33	14	15	11	42
Support for online students							
Satisfied	46	15	45	37	25	30	16
Dissatisfied	14	18	11	12	5	9	31
Policy on intellectual property							
Satisfied	17	7	29	32	40	17	0
Dissatisfied	6	14	2	6	0	10	16
Recognition in tenure and promotion							
Satisfied	14	15	24	9	15	14	0
Dissatisfied	24	18	24	27	30	24	26
Incentives for developing/teaching an online course							
Satisfied	13	7	16	17	20	18	0
Dissatisfied	38	29	44	37	50	39	63

Table 71: Q39 Most Frequent Themes by Faculty Answering the Prompt:
If you could make one change to how technology is used at Iowa State University, what would that change be? Number of faculty responding = 220

	Number of responses
Institutional policy	49
Technology support	45
Equipment	36
Culture of teaching and learning	34
Software/applications	29
Blackboard	22

Section 1: Educational Technologies

Results to answer the research question: What educational technologies are currently used and what technologies will be needed in the future?

Table 72: Q6 Student Reported Educational Technologies Used In Their Courses (Percent)

Presentation software applications (e.g., PowerPoint, Keynote)	94
Learning management software (e.g., Blackboard, Moodle)	94
Email	93
Projector and/or other audio visual (AV) enhancements	90
Document sharing (e.g., Google docs, Dropbox)	52
Online discussion groups or group assignments	50
Computer simulations/exercises	49
Computer labs	49
Online or digital resources provided by others (e.g., educational publishers or open education resources)	48
Classroom response systems (e.g., clickers)	48
Online library resources	40
Out-of-class online testing–from home or other unsupervised location	39
Collaboration tools (e.g., Whiteboard, Illuminator)	38
Out-of-class online testing--proctored testing center	31
Pre-recorded video lectures	28
Social networking sites (e.g., Facebook, Twitter, Google+)	22
In-class online testing	18
Student & community writing tools (e.g., blogs, wikis)	16
Classroom response systems using student mobile devices	13
Live synchronous video systems (e.g., video conference)	8
Live chat rooms	7

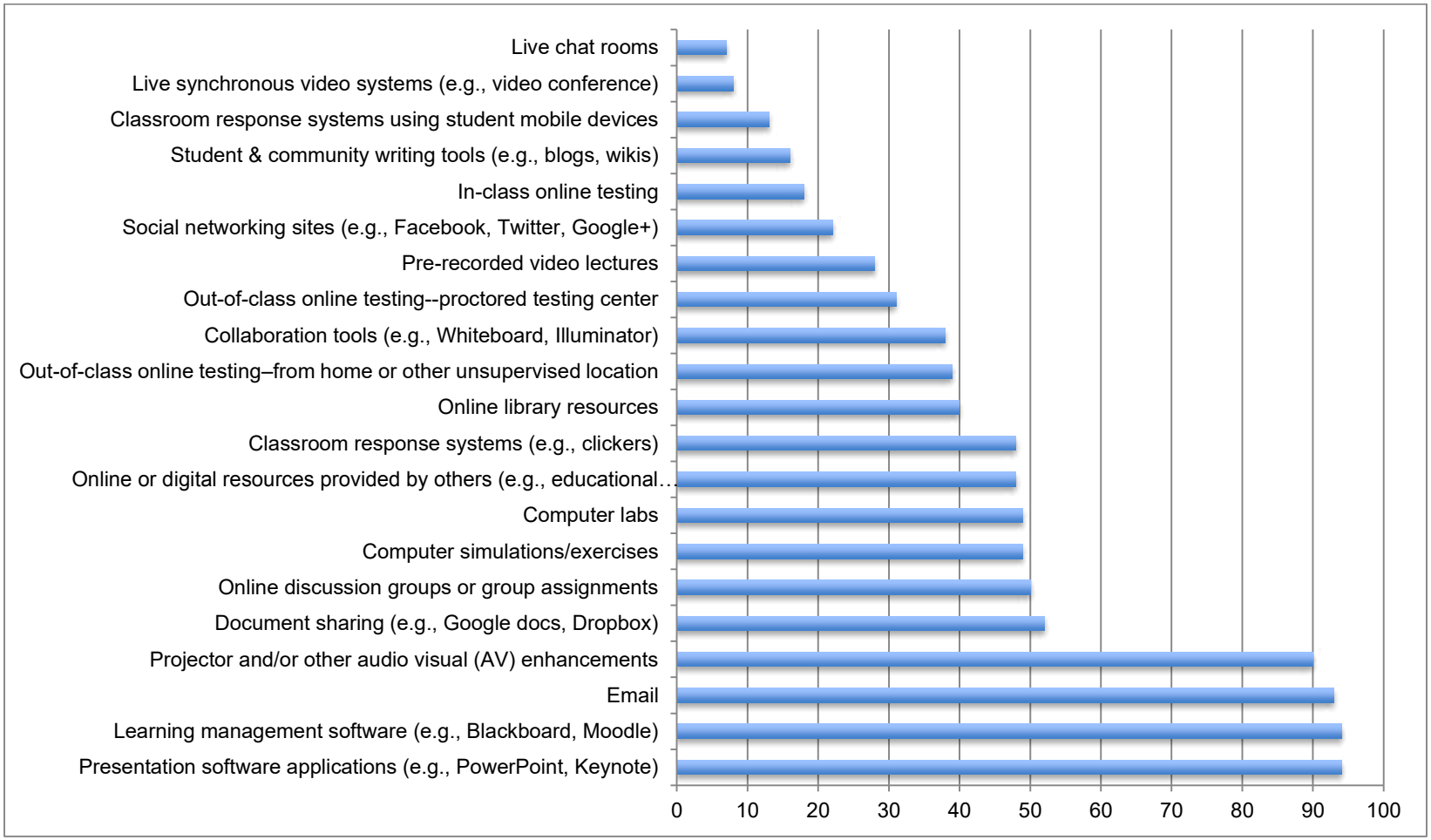


Figure 23: Q6 Student Reported Educational Technologies Used In Their Courses (Percent)

Table 73: Q7 Frequency of Student Access of Pre-recorded Lectures (Percent)

Once a Day	Once a Week	Only to Review for an Exam
10	40	50

Q8 Open-ended Response to: Please list any other technologies (tools) you would like to use to support your learning. n=1628

- Recorded lectures of face-to-face classes available online
- Equipment including laptops, iPads, electronic tablets
- More universal use of Blackboard by all faculty
- More interactive technologies, including clickers, whiteboards, and social interaction learning opportunities (e.g. Google+ integration)
- Greater integration of mobile devices

Table 74: Q9 Frequency of Student's Courses Using a Learning Management System (Percent)

Never	Rarely	Sometimes	Often	Always
1	2	6	20	71

Table 75: Q10 Student Reported Use of Simultaneous Multiple Learning Management Systems (Percent)

Never	Rarely	Sometimes	Often	Always
13	18	16	22	31

Table 76: Q11 Student Use of a Learning Management System (Percent)

To check your grades	97
To submit an assignment	91
To upload documents (e.g., class materials, syllabus, class notes)	89
Online quizzes or tests	82
For class discussion	52
For group collaboration	50

Table 77: Q64 Frequency of Student Log In to LMS (Percent)

Monthly or less	Weekly	A Few Times per Week	Daily	Multiple Times per Day
1	6	18	30	45

Q12 Open-ended Response to: What other features do you wish were available in an LMS, if any?

n=2046

The general themes emerging from this prompt include LMS features offering more sophistication in the grade book and calendar functionality.

Notable themes include:

- Suggestions for user interface improvement
- Suggestions for a variety of functionality improvements
- Suggestion to improve the calendar to aggregate all classes, due dates, with an alert system
- Suggestions to improve the grading feature (cumulative grades, a dashboard of all course grades, weighted grades)
- Learning analytics including progress tracking
- Students are weary of the lack of interface standardization including the use of different templates in Blackboard for each course. Students are experiencing an interface way-finding fatigue.

Table 78: Q13 Student Reported Faculty Frequency
Allowing Use of Mobile Devices in the Classroom (Percent)

Never	Rarely	Sometimes	Often	Always
8	22	31	26	13

Table 79: Q14 Student Reported Faculty Use of Smart Classrooms
(Classroom with Projector and/or Other AV Enhancements (Percent)

Never	Rarely	Sometimes	Often	Always
5	5	15	35	40

Table 80: Q15 Student Response to:
When you take a course in a smart classroom (e.g., classroom with a projector, other AV enhancements) compared to a classroom without technology, how would you rate your learning experience? (Percent)

Much Worse	Somewhat Worse	About the Same	Somewhat Better	Much Better
1	6	27	40	26

Q16 Smart Classroom example, *n*=2693

Most students ignored the prompt's request for an example and rather gave the reason Smart Classrooms help them learn.

The reasons most cited were:

- The ability to follow the organization of the lecture
- The ability to see illustrations, photographs, animations, and videos to supplement the lecture
- The ease of being able to take notes
- The ability for the instructor to display examples of exercises efficiently
- Speeds communication of professor due to not needing to write on a board
- Often the PowerPoint is shared by the instructor, allowing the student more thinking time instead of transcribing notes

Section 2: Online and Blended Learning

Results to answer the research question: What are the attitudes and practices toward online and blended learning?
Online and Blended Learning

Table 81: Q18 & Q25 Student Experience Taking at Least One Online or Blended Course (Percent)

Experience taking at least one online course	65
Experience taking at least one blended course	38

Q23 Open-ended response to: Why wouldn't you consider taking an online course?
n=297 and Q28 Open-ended response to: Why wouldn't you consider taking a blended course?
n= 305

There were 3272 students (65 percent) who responded that they have experience taking at least one online course, while 1908 students (38 percent) have taken at least one blended course. Of the respondents who have no experience taking an online or blended course, 21 percent would not consider taking an online course in the future and 13 percent would not consider taking a blended course in the future.

The reasons given for not considering online or blended modalities were similar.

- A preference for a face-to-face modality

- A lack of interest in the modality
- Meta-cognitive awareness that face-to-face classes are required for self-motivation
- A desire for peer and instructor collaboration and discussion

Table 82: Q19 & Q20 Student Experience Taking At Least One Online or Blended Course (Percent)

Number of Courses	0	1	2-5	> 5
Number of online courses completed per student	5	40	49	6
Number of online courses dropped per student	87	11	2	0

Table 83: Q21 & Q26 Student Satisfaction in Taking Online and Blended Courses (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Satisfied and very Satisfied taking at least one online course	5	14	21	50	10
Satisfied and very satisfied taking at least one blended course	2	8	22	57	11

Table 84: Q22 & Q27 Students Without Previous Experience Taking an Online or Blended Course Who Would Consider Taking an Online or Blended Course in the Future (Percent)

Students with no previous experience willing to consider taking an online course in the future	79
Students with no previous experience willing to consider taking an blended course in the future	87

Table 85: Q24 & Q29 Student Agreement that Online or Blended Learning Can Achieve Outcomes Equivalent to Face-to-Face Courses (Percent)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Online courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	12	31	26	23	8
Blended courses can achieve learning outcomes that are at least equivalent to those of face-to-face courses.	1	9	69	18	3

Table 86: Q57 Student Attitudes Toward the Appropriateness of Online Instruction with The Way They Learn and What They Study (Percent)

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Rate the appropriateness of online instruction with the way you learn.	11	25	32	27	5
Rate the appropriateness of online instruction with what you study (e.g. subjects, content, discipline).	14	26	31	24	5

Table 87: Q32 Reasons Students Would Consider Taking an Online or Blended Course (Percent)

Motivating Factors	Online Course	Blended Course
There is flexibility in the schedule.	78	45
There is an ability to work from home.	79	43
I like or think I would like blended and online courses.	40	44
Students learn as much or more in blended and online classes as compared to face-to-face classes.	25	36
There is more interaction with my instructor in blended and online courses.	13	31
There is better interaction with my instructor in a blended or online class.	13	30
I am more motivated when taking blended or online classes.	18	26
I prefer online interaction with my instructor.	21	22

Figure 24: Q32 Reasons Students Would Consider Taking an Online or Blended Course (Percent)

Table 88: Q33 Student Reasons Not to Take an Online or Blended Course (Percent)

Reason	Online Course	Blended Course
Lack of motivation in an online environment.	61	35
Technical obstacles like browser issues, computer crashes, or poor Internet connection.	42	26
Lack of feedback from instructor.	30	30
Lack of necessary technical skills	28	14
Lack of academic skills for an online environment.	28	15
Lack of computer or Internet connection.	24	15
Time necessary to learn how to use technology	23	14

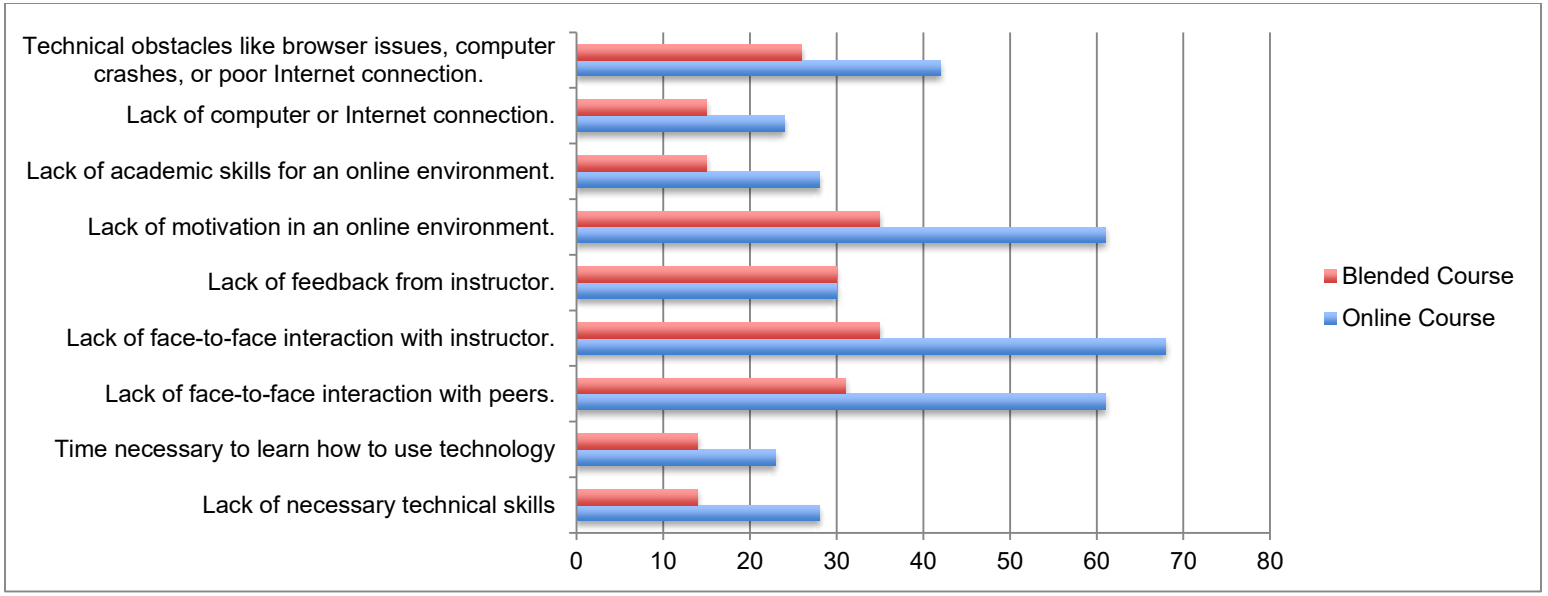


Figure 25: Q33 Student Reasons Not to Take an Online or Blended Course (Percent)

Section 3: Technology Support

Results to answer the research question: What academic technology support services are used? What are the perceptions of the support provided for the application of academic technologies?

Table 89: Q35 Technology Support Sources Used by Students (Percent)

Another student	70
Online resources	57
Instructor/TA	56
ITS help desk (solution Center)	23
College help desk	6

Table 90: Q41 Student Satisfaction With the Following Sources of Technology Support

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Another student	1	1	19	55	24
Online resources	1	2	22	53	22
Instructor/TA	3	5	21	50	21
ITS help desk (Solution Center)	4	6	36	37	17
College help desk	3	5	59	25	8

Table 91: Q42 Student Satisfaction with Support Structures for Online Learning (Percent)

	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Student Satisfaction with Support Structures for Online Learning	1	5	48	41	5

Q43 Emerging Themes by Students Commenting about Their "biggest satisfaction" with Technology at ISU.

Number of Students Responding = 3398

- Blackboard LMS features aggregating information and facilitating assignment management
- Access to computer equipment and software
- Flexibility in time and space of online and blended courses, resources, and access to content
- Smart classrooms
- Recorded lectures
- Content resources
- Internet access and Wi-Fi

Q55 Emerging Themes by Students Commenting about Their "biggest frustration" with Technology at ISU.

Number of Students Responding = 3343

- Slow Internet connection
- Difficulty with online homework including BB crashing, slow Internet connection, and general inefficiency and lack of reliability
- Blackboard system reliability, crashes, slow
- Instructors who are not tech savvy

- Instructors struggling to work with broken equipment or slow Internet connection in class
- Printing services and policies

Q44 Emerging Themes by Students Commenting about What They Would Change about Technology at ISU.
Number of Students Responding = 2656

- Standardization and unification of learning management systems; a wish for the University to settle on one LMS – not simultaneous use of Moodle and BB and professor's personal web site
- Standardization of BB interface for all courses
- Blackboard interface and user experience needs improvement
- Better connectivity; Internet is slow, Blackboard crashes
- Abandon online homework – the connection is too slow
- Train the faculty how to use technology and make better use of tech for learning

APPENDIX D: ISU INSTITUTIONAL REVIEW BOARD DOCUMENTATION

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515 294-4566
FAX 515 294-4267

Date: 11/19/2012

To: Dr. Ann Marie VanDerZanden
106 Horticulture Hall

CC: Steven Freeman
104 I ED II

From: Office for Responsible Research

Title: Center for Excellence in Learning and Teaching Evaluation

IRB ID: 12-521

Study Review Date: 11/19/2012

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where
  - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
  - Any disclosure of the human subjects' responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

- (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified directly or through identifiers linked to the subjects.

The determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**

- **You must carry out the research as described in the IRB application.** Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

  Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

  Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. **Only the IRB or designees may make the determination of exemption**, even if you conduct a study in the future that is exactly like this study.

Please be aware that **approval from other entities may also be needed.** For example, access to data from private records

(e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.**

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.

IRB ID: 12-521

INSTITUTIONAL REVIEW BOARD (IRB)

Exempt Study Review Form

RECEIVED
OCT 17 2012
By IRB

Title of Project: Center for Excellence in Learning and Teaching Evaluation

Principal Investigator (PI): **Ann Marie VanDerZanden**		Degrees: Ph.D.
University ID: 611364754	Phone: 4-5075	Email Address: vanderza@iastate.edu
Correspondence Address: 3024 Morrill Hall		
Department: SVPP		College/Center/Institute: CELT

PI Level: ☒ Tenured, Tenure-Eligible, & NTER Faculty ☐ Adjunct/Affiliate Faculty ☐ Collaborator Faculty ☐ Emeritus Faculty
☐ Visiting Faculty/Scientist ☐ Senior Lecturer/Clinician ☐ Lecturer/Clinician, Ph.D. or DVM ☐ P&S Employee, P37 & above
☐ Extension to Families/Youth Specialist ☐ Field Specialist III ☐ Postdoctoral Associate ☐ Graduate/Undergrad Student ☐ Other (specify:)

FOR STUDENT PROJECTS (*Required when the principal investigator is a student.*)		
Name of Major Professor/Supervising Faculty:		
University ID:	Phone:	Email Address: @iastate.edu
Campus Address:		Department:
Type of Project: (check all that apply) ☐ Thesis/Dissertation		☐ Class Project ☐ Other (specify:)

Alternate Contact Person: Steve Freeman	Email Address: sfreeman@iastate.edu
Correspondence Address: 106 I Ed II	Phone: 4-9541

ASSURANCE

- I certify that the information provided in this application is complete and accurate and consistent with any proposal(s) submitted to external funding agencies. Misrepresentation of the research described in this or any other IRB application may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.
- I agree to provide proper surveillance of this project to ensure that the rights and welfare of the human subjects are protected. I will report any problems to the IRB.
- I agree that modifications to the originally approved project will not take place without prior review and approval by the IRB.
- I agree that the research will not take place without the receipt of permission from any cooperating institutions, when applicable.
- I agree to obtain approval from other appropriate committees as needed for this project, such as the IACUC (if the research includes animals), the IBC (for research involving biohazards), the Radiation Safety Committee (for research involving x-rays or other radiation producing devices or procedures), etc.
- I agree that all activities will be performed in accordance with all applicable federal, state, local, and Iowa State University policies.

AnnMarie VanDerZanden 10/15/12
Signature of Principal Investigator Date

Signature of Major Professor/Supervising Faculty Date
(*Required when the principal investigator is a student.*)

- I have reviewed this application and determined that departmental requirements are met, the investigator(s) has/have adequate resources to conduct the research, and the research design is scientifically sound and has scientific merit.

Daniel K Hahn 10/15/2012
Signature of Department Chair Date

For IRB Use Only	☐ Not Research Per Federal Regulations	☐ No Human Participants	Review Date: November 19, 2012
	☑ Minimal Risk	EXEMPT Per 45 CFR 46.101(b): 2, 4	
IRB Reviewer's Signature	Rob Rapp 11-19-12		

APPENDIX E: UCF INSTITUTIONAL REVIEW BOARD DOCUMENTATION

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

NOT HUMAN RESEARCH DETERMINATION

From : **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To : **Cherie Mazer** and Co-PIs: **Jay R. Hoffman**

Date : **May 08, 2014**

Dear Researcher:

On 5/8/2014 the IRB determined that the following proposed activity is not human research as defined by DHHS regulations at 45 CFR 46 or FDA regulations at 21 CFR 50/56:

Type of Review:	Not Human Research Determination
Project Title:	Learning Ecosystem Assessment and Review of Needs
Investigator:	Cherie Mazer
IRB ID:	SBE-14-10229
Funding Agency:	
Grant Title:	
Research ID:	N/A

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

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

Signature applied by Patria Davis on 05/08/2014 03:28:31 PM EDT

IRB Coordinator

APPENDIX F: PERMISSION TO USE ISU DATA

From: "Twetten, Jim [ITACD]" <jtwetten@iastate.edu>
Subject: Iowa State University - use of data
Date: May 13, 2014 at 3:45:01 PM EDT
To: "Cherie Mazer (cmazer1@gmail.com)" <cmazer1@gmail.com>

Cherie –

I wanted to follow up with you regarding data usage surrounding your dissertation. It was Iowa State's understanding all along that ISU data would be used within the confines of your dissertation work and defense. In the event it has not been expressly stated before, Iowa State University approves and allows the use of our data associated with the LEARN needs assessment in and for your dissertation.

Thank you for all of your work on the effort.

Jim Twetten
Director, Academic Technologies & LEARN co-chair
Information Technology Services
Iowa State University
jtwetten@iastate.edu
515-294-2317

APPENDIX G: PERMISSION TO USE THE BLENDED LEARNING ADOPTION MATRIX FROM DR. CHARLES GRAHAM

Charles Graham
To: Cherie Mazer <cherie@knights.ucf.edu>
Reply-To: charles.graham@byu.edu
Re: Seeking permission to use the BL Adoption Framework Matrix

May 6, 2014 10:48 AM
Hide Details
Inbox - Exchange 2

Cherie:

Of course you can use it. I'm glad that you have found it useful. Best wishes as you work to complete your dissertation!

Charles

On Mon, May 5, 2014 at 12:45 PM, cherie <cherie@knights.ucf.edu> wrote:

> Dr. Graham,
>
> Good day. A few weeks ago, we met virtually on LinkedIn and now I write to seek permission to use your "Matrix representing categories and stages in the BL adoption framework" (Graham, Woodfield, & Harrison, 2012) in my dissertation (see Page 32 in the dissertation).
>
> I have relied frequently on you and your colleague's research in my Lit Review and also use your framework combined with Bolman and Deal's Four Frame model as a sort of checklist of considerations for an institution in the early phases of adoption of BL. My dissertation is an evaluation: the Learning Ecosystem Evaluation Review of Needs (a needs assessment) at Iowa State University. I used your framework, in part, as a basis of my recommendations and as guidance for survey questions.
>
> I have attached Draft 1 of my Dissertation in Practice (Ed.D.) should you like to see how I am using your work. Thank you for your kind consideration.
>
> Cherie Mazer
> cherie@knights.ucf.edu
> Doctoral Candidate 2014
> College of Education and Human Performance

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****
Charles R. Graham
Brigham Young University
Instructional Psychology & Technology
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charles.graham@byu.edu
801-422-4110
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REFERENCES

ACT, Inc. 2012. ACT profile report – State, graduating class 2012. Retrieved from http://www.act.org/newsroom/data/2012/pdf/profile/Iowa.pdf

ACT, Inc. 2013. *The condition of college & career readiness 2013*. http://www.act.org/research/policymakers/cccr13/pdf/CCCR13-NationalReadinessRpt.pdf

ACT, Inc. 2014. Retrieved from http://www.act.org/products/k-12-act-test/

Allen, I. E., & Seaman, J. (2007). Likert scales and data analysis. Retrieved from http://mail.asq.org/quality-progress/2007/07/statistics/likert-scales-and-data-analyses.html

Allen, E.I. & Seaman, J. (2011). *Going the distance: Online education in the United States, 2011.* Babson Survey Research Group, Wellesley, MA.

Allen, I. E., & Seaman, J. (2012). *Conflicted: Faculty and online education*, 2012. Babson Survey Research Group.

Allen, I. E., & Seaman, J. (2012). *Digital faculty: Professors, teaching and technology,* 2012. Babson Survey Research Group.

Allen, I. E., & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States*. Sloan Consortium. PO Box 1238, Newburyport, MA 01950.

Allen, I. E., & Seaman, J. (2014). Grade change: Tracking online education in the United States. Babson Survey Research Group and Ouahog Research Group.

Alliance for Excellent Education, *Saving now and saving later: How high school reform can reduce the nation's wasted remediation dollars*. (2011). Retrieved from http://all4ed.org/wp-content/uploads/2013/06/SavingNowSavingLaterRemediation.pdf.

American Educational Research Association, Publications. (2014). Retrieved from http://www.aera.net/Publications/tabid/10067/Default.aspx

American Evaluation Association, Reading. (2014). Retrieved from http://www.eval.org/p/cm/ld/fid=51

Argyris, C. & Schön, D. A. (1974). Theory in practice: Increasing professional effectiveness. Jossey-Bass.

Attewell, P., Heil, S., & Reisel, L. (2011). Competing explanations of undergraduate non-completion. *American Educational Research Journal*, *48*(3), 536-559.

Baran, E., Correia, A., & Thompson, A. (2011). Transforming online teaching practice: critical analysis of the literature on the roles and competencies of online teachers. *Distance Education*, *32* (3), 421-439.

Bates, A. T., & Sangra, A. (2011). Managing technology in higher education: Strategies for transforming teaching and learning. Jossey-Bass.

Baum, S., Kurose, C., & McPherson, M. (2013). An overview of American higher education. The future of children, 23(1), 17-39.

Baum, S., & Ma, J. (2012). *Trends in college pricing 2012*. Trends in Higher Education Series. College Board Advocacy & Policy Center.

Beaudoin, M. (2013). Institutional leadership. In Moore, M. G. (Ed.). (2013). *Handbook of distance education*. Routledge.

Bolman, L.G. & Deal, T.E. (2008). *Reframing organizations: Artistry, choice, and leadership*. Jossey-Bass, San Francisco, Calif.

Bonk, C. J., & Graham, C. R. (2006). The handbook of blended learning: Global perspectives, local designs. Wiley.com.

Bonner, J. (2013). *Branstad vetoes $7 million in projects at state universities*. Ames Tribune, June 21, 2013. Retrieved from http://amestrib.com/sections/news/ames-and-story-county/branstad-vetoes-7-million-projects-state-universities.html

Bowen, W. G. (2013). *Higher education in the digital age*. Princeton University Press.

Bowen, W. G. (2013). The Potential for online leaning: Promises and pitfalls. *Educause Review Online*, October 7, 2013. Retrieved from http://www.educause.edu/ero/article/potential-online-learning-promises-and-pitfalls.

Bowen, W. G., & Lack, K. A. (2012). Current status of research in online learning in postsecondary education. Ithaka SandR.

Boyce, M. E. (2003). Organizational learning is essential to achieving and sustaining change in higher education. *Innovative Higher Education*, *28*(2), 119-136.

Chalmers, D. (2011). Progress and challenges to the recognition and reward of the scholarship of teaching in higher education. *Higher Education Research & Development*, *30*(1), 25-38.

Cho, S. K., & Berge, Z. L. (2002). Overcoming barriers to distance training and education. *USDLA Journal*, 16(1), 16-34.

The Chronicle of Higher Education (2010). *Tuition over time 1999 – 2010.* Retrieved from http://chronicle.com/article/Interactive-Tool-Tuition-Over/125043/

Clarke, J., & Dede, C. (2009). Design for scalability: A case study of the River City curriculum. *Journal of Science Education and Technology*, *18*(4), 353-365.

Carnegie Project on the Education Doctorate, Design concept definitions. (2014). Retrieved from http://cpedinitiative.org/design-concept-definitions.

Cohen, A. M. (2007). The shaping of American higher education: Emergence and growth of the contemporary system. John Wiley & Sons.

Cook, R. G., Ley, K., Crawford, C., & Warner, A. (2009). Motivators and inhibitors for university faculty in distance and e- learning. *British Journal of Educational Technology*, *40*(1), 149-163.

Cousins, J. B., & Chouinard, J. A. (Eds.). (2012). Participatory evaluation up close: An integration of research-based knowledge. IAP.

Cousins, J. B., & Whitmore, E. (1998). Framing participatory evaluation. New directions for evaluation, 1998(80), 5-23.

Creswell, J. W., Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Dahlstrom, E., Walker, J.D., & Dziuban, C. (2013). *ECAR study of undergraduate students and information technology*. Louisville, CO: EDUCAUSE Center for Analysis and Research, September 2013, available from http://www.educause.edu/ecar

Dillman, D. A. (2011). Mail and Internet surveys: The tailored design method--2007 Update with new Internet, visual, and mixed-mode guide. John Wiley & Sons.

Dziuban, C., Hartman, J., Cavanagh, T. B., & Moskal, P. D. (2011). Blended courses as drivers of institutional transformation. In Kitchenham, A., (Ed.), *Blended learning across disciplines: Models for implementation,* (pp.17-37).

Dziuban, C., Hartman, J., & Moskal, P. (2005). Higher education, blended learning and the generations: Knowledge is power–no more. *Elements of quality online education: Engaging communities. Needham, MA: Sloan Center for Online Education*.

Dziuban, C., Hartman, J., & Moskal, P. (2007). Everything I need to know about blended learning I learned from books. In A. G. Picciano & C. D. Dziuban, (Eds.) *Blended learning research perspectives* (pp. 265– 285). Needham, MA: Sloan-C.

Fisher, Saul, (2001). Teaching and technology: Promising directions for research on online learning and distance education in the selective institutions paper for the For-Profit Higher Education Project, financed by the Sloan Foundation, Curry School of Education, University of Virginia, Charlottesville.

Futch, L., Thompson, K., Truman-Davis, B., & Yonekura, F. (2000). Support for online teaching and learning. *Educause Quarterly.* November, 2, 2000.

Garrison, D.R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education, 7*(2), 95-105. doi:10.1016/j.iheduc.2004.02.001

Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education*, *13*(1), 5-9.

Gerbic, P. (2011). Teaching using a blended approach – what does the literature tell us? *Education Media International*. 48:3, 221-234.

Ginsburg, A. & Ciabocchi, E. (2014). Growing your own blended faculty: A review of current faculty development practices in traditional, not-for-profit higher education institutions. In Picciano, A. G., Dziuban, C. D., & Graham, C. R. (Eds.), (2013). *Blended learning: Research perspectives* (Vol. 2). Routledge.

Graham, C. R., Woodfield, W., & Harrison, J. B. (2012). A framework for institutional adoption and implementation of blended learning in higher education. *The Internet and Higher Education*.

Graham, C. R. (2013). Emerging practice and research in blended learning. *Handbook of distance education*, 333-350.

Halverson, L. R., Graham, C. R., Spring, K. J., & Drysdale, J. S. (2012). An analysis of high impact scholarship and publication trends in blended learning. *Distance Education*, *33*(3), 381-413.

Hargreaves-Mawdsley, W. N. (1978). A history of academical dress in Europe until the end of the eighteenth century. Greenwood Press.

Harvard University, Guide to Academic Garb. (2014). Retrieved from http://www.harvard.edu/guide-to-academic-garb

Hickman, G. R. (2010). Leading organizations: Perspectives for a new era (2nd ed.) (Ed.) Thousand Oaks: Sage Publications

Hinkle, D. E., Wiersma, W., & Jurs, S. G. (2003). Applied statistics for the behavioral sciences.

Hitt, J. & Hartmann, J. (201). Two views of alignment. *Educause*, March/April 2010. 8 -9.

Howell, S. L., Saba, F., Lindsay, N. K., & Williams, P. B. (2004). Seven strategies for enabling faculty success in distance education. *The Internet and Higher Education*, *7*(1), 33-49.

Inside Iowa State. (2011). Retrieved from http://archive.inside.iastate.edu/2011/0324/tuition.php, http://thegazette.com/2011/12/08/regents-approve-3-75-percent-tuition-hike-for-state-universities/

Inside Iowa State. (2013). Retrieved from http://www.inside.iastate.edu/article/2013/12/05/regents

Institute of Education Sciences. National Center of Education Statistics. (2011). *Digest of Education Statistics: 2011*. Retrieved from http://nces.ed.gov/programs/digest/d11/

Integrated Postsecondary Education System. (2013). Retrieved from http://nces.ed.gov/ipeds/

Iowa State Regents Annual Report (2013). Retrieved from http://www.regents.iowa.gov/annualreport/2013/annualreport2013.pdf.

Iowa State University, Academic Technologies. (2014). http://www.it.iastate.edu/services/academic

Iowa State University, eLearning. (2014). http://www.celt.iastate.edu/elearning/

Iowa State University, History of Iowa State. (2014). Retrieved from http://www.inside.iastate.edu/article/2014/02/13/transform

Iowa State University, Sesquicentennial celebration (2014). Retrieved from http://www.public.iastate.edu/~isu150/president.shtml

Iowa State University, Inside Iowa State. (2014). Retrieved from http://www.inside.iastate.edu/article/2014/02/13/transform

Iowa State University, Learning Ecosystem Assessment and Review of Needs, (2012). Retrieved from http://learn.provost.iastate.edu

Iowa State University, The Office of the President. (2014). Retrieved from http://www.president.iastate.edu/about/11/announcement.php

Iowa State University, The Office of the Registrar. (2014). Retrieved from http://www.registrar.iastate.edu/enrollment

Iowa State University, President's Council. (2011). Retrieved from http://www.ir.iastate.edu/PDFfiles/PCR/1111.pdf.

Iowa Regents Annual Report, 2013. Retrieved from Source: http://www.regents.iowa.gov/annualreport/2013/annualreport2013.pdf

Joint Committee on Standards of Educational Evaluation, Program Evaluation Standards. (2014). http://www.jcsee.org/program-evaluation-standards-statements

Joosten, T. M., Barth, D., Harness, L., & Weber, N. L. (2013). The impact of instructional development and training for blended teaching on course effectiveness. *Blended Learning: Research Perspectives*, *2*, 173 [Kindle Version 1.10.6.

KCRG-TV9, Iowa Regents say any savings from spending will be re-invested. (2014). Retrieved from http://www.kcrg.com/home/top-9/Iowa-Regents-Say-Any-Savings-From-Spending-Review-Will-Be-Reinvested-246004021.html.

Kotter, J. (1995). Leading change: Why transformation efforts fail. Harvard Business Review. Mar-Apr, 59-67.Mintzberg, Henry, The Structuring of Organizations: A Synthesis of the Research (1979). University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship. Available at SSRN: http://ssrn.com/abstract=1496182

Moskal, P., Dziuban, C., & Hartman, J. (2013). Blended learning: A dangerous idea?. *The Internet and Higher Education*, *18*, 15-23.

National Center for Education Statistics. Digest of Education Statistics: 2012. Retrieved from http://nces.ed.gov/programs/digest/d12/

Niemiec, M., & Otte, G. (2009). An administrator's guide to the whys and hows of blended learning. *Journal of Asynchronous Learning Networks*, *13*(1), 19-30.

Norberg, A., Dziuban, C. D., & Moskal, P. D. (2011). A time-based blended learning model. *On the Horizon*, *19*(3), 207-216.

Obradovich, K. (2013, June 23). http://www.desmoinesregister.com/article/20130625/OPINION01/306250068/Obradovich-U-Phoenix-reference-torpedoes-veto-argument

Ocak, M. A. (2011). Why are faculty members not teaching blended courses? Insights from faculty members. *Computers & Education*, *56(3),* 689-699. Elsevier Ltd. doi:10.1016/j.compedu.2010.10.011.

Oh. E. & Park, S. (2009). How are universities involved in blended education? *Online Educational Technology and Society. 12 (3),* 327-332.

Oliver, M., & Trigwell, K. (2005). Can blended learning be redeemed. *E-learning*, *2*(1), 17-26.

Orton, J. D., & Weick, K. E. (1990). Loosely coupled systems: A reconceptualization. *Academy of management review*, *15*(2), 203-223.

Picciano, A. G., Dziuban, C. D., & Graham, C. R. (Eds.). (2013). *Blended learning: Research perspectives* (Vol. 2). Routledge.

Porter, W. W., Graham, C. R., Spring, K. A., & Welch, K. R. (2014). Blended learning in higher education: Institutional adoption and implementation. *Computers & Education*.

Pugilese, L. (2012). A post LMS world. *Educause Review,* January/February 2012.

Radford, A. W., Berkner, L., Wheeless, S. C., & Shepherd, B. (2010). Persistence and Attainment of 2003-04 Beginning Postsecondary Students: After 6 Years. First Look. NCES 2011-151. *National Center for Education Statistics*.

Rockwell, S.K., Schnauer, J., Fritz, S., and Marx, D. (1999). Incentives and obstacles influencing higher education faculty and administrators to teach via distance. *Online Journal of Distance Learning Administration*, Volume II, Number IIII, Winter1999

Rogers, E. M. (2003). *Diffusion of innovations.* Free Press. New York, NY.

Sahin, I. (2006). Detailed Review of Rogers' Diffusion of Innovations Theory and Educational Technology-Related Studies Based on Rogers' Theory. *Online Submission*, *5*.

Schön, D. A. (1983). The reflective practitioner: How professionals think in action (Vol. 5126). Basic books.

Selingo, J. J. (2013). College (un) bound: The Future of Higher Education and what it Means for Students. Houghton Mifflin Harcourt.

Senge, P. M. (1997). The fifth discipline. Measuring Business Excellence, 1(3), 46-51.

Shea, P. (2007). Bridges and barriers to teaching online college courses: A study of experienced online faculty in thirty-six colleges. *Journal of Asynchronous Learning Networks*, *11*(2), 73-128.

The Sloan Consortium. (2014). The 5 pillars. Retrieved from http://sloanconsortium.org/5pillars.

The Sloan Consortium. (2014). Sloan-C Quality Scorecard for the Administration of Online Education Programs. Retrieved from http://sloanconsortium.org/QS_Review%20.

Sloan Consortium Commons, Alphabetic listing of definitions about online learning from JALN. (2014) Retrieved from http://commons.sloanconsortium.org/document/glossary-alphabetic-listing-definitions-about-online-learning-jaln.

Snyder, T.D., & Dillow, S.A. (2013). Digest of Education Statistics 2012 (NCES 2014-015). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Sparks, D., & Malkus, N. (2013). First-Year Undergraduate Remedial Coursetaking: 1999-2000, 2003-04, 2007-08. Statistics in Brief. NCES 2013-013. *National Center for Education Statistics*.

Staley, D. J., & Trinkle, D. A. (2011). The changing landscape of higher education. *Educause Review*, *46*(1), 16-33.

State Higher Education Officers (SHEEO), State of Higher Education Finance FY 2012. (2012). Retrieved from http://www.sheeo.org/sites/default/files/publications/SHEF%20FY%2012-20130322rev.pdf.

Strewn, J. (2012). Iowa State News. http://news.engineering.iastate.edu/2012/05/09/wickert-named-senior-vice-president-and-provost-at-iowa-state/).

Stufflebeam, D. L. (2004). The 21st century CIPP model. *Evaluation roots*, 245-266.

Stufflebeam, D. L. (2004). *Evaluation design checklist*. Retrieved from http://www.wmich.edu/evalctr/wp-content/uploads/2010/05/plans_operations1.pdf.

Surowiecki, J. (2005). *The wisdom of crowds*. Random House LLC.

Torres, R. T., & Preskill, H. (2001). Evaluation and organizational learning: Past, present, and future. *The American Journal of Evaluation*, *22*(3), 387-395.

Watson, J. (2008). Blending learning: The convergence of online and face-to-face education. *Promising Practices in Online Learning, North American Council for Online Learning*.

The White House, Higher Education. (2014). Retrieved from http://www.whitehouse.gov/sites/default/files/completion_state_by_state.pdf.

Worthen, B. R., Sanders, J. R., & Fitzpatrick, J. L. (1997). *Program evaluation*. Longman.

University of Central Florida, Blended Learning Toolkit, 2014. Retrieved from https://blended.online.ucf.edu/about/what-is-blended-learning/.

Watkins, R., Kaufman, R., & Odunlami, B. (2013). Strategic planning and needs assessment in distance education. *Handbook of Distance Education*, 452.

Wickert, J. (2013). Iowa State University Strategic Plan. Retrieved from http://www.regents.iowa.gov/annualreport/index.html

Wickert, J. (2013). Meeting notes of 8/17/13.

Worthen, B. R., Sanders, J. R., & Fitzpatrick, J. L. (2011). *Program evaluation, 4th ed.* Longman.

Zumeta, W. (2013). Higher Education Enters a New Era. *The NEA Almanac of Higher Education*.